

REPORT OF THE SECRETARY
OF THE SMITHSONIAN
INSTITUTION

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FOR THE YEAR ENDING JUNE 30

1921



(Publication 2659)

WASHINGTON
GOVERNMENT PRINTING OFFICE
1921

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REPORT OF THE
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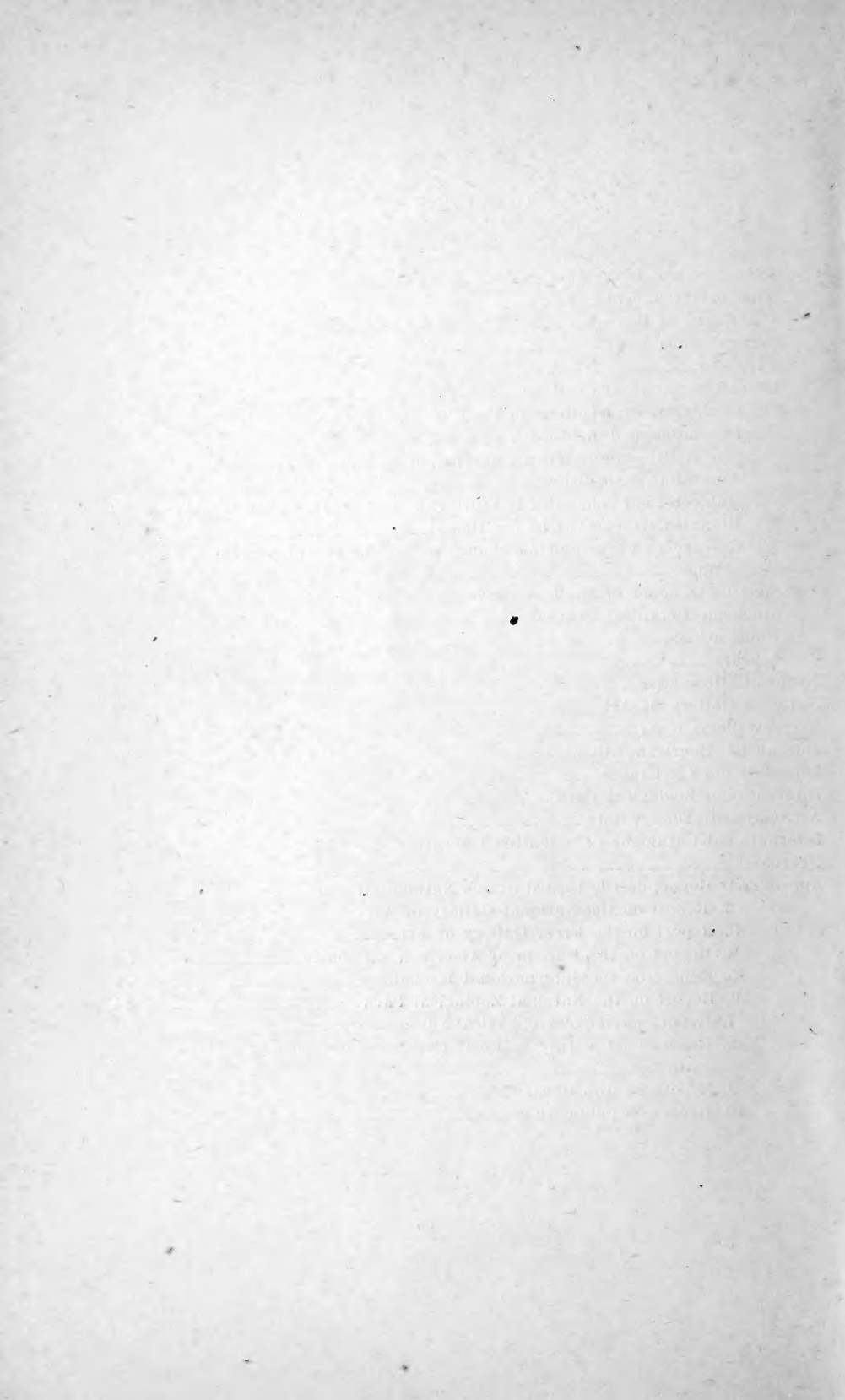
ADMINISTRATION

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REPORT
OF THE
SECRETARY OF THE SMITHSONIAN INSTITUTION,

CHARLES D. WALCOTT,

FOR THE YEAR ENDING JUNE 30, 1921.

To the Board of Regents of the Smithsonian Institution.

GENTLEMEN: I have the honor to submit herewith the annual report on the activities and condition of the Smithsonian Institution and its branches during the year ending June 30, 1921. The affairs of the Institution proper are reviewed on the first 18 pages of this report, while more detailed accounts of the year's work of the various branches of the institution are given in the appendices hereto. These include reports on the United States National Museum, the Bureau of American Ethnology, the International Exchange Service, the National Zoological Park, the Astrophysical Observatory, the Smithsonian Library, the United States Regional Bureau of the International Catalogue of Scientific Literature, the National Gallery of Art, the Freer Gallery of Art, 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 on either 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, it becomes my sad duty to record the death on May 19, 1921, of its chancellor, Edward Douglass White, Chief Justice of the United States. Resolutions in memory of Chancellor White were adopted by the Regents at a special meeting held May 27, 1921, when the Hon. Calvin Coolidge, Vice President of the United States, was elected chancellor of the Institution.

The only other change in the personnel of the board was the appointment of the Hon. A. Owsley Stanley, Senator from Kentucky, as a Regent on January 5, 1921, to succeed Senator Charles S. Thomas. The roll of Regents at the close of the fiscal year was as follows: Calvin Coolidge, Vice President of the United States, chancellor; 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; John A. Elston, Member of the House of Representatives; Alexander Graham Bell, citizen of Washington, D. C.; George Gray, citizen of Delaware; Charles F. Choate, jr., citizen of Massachusetts; John B. Henderson, citizen of Washington, D. C.; Henry White, citizen of Maryland; and Robert S. Brookings, citizen of Missouri.

The board held its annual meeting on December 9, 1920. 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 statement 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.

The act establishing the Smithsonian Institution in 1846 included in its functions the promotion of art as well as science. Heretofore

this phase of the Institution's activities has remained somewhat in abeyance owing to the lack of means to further it, but within the last few years a tremendous impetus has been given the art feature. At the beginning of the past fiscal year, the National Gallery of Art, formerly administered as a part of the National Museum, became a separate unit under the Smithsonian Institution, and Congress provided a small appropriation for its maintenance. This important step will do much toward the development of Washington as an art center, and will undoubtedly bring much desirable material to the national collections, already valued in money at several million dollars. The Freer Gallery of Art, a unit of the National Gallery, was brought practically to completion during the year, and work is going forward on the installation of the Freer collection. This beautiful building and the unexcelled collection of American and oriental art which it contains are, as noted in previous reports, the gift to the Nation, through the Smithsonian Institution, of the late Mr. Charles L. Freer, of Detroit.

It is an unpleasant duty to here record again the pressing need of the Institution for a larger endowment. Although several generous contributions have been received since the founding of the Institution, few material additions to its endowed funds have ever been made. Despite the greatly enlarged field of its scientific activities, despite the ever-increasing demands for scientific information from individuals throughout the country, its income has remained substantially the same. Almost daily the Institution is forced to forego opportunities for valuable explorations and scientific researches on account of lack of means, and it is hoped that some far-sighted benefactor, recognizing the advantageous position and unexcelled facilities of the Smithsonian Institution for carrying on valuable researches in every branch of science, will provide an endowment sufficient to enable it to carry on this work in the "increase and diffusion of knowledge among men."

Bequests.—As noted in a previous report, an important bequest was made to the Institution under the terms of the will of Mrs. Virginia Purdy Bacon, of New York, probated April 14, 1919, which will do much toward extending our knowledge of the fauna of the world.

That portion of Mrs. Bacon's will relating to the Institution reads as follows:

(f) To Smithsonian Institute the sum of fifty thousand dollars (\$50,000), to be used in establishing a traveling scholarship, to be called the Walter Rathbone Bacon scholarship for the study of the fauna of countries other than the United States of America; the incumbents to be designated by said Institute under such regulations as it may from time to time prescribe and to hold such scholarship not less than two years, and while holding such scholarship to conduct for said

Institute investigations in the fauna of other countries under the direction of said Institute.

During the year the Institution received from the executors of Mrs. Bacon's estate securities amounting to \$45,000 on account of the total \$50,000. At the close of the year sufficient income from this amount had not been received to enable the first scholarship to be established, but it is planned to inaugurate the project during the coming year.

Miss Caroline Henry, daughter of Joseph Henry, first secretary of the Institution, died November 10, 1920. Under the terms of her will the Institution is named as the ultimate beneficiary, the entire estate reverting to it after the death of the last life beneficiary, as a memorial to her father and mother. Miss Henry also bequeathed to the Institution the sum of \$1,000 and certain articles of furniture; to the National Museum a set of china presented to Joseph Henry by the first Japanese minister; and to the National Gallery of Art an oil portrait by Kneller.

FINANCES.

The investments of the Institution are as follows:

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

CONSOLIDATED FUND.

These securities are carried at cost and represent the investments made by the Institution, or gifts transferred to the Institution by the donors. The total of this fund now amounts to \$157,562.05, namely:

Province of Manitoba 5 per cent gold debentures, due in 1922.....	\$2,000
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 Railroad Co. 4 per cent general mortgage bonds, due in 1995, gift.....	2,000
Chesapeake & Ohio Railroad Co. 5 per cent first consolidated mortgage 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
Liggitt & Myers Tobacco Co. 7 per cent gold bonds, due in 1944, gift.....	6,000
City of Youngstown, Ohio, 6 per cent municipal bonds, due in 1928.....	3,000
Brooklyn Rapid Transit Co. 5 per cent secured gold notes, due in 1918.....	3,500
Northern Pacific—Great Northern joint convertible 6½ per cent gold bonds, due in 1936.....	41,500
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 Victory loan.....	6,550
United States war-savings stamps, series of 1918.....	100
Atchison, Topeka & Santa Fe Railroad Co. 5 per cent preferred stock, gift.....	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

The \$3,500 par value of the 5 per cent gold notes of the Brooklyn Rapid Transit Co. are held in the hands of receivers pending re-organization. No plan, however, has yet been adopted.

The sum invested for each specific fund and the manner in which held is described as follows:

Fund.	United States Treasury.	Consolidated fund.	Total.
Smithson fund.....	\$727,640.00	\$1,468.74	\$729,108.74
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	156.00	746.00
Avery fund.....	14,000.00	18,439.80	32,439.80
Addison T. Reid fund.....	11,000.00	2,860.00	13,860.00
Lucy T. and George W. Poore fund.....	26,670.00	6,660.00	33,330.00
George K. Sanford fund.....	1,100.00	294.00	1,394.00
Chamberlain fund.....		35,000.00	35,000.00
Bruce Hughes fund.....		8,741.93	8,741.93
Lucy H. Baird fund.....		1,166.58	1,166.58
Virginia Purdy Bacon fund.....		45,000.00	45,000.00
Hamilton fund.....	2,500.00	500.00	3,000.00
Total.....	1,000,000.00	157,562.05	1,157,562.05

To Mr. B. H. Swales, honorary custodian, section of birds' eggs, the Institution is indebted for an additional gift of \$100 for the purchase of specimens, making a total contribution of \$700 since January, 1919.

Some of the unimproved land near Lowell, Mass., has been sold, and the sum of \$226.42 was realized therefrom and invested for account of the Lucy T. and George W. Poore fund.

Dr. William L. Abbott has contributed \$2,000 during the year to the maintenance of a field party, the purpose of which is to procure archeological and natural history specimens in Australia. This expedition followed those to Borneo and Celebes and has now continued for two and a half years.

The Institution has received for specific activities further valuable contributions from Mr. John A. Roebling, amounting to \$15,200.

In partial settlement of the Charles L. Freer bequest the Institution received, in October, 1920, 3,919 shares of the stock of Parke,

Davis & Co. (Inc.), and in March, 1921, 10,000 shares, making a total of 13,919 shares. The dividends are required to be expended in accordance with the terms prescribed by the testator. The total amount received by the Institution from this source since the transfer of these shares was \$25,970.75, and the sum of \$15,026.01 has been expended.

Current funds not immediately required for expenditure are, when conditions will permit, deposited on time in local trust companies and draw 3 per cent per annum. The interest received in this manner during the fiscal year 1921 amounted to \$1,066.67.

The income during the year consisted of interest on permanent investments and other revenues for current expenses, \$61,576.32; receipts from bequests and for specific purposes, \$110,740.47; which, with cash subject to check on July 1, 1920, amounting to \$13,304.34, constituted a total of \$185,621.13.

The disbursements described in the annual report of the executive committee were classed as follows: General objects of the Institution, \$66,202.39; investments and expenditures for specific purposes, \$93,816.33; temporary advances for field expenses, etc., \$9,373.07; leaving \$5,000 deposited on time and \$11,229.34 subject to check.

The Institution was charged by Congress with the disbursement of the following appropriations for the year ending June 30, 1921:

International Exchanges.....	\$50,000
American Ethnology	44,000
International Catalogue of Scientific Literature.....	7,500
Astrophysical Observatory	13,000
National Museum:	
Furniture and fixtures.....	20,000
Heating and lighting.....	74,000
Preservation of collections.....	312,620
Building repairs	10,000
Books	2,000
Postage	500
National Gallery of Art.....	15,000
National Zoological Park:	
Maintenance	125,000
Purchase of additional land.....	80,000
 Total.....	 753,620

In addition to the above, there was appropriated for printing and binding \$123,123.69 to cover the cost of printing and binding the Smithsonian annual report and reports and miscellaneous printing for the Government branches of the Institution. This includes the usual annual appropriation for printing and binding and the additional amount appropriated by Congress for printing delayed by war work.

RESEARCHES AND EXPLORATIONS.

An important phase of the Institution's work in the "increase and diffusion of knowledge among men" is the scientific exploration of little-known parts of the earth, as well as the extending of existing knowledge concerning better-known regions through field-work. Although the Institution's funds for this purpose are extremely limited, it is often able to cooperate advantageously with other establishments in putting expeditions in the field. The results of these numerous explorations in every quarter of the globe have not only advanced scientific knowledge, but have greatly enriched the collections in the United States National Museum in biology, geology, and anthropology.

A number of the expeditions sent out during the past year are described in the appendices to this report, and others are here reviewed briefly to indicate the character of the Institution's work in this direction.

GEOLOGICAL EXPLORATIONS IN THE CANADIAN ROCKIES.

Your secretary continued his geological field-work in the Canadian Rockies with two main objects in view, (1) the determination of the character and extent of the great interval of nondeposition of sedimentary rock-forming material along the Front Range of the Rocky Mountains west of Calgary, Alberta; (2) the clearing up of the relations of the summit and base of the great Glacier Lake section of 1919 to the geological formation above and below. Work was begun early in July along the Ghost River northeast of Banff, Alberta.

The solution of the two problems attacked may be briefly described as follows:

The Rocky Mountain front is formed of masses of evenly bedded limestone that have been pushed eastward over the softer rocks of the Cretaceous plains-forming rocks. This overthrust is many miles in extent and occurred long before the Devils Gap, Ghost River Gap, and other openings were cut through the cliffs by running water and rivers of ice. Great headlands and high buttes have been formed by the silent forces of water and frost, many of which stand out against the western sky as seen from the distant foothills and plains.

It was among these cliffs that we found that the first great cliff was of lower Middle Cambrian age, and that resting on its upper surface there were 285 feet (86 meters) of a yellowish weathering magnesian limestone, named the Ghost River formation, which represents the great interval between the Cambrian below and the Devonian above. Sixty miles to the west, over 4 miles in thickness

of limestone, shales and sandstones occur in the break in sedimentation of Ghost River cliffs.

Returning to Bow Valley, the party left the Canadian Pacific Railroad at Lake Louise and went north over Pipestone Pass to the Siffleur River, which is tributary to the Saskatchewan. In the northward facing cliffs, 25 miles (40 kilometers) east of the Glacier Lake section of 1919, and 40 miles (64 kilometers) north of Lake Louise, a geological section was studied that tied in the base of the Glacier Lake section of 1919 with the Middle and Lower Cambrian formations. Returning up the canyon valley of the Siffleur River to the wide upper valley of the Clearwater River, a most perfectly exposed series of limestones, shales, and sandstones of Upper Cambrian and later formations was found, which cleared up the relations of the upper portion of the Glacier Lake section to the Ordovician above.

The work was considerably handicapped by forest fires in July and August and by unusually stormy weather in September.

PALEONTOLOGICAL FIELD-WORK.

Dr. R. S. Bassler, curator of paleontology, National Museum, succeeded during the year in securing for the Museum's collections two much-desired specimens, one a large well-preserved fossil elephant skull formerly exhibited in Cincinnati, the other a highly fossiliferous limestone slab of Silurian age quarried out by him near Oxford, Ohio. Such a slab has long been desired to show the advancement in life from the primitive Cambrian forms, represented in the large Cambrian sea-beach sandstone exhibit, to the higher and more complex species of succeeding geological periods. Notwithstanding the numerous occurrences of fossiliferous limestone of Ordovician and Silurian age, it was not until the past year that a layer affording slabs of suitable size and sufficient perfection of preservation was brought to the attention of the Museum. Numerous large blocks of stone had to be removed before the real task of quarrying the desired slab was begun. The work was successfully accomplished with the generous assistance of Dr. W. H. Shideler, professor of geology at Miami University, Oxford, Ohio, who first located the specimen, and before the close of the year this valuable educational exhibit was installed in the hall of invertebrate paleontology.

At the conclusion of this work Dr. Bassler proceeded to Chicago for the purpose of securing casts of type specimens of fossils in the collections of the Walker Museum, University of Chicago. Regarding this work, Dr. Bassler says:

The paleontological collection of the National Museum, which includes the celebrated Walcott, Ulrich, Springer, Harris, Nettelroth, and Rominger collections, is especially rich in type specimens of early Paleozoic fossils, but nevertheless the Walker Museum possesses many unique types not represented

at all in Washington. Permission to prepare casts of these and thus advance our study series toward the completeness which the National collections should attain was generously granted by Dr. Stuart Weller, director of the Walker Museum. In two weeks' time I was enabled to finish casting all of the Ordovician and Silurian types, leaving the remaining Paleozoic species for a future trip. The work was done quickly by using the modeling compound (plastocene) to make the mold from which the cast is prepared.

THE SMITHSONIAN AFRICAN EXPEDITION.

The Smithsonian African expedition, in conjunction with the Universal Film Manufacturing Co., which was described in my last report, concluded its work shortly after the beginning of the fiscal year, and somewhat later the collections made by Mr. H. C. Raven, the Institution's representative on the expedition, were received by the National Museum. Among the more important material may be mentioned 697 mammals (including 272 specimens from South Africa, a region hitherto very imperfectly represented in the Museum's collections; 152 from Lake Tanganyika; and the chimpanzee of Uganda), 575 birds, 206 reptiles, and 193 fishes. Although not numerically large, these collections are of unusual interest on account of the manner in which they supplement those obtained by other expeditions to Africa in which the Smithsonian Institution has been interested.

Dr. H. L. Shantz, of the United States Department of Agriculture, also accompanied the expedition with the objects in view of securing live plants of agricultural value for introduction into the United States, of studying the agricultural methods of both natives and Europeans, and of collecting plants for the National Herbarium of the United States National Museum. Over 1,000 botanical specimens were secured for the Museum, and first-hand observations were made of the methods of agriculture pursued by African tribes as well as the Europeans. About 1,600 plants were collected for growth as agricultural plants in this country, the more important being forage plants, nut plants, fruits, and vegetables.

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 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. During the year two shipments were received from Mr. Hoy containing a total of 440 mammals well prepared, several of which were hitherto unrepresented in the collec-

tion, together with series of skeletal and embryological material; 570 bird skins, with 24 additional examples in alcohol, and smaller collections of reptiles, amphibians, insects, marine specimens, etc.

MALACOLOGICAL FIELD-WORK IN CALIFORNIA AND THE HAWAIIAN ISLANDS.

On the way to the First Pan-Pacific Scientific Congress, held in Honolulu, August 2 to 20, 1920, Dr. Paul Bartsch, curator of mollusks, United States National Museum, spent one day on shipworm investigation at Mare Island, Calif. A tug was placed at his disposal by the commandant of the station in order to make every minute of the brief visit count, and the investigation resulted in the discovery that the mollusk which caused damage to the extent of some \$25,000,000 last year is a new species of *Teredo*, which Dr. Bartsch named *Teredo beachi*, in honor of the commandant of Mare Island.

In the Hawaiian Islands, collections of mollusks were made at several localities, and dredgings were made in Pearl Harbor, where the commandant placed a dredge at the disposal of Dr. Bartsch and Mr. John B. Henderson. Here also a new species of shipworm was discovered, which was named *Teredo parksii* in honor of Admiral Parks.

An interesting observation made at the southeast point of Hanouma Bay was the finding of an existing marine flora and fauna at a considerable elevation above the level of the sea. Regarding this occurrence, Dr. Bartsch says:

This flora and fauna consist of algae, quite a number of species of mollusks, crustaceans, echinoderms, and other marine organisms, which occupy pools and puddles kept ever moist and supplied with fresh water by the spray from the breaking surf, which incessantly pounds that shore. I consider this an important observation, since the occurrence of fossiliferous laminae bearing marine organisms between sheets of lava has been held to indicate that they were deposited at or below sea level, and their occurrence above this has been held as evidence of elevation. We have here an instance which indicates that this is not necessarily the case, for such a lamina would be produced if a new outpouring of lava were to cover up the place mentioned.

BOTANICAL RESEARCHES IN THE ORIENT.

Dr. A. S. Hitchcock, custodian, section of grasses, United States National Museum, left Washington the last of April for several months' botanical work in the Orient under the auspices of the United States Department of Agriculture. This journey was undertaken with two main objects in view: (1) To study the grasses of the Philippine Islands in response to a request from the director of the Philippine Bureau of Science (Dr. E. D. Merrill) to prepare the manuscript on the grasses for a flora of the Philippine Islands; (2) to study the native and cultivated bamboos of the Philippines.

Japan, and China with special reference (1) to their introduction into the United States and (2) to the publication of a revision of the economic bamboos of the world.

Dr. Hitchcock arrived in Manila June 9 and spent 19 days in the islands, mostly in Luzon. He visited Los Baños and from there ascended to the summit of Makiling, 3,300 feet, through virgin forest. He also ascended Baguio, 5,000 feet, and Santo Thomas, 8,000 feet.

At the close of the year he was en route to Japan by way of Hongkong. In Japan he intends to visit Hokone and to ascend Mount Fuji and other mountains, studying and collecting bamboos. From there he will proceed to China, and, if time permits; to Java, returning to Washington the latter part of December.

RESEARCHES ON A MULTIPLE-CHARGE ROCKET FOR REACHING GREAT ALTITUDES.

As mentioned in my last report, Prof. Robert H. Goddard, of Clark University, is working under a grant from the Hodgkins fund of the Institution, on a multiple-charge rocket for exploring the unknown upper layers of the earth's atmosphere. During the year the work has consisted entirely of the construction and test of a small model, illustrating the multiple-charge principle.

The experiments and tests carried on during the year have been specifically for the purpose of eliminating jamming, of improving and simplifying the firing devices, of securing proper protection for the propelling charges, and of overcoming difficulties introduced by changes in the manufacture of materials used.

A parachute device for preventing damage to the rocket and any apparatus or instruments carried has been made which operates for a fall of 60 feet. In addition to this, a modification has been constructed suitable for operating the parachute after a short fall in rarefied air, such as is to be encountered at high elevations.

The intention has been to demonstrate as early as possible a model multiple-charge rocket such as has been mentioned, a successful demonstration of which, it is believed, should show clearly that a larger multiple-charge rocket, constructed upon the same lines, will make possible the reaching of great altitudes.

MEETING IN HONOR OF MADAME CURIE.

A meeting in honor of Madame Curie, the codiscoverer of radium, was held in the auditorium of the National Museum the evening of May 20, 1921, by the Madame Curie Committee of Washington. The address of welcome to Madame Curie was delivered by your secretary, honorary chairman of the committee, who said in part:

In your personality as a child of Poland and a citizen of France you recall to us the inspiration that has come to our national life from those lands and as a scientist the inspiration and courage that you have given to every research student in America. * * * Your discovery of the two elements, polonium and radium, and the determination of their atomic weights and many of their properties, awards you a place in the foremost rank of the world's research workers, while your generous devotion to science and the application of your work to the alleviation of human suffering, asking for yourself only the privilege of continuing your work, place you among the great benefactors of mankind. Moreover, your work has another great underlying value. It has demonstrated to the public at large and to those who control government expenditure for scientific research, the inevitable ultimate benefit to humanity of research in the domain of pure science, however distant it may seem in the beginning from useful application.

The meeting was also addressed by Miss Julia Lathrop, and a lecture on radium was given by Dr. R. A. Millikan, of the University of Chicago.

CINCHONA BOTANICAL STATION.

The lease of the Cinchona Botanical Station held by the Smithsonian Institution on behalf of several American botanical agencies, mentioned in previous reports, was terminated on June 30, 1921, as the colonial Government of Jamaica decided to retain the station for the use of British and Jamaican botanists. It is hoped that the Institute for Research in Tropical America, recently organized in this country, will soon be able to provide some station affording advantages similar to those of the Cinchona station for botanical research in the Tropics.

PUBLICATIONS.

There were issued during the year by the Smithsonian Institution and its branches 113 volumes and pamphlets. Of these publications there were distributed a total of 142,208 copies, including 255 volumes and separates of the Smithsonian Contributions to Knowledge, 12,922 volumes and separates of the Smithsonian Miscellaneous Collections, 24,423 volumes and separates of the Smithsonian annual reports, 89,000 volumes and separates of the publications of the National Museum, 12,795 publications of the Bureau of American Ethnology, 2,000 special publications, 14 volumes of the Annals of the Astrophysical Observatory, 40 reports on the Harriman Alaska expedition, 414 reports of the American Historical Association, and 345 publications presented to but not issued by the Smithsonian Institution.

The publications of the Institution and its branches are the principal means of carrying out one of its chief purposes, the "diffusion of knowledge." They cover practically every branch of science and are distributed to libraries, educational and scientific establishments, and interested individuals throughout the world. The annual report

of the Institution contains a general appendix made up of articles reviewing in a semipopular style recent advances and interesting developments in all branches of science. These reports are printed in large editions, and the increasing demand for them indicates that there is a growing interest in scientific matters among the American people. The publications of the National Museum and the Bureau of American Ethnology are described in detail in the appendices devoted to those branches of the Institution.

Seven papers of the Smithsonian Miscellaneous Collections were issued during the year, among which may be mentioned as of special interest a seventh revised edition of the Smithsonian Physical Tables, a comprehensive work for which there is great demand among industrial concerns, engineers, and educational institutions; the annual Smithsonian Exploration Pamphlet, which describes briefly the results of the Institution's explorations and field-work during the year and is profusely illustrated with interesting photographs taken by the explorers in various parts of the world; and a reprint of the Smithsonian Mathematical Tables, one of the Institution's series of tables which includes the Physical Tables mentioned above, the Meteorological Tables, and the Geographical Tables.

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, 1922, are as follows:

For the Smithsonian Institution: For printing and binding the annual reports of the Board of Regents, with general appendices, the editions of which shall not exceed 10,000 copies, to be immediately available—	\$20,000
For the annual reports of the National Museum, with general appendices, and for printing labels and blanks, and for the bulletins and proceedings of the National Museum, the editions of which shall not exceed 4,000 copies, and binding in half morocco or material not more expensive, scientific books and pamphlets presented to or acquired by the National Museum Library—	37,500
For the annual reports and bulletins of the Bureau of American Ethnology, and for miscellaneous printing and binding for the bureau—	21,000
For the annual report of the National Gallery of Art and for printing catalogues, labels, and blanks—	1,000
For miscellaneous printing and binding:	
International Exchanges—	200
International Catalogue of Scientific Literature—	100
National Zoological Park—	200
Astrophysical Observatory—	4,000
For the annual report of the American Historical Association—	7,000

Committee on printing and publication.—The function of the Smithsonian advisory committee on printing and publication is to

examine and make recommendations concerning all manuscripts offered for publication by the Institution or its branches. During the year eight meetings were held and 94 manuscripts were 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.

Accessions to the library of the Institution during the year numbered 11,948 volumes and pamphlets, of which 6,250 went to the Smithsonian deposit in the Library of Congress; 938 to the Smithsonian office, Astrophysical Observatory, Freer Gallery of Art, and National Zoological Park libraries; and 4,760 to the National Museum library. Many of the packages of books and pamphlets received by the library through the International Exchange service consisted of publications issued by several foreign countries during the years 1914 to 1920 which had been held awaiting normal transportation facilities. This unusual number of receipts necessitated more than twice the amount of cataloguing accomplished by the library staff during the previous year.

Among the many valuable accessions to the scientific library of the National Museum may be mentioned the entire geological library of the late Dr. Joseph P. Iddings, which forms the most important acquisition to the geological section of the library since the foundation of the department in 1880.

Two new branch libraries were created during the year, namely, the National Gallery of Art library and the Freer Gallery of Art library. The former is administered by the National Museum library, but the latter is a distinct unit consisting of publications needed for reference use in connection with the Freer art collections.

NATIONAL MUSEUM.

The past year was an unusually busy one for the National Museum. The National Gallery of Art was separated from the Museum and created a separate administrative unit under the Smithsonian Institution; the Aircraft Building was opened to the public; and considerable additional work was entailed by the schemes for reclassification and reorganization of the Government departments, the putting into effect of the retirement system for civil employees, and the impending inauguration of the budget system for Government accounts.

Other changes in the organization of the Museum besides the separation of the National Gallery of Art include the removal of the division of graphic arts from the department of anthropology to the department of arts and industries; the creation of the division of history, formerly under anthropology, as an independent division; the subdivision of the division of marine invertebrates; and the grouping of all strictly engineering units, including mineral and mechanical technology, under one curator. The Museum, as now organized, comprises an administrative office, 4 scientific and technical departments, and 1 independent division, with a total of 49 recognized subdivisions.

The total number of specimens acquired by the Museum during the year was 338,120. This new material is described somewhat in detail in the report of the administrative assistant in charge, appended hereto, so that it is necessary to mention here only a few of the most interesting accessions. In anthropology, a collection of rare Mission Indian baskets was received from Miss Ella F. Hubby, and Dr. W. L. Abbott contributed some very interesting stone fetishes and ancient pottery from Santo Domingo. An immense collection of skeletal material was received from the College of Physicians and Surgeons, New York City, which will double the value of the collections in the division of physical anthropology.

The most notable accession to the department of biology was the material collected in Australia by Mr. Charles M. Hoy through the generosity of Dr. W. L. Abbott. A great collection of Japanese mollusks was donated by Mr. Y. Hirase, of Japan, forming one of the most valuable accessions ever received by the division of mollusks. The geological accessions included a quantity of South American material comprising Bolivian tin and tungsten ores, rare copper minerals from Chile, and a representative series of ores from Argentina. An interesting exhibit of precious opal in the matrix, ranging in color from the "black" opal to the pale opalescent tints, was presented by the Rainbow Mining Co., of Nevada. An extensive series of igneous rocks from islands of the Pacific and Indian Oceans, collected by the late Dr. Joseph P. Iddings, was presented by his sister, Mrs. Francis D. Cleveland.

The division of textiles received specimens of the fabrics used in the construction of airplanes for military use, and many beautiful specimens of silks, fur fabrics, plushes, and velvets contributed by American manufacturers to show the progress of textile industries in this country. The division of medicine acquired, among other valuable material a series of the most frequently prescribed pharmaceutical preparations, arranged, according to their therapeutic action, into 26 groups. The collection of aeronautical material in the division of mechanical technology was enriched by the acquisition of the original hydroplane model devised by Mr. Edson F. Gallaudet.

This model was constructed and experimented with in 1898, and is particularly interesting in that means for lateral control and wing warping were incorporated, but in practice were unsuccessful.

The Herbert Ward collection of African ethnologica was shipped from Paris on June 25, 1921, but was not received at the Museum until after the close of the fiscal year. This rare and valuable material includes 19 pieces of sculpture by Mr. Ward and about 2,600 specimens of the arms and implements of the Africans of the Congo.

The usual large number of meetings and congresses were held in the auditorium of the Museum. Visitors to the Natural History Building during the year totaled 364,281 for week days and 103,018 for Sundays, and to the Arts and Industries Building 286,397. The publications issued during the year comprised the annual report, 8 bulletins, and 60 separate papers including 4 parts of bulletins, 5 parts of the Contributions from the National Herbarium, and 51 proceedings papers.

NATIONAL GALLERY OF ART.

An event of great importance in the development of Washington as an art center was the organization, at the beginning of the year, of the National Gallery of Art, previously a dependency of the United States National Museum, as a separate administrative unit under the Smithsonian Institution. This step, which was made possible through an appropriation contained in the sundry civil bill for the year 1921, will enable the institution to carry out the provisions of the act of establishment in which art was placed on an equal footing with science in the proposed development of the institution. The art feature has heretofore been held in abeyance through lack of funds and of proper means for administering the National Gallery. All that is now necessary for the full development of the Nation's art collections is a suitable building to house the treasures at present on hand and contributions that may confidently be expected in the future.

The first real impetus to the growth of the gallery was the bequest of a valuable collection of art works by Harriet Lane Johnston in 1906. Since that time the national collections have increased rapidly, chiefly through gifts and bequests of art works by patriotic citizens, until now the value of the material already assembled is estimated at several million dollars. The gallery has never had any funds for the purchase of pictures until recently, when a liberal private fund has become available. The will of the late Henry Ward Ranger provides that the interest of the sum of \$200,000 shall be used for the purchase of works of art which may ultimately come to the National Gallery. A number of valuable paintings have already been purchased from this fund.

Two other agencies which will do much toward building up the National Gallery are the National Portrait Committee, which secured for the gallery the portraits of many of the distinguished leaders of America and the Allies in the World War, and the National Gallery of Art Commission, whose functions are "to promote the administration, development, and utilization of the National Gallery of Art, including the acquisition of material of high quality representing the fine arts and the study of the best methods of exhibiting material to the public and its utilization for instruction."

An illustrated catalogue of the present collection was in preparation and nearly ready for the press at the close of the year. A start was made, also, during the year toward the building up of an art library. The income from a bequest to the Smithsonian Institution by the Rev. Bruce Hughes, of Lebanon, Pa., will be used for the purchase of reference works on art which will serve as a permanent memorial to the donor.

FREER GALLERY OF ART.

In the first report on the Freer Gallery of Art (Appendix 3 of this report), the curator, Mr. J. E. Lodge, gives a list indicating the nature and number of objects in the Freer collection, all of which had been received at the Freer Building by November, 1920. Art works of various kinds from the following sources are included in the collection: American, Babylonian, Byzantine, Cambodian, Chinese, Cypriote, Egyptian, Greek, Italian, Japanese, Korean, Near Eastern and East Indian, Palmyran, and Tibetan. The total number of art objects, including a small amount of unclassified material, is 9,566.

During the past year, the collection was unpacked and the objects placed in their respective storage spaces. The Japanese pottery and Chinese paintings were classified, and the task of checking and cataloguing the entire collection was begun. The interior fittings of the building were completed during the year, with the exception of a few minor items, and in June the Institution formally accepted the building from the architect, Mr. Charles A. Platt.

The plan of installation is first to catalogue and arrange the collections in the storage rooms so that they will be accessible for study, then to select objects for exhibition, and finally to arrange the public exhibits. This method delays the opening of the building to the public, but in the long run of years it will make the collection more valuable for purposes of study and exhibition, and will assure a far more accurate record of every object. Such an art gallery as this will exert its influence for centuries, and a year of delay in the beginning will not materially decrease its usefulness.

BUREAU OF AMERICAN ETHNOLOGY.

The Chief of the Bureau of American Ethnology calls attention to the desirability of increasing the membership of the staff in order to meet the requirements of modern ethnological research. The service that the bureau should render to the state is somewhat different from what it was when the bureau was organized by Maj. Powell, its director. American ethnology of the future, having passed its descriptive stage, will demand a synthetic comparative treatment of the vast mass of facts accumulated in the last 25 years. There is an urgent call for generalizations that will be immediately useful to the community; and as there is an ever-growing interest in the history of the Indians, the future of this science lies along the line of the historical development and appreciation of prehistoric culture.

Nature has made the Rocky Mountains a vacation ground for the people of this country who love mountain scenery, and parks and monuments containing natural attractions are being set aside by presidential proclamation and placed under the direction of the Department of the Interior. One line of usefulness that ethnology can follow is to turn the minds of our people to the educational value of this area.

The aim of the chief during the year has been to cover as fully as possible with the funds available the comprehensive field of the ethnology and archeology of the American Indian. This plan embraces the many aspects of the cultural life of the Indians, their languages, dwellings, social and religious customs, music, mythology, and ritual. In many cases it is urgent that this valuable material be recorded immediately, as certain of the tribes are rapidly approaching extinction. It is the purpose of the chief to increase as much as possible the field-work of the bureau, especially in the branch of archeology, which is becoming more and more popular as shown by the increasing demand for publications on this subject. Researches were carried on during the year on the Algonquian Indians, the Iroquois, various members of the Muskogean stock, Kiowa, Pueblo, Osage, Pawnee, and others. Archeological explorations were conducted in Texas, Missouri, Tennessee, Kentucky, Colorado, New Mexico, and the Hawaiian Islands.

Successful archeological field-work was accomplished by Dr. J. Walter Fewkes on the Mesa Verde National Park, Colo. An extremely interesting ruin on which work was begun during the previous year was completely excavated and repaired. Owing to its undoubted use in connection with the worship of fire by the Indians, it was named Fire Temple. In Tennessee a number of prehistoric mounds were excavated which yielded interesting and valuable data

on the Indians of that region, and similar work was conducted in Texas under the auspices of the bureau. Researches on Indian music were continued by Miss Densmore, the music of the Papago being studied this year.

INTERNATIONAL EXCHANGES.

The work of the exchange service was greatly increased during the past year owing to the resumption of exchange relations with Germany. The total number of packages of publications handled during the year was 451,471, an increase of 82,099 over the total for the preceding year. The weight of this material was 605,312 pounds, an increase of 108,934 pounds.

During the year exchanges of publications were inaugurated with the Czechoslovak Republic and with the Polish Government. Exchange relations will be established with Roumania and Jugoslavia as soon as transportation and other facilities are sufficiently stabilized.

To the list of countries receiving full sets of United States Government documents there was added the Government of Poland, making a total of 57 foreign depositories, while to the list receiving partial sets were added Latvia and the Library of the League of Nations at Geneva, bringing the total number of partial sets up to 39.

As an example of the value of the exchange service in securing special series of publications in this country for establishments abroad, a set of publications which would tend to make the United States better known in Belgium was obtained from the various Government bureaus in this country and forwarded to the Société Belge d'Etudes et d'Expansion, at Liege, at their request.

NATIONAL ZOOLOGICAL PARK.

That the National Zoological Park is becoming more and more valuable to the people of Washington and out-of-town visitors from all parts of the country as a source of recreation and natural history instruction is evident from the fact that the record of attendance has again been broken during the past year. The previous year's visitors numbered 2,229,605, which figure was this year exceeded by 171,232, making a total of 2,400,837. One hundred and twenty-four schools and classes, numbering 13,629 individuals, visited the park during the year for instruction purposes. The number of animals exhibited to the public is greater than any time since 1912, while the number of species represented in the collection is greater than ever before. The scientific importance and monetary value of the collection also are much greater than in any previous year. Gifts of animals during the year numbered 178, including many rare and valuable specimens. Mr. Isaac Ellison, of Singapore, presented the park with

a male orang-utan, the first of these interesting animals to be shown for many years. Mr. Victor J. Evans, of Washington, continued his previous generosity to the park by presenting a young Kadiak bear, a pair of birds of paradise, a species never before shown here, and some valuable parrots. A full list of the animals presented and their donors is given in the full report on the park, Appendix 6. Many valuable specimens were also secured by exchange and transfer, and a few by purchase. The total number of animals in the collection on June 30, 1921, was 1,545, representing 478 species, an increase over the year before of 118 individuals and 59 species.

Owing to a drop toward the end of the year in the cost of food for the animals, it was possible to undertake a few much-needed and long-deferred improvements. Sections of roads were rebuilt and repaired, one of the fords across Rock Creek was rebuilt with cement, a sidewalk was laid from the much-used Harvard Street entrance, the great flight cage for birds was scraped and painted, and several minor improvements were completed. With the aid of a small sawmill, 140,000 feet of lumber and 80,000 shingles were salvaged from dead chestnut trees in the park.

The purchase of land necessary for the protection of the Connecticut Avenue entrance, mentioned in several previous reports, was completed during the year, and a small unexpended balance of the money available for this purpose was reappropriated for the purchase of certain much-needed lots near the Adams Mills Road entrance.

The most urgent needs of the park are a suitable public restaurant building, a building for the exhibition of small mammals, and funds for the completion of grading and filling operations, which would provide a large area of flat space for deer and other animals, and would make possible the elimination of a dangerous curve in the main automobile road.

ASTROPHYSICAL OBSERVATORY.

The most important event during the year was the location of a new solar observing station on Mount Harqua Hala, Ariz., probably the most cloudless region in the United States. This station, which was erected through the generosity of Mr. John A. Roebling, of New Jersey, will be used for the purpose of securing solar-constant observations on all possible days for several years, which it is hoped will furnish, in conjunction with similar observations to be made at the Smithsonian station at Montezuma, Chile, a sound basis for the study of the relation between solar variation and our weather conditions on the earth.

At Washington the preparation of Volume IV of the *Annals of the Astrophysical Observatory*, mentioned in last year's report,

was brought nearly to completion. A large amount of delicate instrument work was carried out at the observatory instrument shop, and Dr. Abbot was invited by Dr. Hale, of the Mount Wilson Solar Observatory, to prepare a special spectrobolometer to observe the energy spectra of the stars. This extremely delicate apparatus was nearly completed at the close of the year.

In the field the usual solar observations were conducted at Mount Wilson, Calif.; Montezuma, Chile; and at the new station in Arizona. At Mount Wilson Dr. Abbot and Mr. Aldrich also carried on observations on the distribution of radiation over the sun's disk, and various investigations with the pyrheliometer, the spectrobolometer, the pyranometer, and the Ångström pyrgeometer. The solar cooker, on which Dr. Abbot has been working for several seasons, was brought to perfection, and practically all the cooking operations required by the observers were performed with the apparatus.

At the new Arizona station observing was begun about the middle of September, and from then until February conditions were even better than had been hoped for. It was possible to make observations on about 70 per cent of the days during that period. March, April, and May were less satisfactory, but this was apparently due to the unusual character of the weather all over the world, and it is confidently hoped that continued observations of the sun here and at the Chile station will lead to important results bearing on weather prediction on the earth.

INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

This international cooperative enterprise has been in existence since 1900, having as its object the systematic indexing and classifying of all original scientific publications. Beginning with the literature of 1901, the catalogue has been completed through 1914, and there is now on hand much material from that date up to the present time.

Until the beginning of the late war the catalogue was practically self-supporting, but owing to the international chaos caused by the war the finances of the enterprise are now in a very precarious condition. For this reason the Royal Society of London, the financial sponsor of the catalogue, called a conference which was held in London during September, 1920. At this conference delegates were sent from 13 of the principal countries of the world, exclusive of the enemy countries, who were not included in the Royal Society's invitation. The United States was represented by delegates from the National Academy of Sciences, the National Research Council,

the Smithsonian Institution, and by a representative from the Rockefeller Foundation, who had just returned from the Continent, where he had been making an investigation of the Concilium Bibliographicum of Zurich.

The consensus of opinion resulting from this meeting appeared to be that it was essential for all organizations, such as the International Catalogue and existing and proposed abstract journals, whose common aim is to supply information required by scientific workers and libraries, to cooperate for their mutual benefit, and that when some definite plan of consolidation was agreed on financial aid would be forthcoming. Plans looking to this most desirable condition are now under way, but it appears that for the present, at least, the necessary funds will have to be supplied from the United States, for although we have felt the burden of war expenses in this country our finances are not in the deplorable condition now common to all of the European countries, which, in addition to the havoc caused by the war, are at a very great additional disadvantage owing to the unprecedented condition of monetary exchange. There is no question as to the need of abstract journals for the immediate use of scientific workers and also of a catalogue and index as a permanent record of scientific literature for the use of libraries, as well as for scientific workers, and as the present organization of the International Catalogue has still the official support of all of the principal countries of the world, and as this organization was founded after years of endeavor by representatives of practically all of the scientific societies of the world, it would now be a calamity to allow it to lapse merely on account of temporary financial difficulties. I can not therefore too strongly urge that this assistance be furnished by some of the several wealthy organizations in this country whose aims are to further the interests of science. A more detailed account of the findings of the conference and of the present condition of the catalogue will be found in the regular annual report of the United States Regional Bureau of the International Catalogue of Scientific Literature, appended hereto.

NECROLOGY.

EDWARD DOUGLASS WHITE.

Edward Douglass White, Chief Justice of the United States and chancellor of the Smithsonian Institution, died May 19, 1921. It is not necessary to here review the life of this distinguished American whose name has been for so many years before the public. At a special meeting of the Board of Regents held May 27, 1921, the following resolutions in memory of Chancellor White were adopted:

Whereas the Board of Regents of the Smithsonian Institution having received the announcement of the death on May 19, 1921, of the Hon. Ed-

ward Douglass White, Chief Justice of the United States, Regent of the Smithsonian Institution for ten years, eight years of which he presided as chancellor:

Resolved, That the board here expresses profound sorrow at the passing away of their beloved colleague, who, as a statesman, jurist, and chancellor, brought always to his work that remarkable ability and high conception of duty that made him so strong an influence for good.

Resolved, That this minute be made a part of the records of the board, and that a copy of these resolutions be transmitted to the family of the late chancellor as an expression of the sympathy of the Regents at the irreparable loss sustained in the death of this distinguished public servant and citizen.

NELSON R. WOOD.

Nelson R. Wood, for over 32 years a taxidermist in the National Museum, died on November 8, 1920. Mr. Wood was one of the best men in the country in his line of work, and his loss is keenly felt by the Museum.

WILLIAM PALMER.

William Palmer, taxidermist in the National Museum, died on April 8, 1921, after 30 years' faithful work in that capacity. Mr. Rathbun, late assistant secretary of the Institution, said of him:

Mr. Palmer has been one of the best all-round taxidermists and preparators in the Museum service. He is not only efficient and a hard worker, but is especially valuable because of his diversified talents, which permit of his being utilized in practically all zoological subjects.

JOSEPH P. IDDINGS.

Dr. Joseph P. Iddings, associate in petrology, department of geology, United States National Museum, died September 15, 1920. Dr. Iddings was one of the leading petrologists of America, indeed of the world. He was for many years connected with the United States Geological Survey, and for a time professor of petrology in the University of Chicago. He was the author of two privately printed volumes on Rock Minerals and Igneous Rocks, and numerous papers in the Government reports. He was also a joint author of the Quantitative System of Rock Classification. The important collections made and studied by him are all in the custody of the National Museum.

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, 1921:

The fiscal year was an unusually busy one. The separation of the National Gallery of Art from the Museum, the completion of the building for the Freer collections, the opening of the Aircraft Building, the preparation of data for the schemes of reclassification of Government employees and reorganization of Government departments, the inauguration of the retirement system for civil employees, and the impending inauguration of a budget system for Government accounts, all added to the usual Museum activities of the year.

The National Gallery of Art, which had for a number of years been administered as the fine arts department of the museum, became an independent bureau under the Smithsonian Institution on July 1, 1920, through provision for its separate maintenance in the sundry civil appropriation act for the year 1921. To the new bureau were transferred such of the Museum's collections as had been in the custody of the curator of the National Gallery of Art, consisting of paintings, sculptures, and a few miscellaneous pieces. For the present the gallery continues to be housed in the Natural History Building of the Museum.

Dr. William H. Holmes severed his connection with the Museum as head curator of anthropology on July 1, 1920, to become director of the National Gallery of Art, and carries with him to his larger field the good will of the entire Museum staff. When, in 1906, it became necessary to provide a somewhat definite organization for the department of fine arts of the Museum, the curatorship of the National Gallery of Art was tendered to Mr. Holmes and accepted by him in addition to his duties then as Chief of the Bureau of American Ethnology. Since that time Dr. Holmes has given freely of his time and strength for the National Gallery without financial return. It is gratifying that he is now enabled to devote all of his energies to his chosen field.

As a separate administrative unit of the Institution a rapid growth is predicted for the National Gallery, of which the Freer collection, housed in its own building, forms a distinct unit. It is hoped that in a few years an additional building, suitable for the permanent home of the National Gallery, will be authorized by Congress.

Dr. Walter Hough, curator of ethnology, was made acting head curator of the department of anthropology upon Dr. Holmes's resignation.

On April 31, 1921, the final work in the construction of the building for the Freer collections was completed, and the structure was formally transferred to the Smithsonian Institution, being accepted on May 3, 1921, just four years and seven months after ground was broken for its erection. That results were not reached earlier, as was anticipated at the beginning, was largely due to unforeseen delays incident to the war, but the work was at all times conducted with that deliberation and attention to details necessary to stability and permanency of structure—and these, it is believed, have been obtained. Planned with special reference to accommodating a collection whose various units were known, and of affording unusual facilities for study and research, the building is an object of art in itself, and is bound to become a mecca for art lovers from all over the world. Under the officer in charge of public buildings and grounds driveways and walks were constructed leading to the Freer Gallery, and the land immediately surrounding it was seeded and has now been brought up to the standard of the balance of the Smithsonian Reservation. During the summer and autumn of 1920 the remaining portions of the Freer collections were brought to Washington from Detroit and stored in the building. The work of unpacking and installing the specimens was begun in the late autumn under the able direction of Miss Katharine N. Rhoades, who had been associated with Mr. Freer in their care for several years. It is anticipated that some time must elapse before the exhibits are all in readiness and the halls can be opened to visitors, as there is a great amount of critical study necessary before the objects can be accurately labeled and classified.

In December, 1920, Mr. John E. Lodge, curator of the department of Chinese and Japanese art in the Boston Museum of Fine Arts, was appointed curator of the Freer Gallery and placed in charge. The Freer Gallery is being administered as an independent unit of the National Gallery of Art, but the heating, lighting, and guarding of the building continue to be carried on in connection with the National Museum system, since the Freer Gallery is dependent upon the Museum plant for heat, light, and power.

By the opening to the public of the Aircraft Building, on October 7, 1920, the Museum added about 14,000 square feet of floor space to its exhibition halls. This metal structure, erected by the War Department on the Smithsonian Reservation in 1917 for the use of the United States Signal Service, was transferred to the custody of the Smithsonian after the close of the war. In it has been assembled

a collection of aircraft and accessories in production during the war period.

Changes during the year in the organization of the Museum, aside from the separation of the National Gallery of Art, included the removal of two divisions from the department of anthropology at the beginning of the year—the division of graphic arts being transferred to the department of arts and industries and the division of history becoming an independent division reporting directly to the administrative assistant in charge of the Museum. In biology, the division of marine invertebrates was subdivided on February 1, 1921, the collections of mollusks being segregated by the reestablishment of the division of mollusks. In the department of arts and industries a combination of all the strictly engineering units was effected in May, 1921, by the appointment of the curator of mechanical technology, Mr. Carl W. Mitman, as curator also of mineral technology. He will be aided by an assistant curator in each division.

The Museum lost by death during the year Dr. J. P. Iddings, associate in petrology, Messrs. Nelson R. Wood and William Palmer, taxidermists, and Mr. T. W. Reese, watchman.

As at present organized, the Museum comprises, besides an administrative office, 4 scientific and technical departments, and 1 independent division, with a total of 49 recognized subdivisions. The scientific staff of the Museum comprises 94 persons, of whom less than half receive pay from the Museum. This by no means represents, however, all the scientific workers on the collections, for the Museum also has much regular assistance from employees of various governmental agencies in Washington in classifying, arranging, and placing on exhibition specimens in their respective fields of investigation.

As the museum organization of the Government, the National Museum has important assistance from the executive departments and other governmental agencies. Particularly was this true during the fiscal year 1921. Credit is due to the Navy Department for transporting and installing in the Museum building many attractive exhibits in the World War collections; to the War Department for similar service, including the detail to the Museum of one officer for several months; to the Departments of Agriculture, Commerce, and the Interior and the Bureau of American Ethnology for many valuable contributions of specimens and much assistance in classifying and labeling objects in the Museum; to the Interior Department also for transferring exhibition cases no longer needed by it; and to the Post Office Department for large series of valuable and interesting postage stamps.

This cooperation is mutual, as the Museum renders aid to other governmental establishments whenever possible, as evidenced by

the work of Dr. Aleš Hrdlička for the Department of Justice, by which over a million of dollars in land and money was saved for the Indians.

The maintenance and operations of the National Museum for the fiscal year 1921 were provided for by items appropriated in the sundry civil and in two deficiency bills, amounting in all to \$483,-322.70.

The item for preservation of collections, from which are paid the administrative, scientific, preparatorial and clerical staff, the watch, labor and cleaning force, and the cost of all preservatives, has remained at \$300,000 from 1911 until the present time. An additional \$12,620 granted for this year meant the extension of the service to cover the Freer Gallery of Art, for which it provided watchmen, cleaners, and clerical help and the necessary miscellaneous supplies needed in connection therewith. It afforded no cessation of the strictest economy by means of which only is it possible to continue the operations of the Museum. Present conditions can perhaps best be realized when it is stated that 10 years ago the item of \$300,000 was considered insufficient to cover the needs of the Museum in these lines. Within this decade, with its tremendous decrease in the purchasing power of the dollar, some 3,000,000 specimens have been added to the collections, the scope of the Museum has been materially enlarged, and an additional building has been added to the Museum group, aside from the Freer Gallery.

During this period, however, increases have been granted in the items for heating and lighting and for printing and binding, owing to the increased cost of coal and the tremendous increase in the cost of labor, paper, and other materials used in printing. On the other hand, even with the greatly extended service, the item for building repairs is now \$5,000 less than it was 10 years ago, at a time when the Natural History Building was new and naturally required comparatively little in the way of repairs. The amount for furniture and fixtures is likewise \$5,000 less than it was for a number of years prior to the war, when prices of labor and material were from 50 to 75 per cent lower.

Of the \$64,202.70 appropriated this year for printing, \$37,500 was the regular item and \$26,702.70 a deficiency item to permit of the completion during the year of an unusual accumulation of work at the Government Printing Office. The Museum printing had for several years been held back for lack of sufficient available funds.

A comparison of the operating expenses of the United States National Museum with museums of similar size and scope in this country and abroad is extremely interesting, and brings out very strongly the inadequacy of the appropriations, especially with reference to the salaries paid to all classes of its employees. The scientific staff is

paid from 40 to 50 per cent less than scientific men of the same grade in similar museums elsewhere.

The upkeep of the buildings during the year involved the usual repair work, including the painting of walls and ceilings in several halls, the painting of all the exterior window frames of the Natural History Building, those of the east end of the Smithsonian Building, and a beginning on those of the Arts and Industries Building; and the painting of the roofs of the latter. A locker room for the engineer force was constructed at the east entrance, ground floor, of the Natural History Building, and the east court of that building was seeded with grass.

When the Freer Building was being planned, arrangements were made to procure heat, light, and power from the central heating plant, which the Institution was assured would be in a position to furnish the same before needed. In the absence of such service, however, the Freer Gallery was connected with the Museum power plant, from which was furnished this year the necessary heat, light, and power. This additional load on the Museum plant required the use of the old boilers in the Arts and Industries Building during the coldest portion of the heating season. By the removal of the old flat grates for burning anthracite coal in these boilers and the installation of hand-operated stokers, bituminous coal could be used without the production of unlawful smoke. The antiquated blow-off valve combination on the boilers in the Natural History Building was also replaced. Though the winter was a comparatively mild one, heat was supplied the buildings from October 6, 1920, to May 20, 1921, with a consumption of 3,224 tons of coal. The ice plant, in operation for 4,017 hours, produced 324.7 tons of ice. As a matter of economy the power plant was shut down as usual during July and August, 1920, and was again closed on June 4, 1921, the electric current being purchased from a private concern during the summer months.

The Museum acquired 62 exhibition cases and 165 pieces of storage, laboratory, and office furniture.

COLLECTIONS.

The total number of specimens acquired by the Museum during the year was approximately 338,120. Additional material to the extent of 794 lots, mainly geological, was received for special examination and report. About 25,000 specimens were sent out in exchange, for which the Museum received much valuable material.

The distribution of specimens for educational work was broadened this year to include objects from the department of anthropology. Of the 6,000 specimens distributed as gifts in aid of education, over

5,000 were comprised in classified and labeled sets of specimens prepared for schools and colleges, nearly 2,000 being ores and minerals. The other subjects represented were rocks, rock weathering and soil formation, mollusks, marine invertebrates, fishes, birds and birds' eggs, insects, pottery, and prehistoric implements.

Anthropology.—The department of anthropology accessions were scientifically more valuable than in the former year, because of the number of professionally collected specimens. The great majority of the accessions are unconditional gifts. The geographical source of the accessions in order is the United States, Asia, Africa, Polynesia, and scattering. The department received and recorded 2,324 specimens, and the work was well in hand at the close of the year.

Of especial note in ethnology are a collection of rare Mission Indian baskets given by Miss Ella F. Hubby, of Pasadena, Calif.; a remarkable Cowichan Indian blanket with totemic paintings, a gift of Mrs. Charles C. Hyde, of Washington, D. C.; a finely carved ancient wooden idol from Hawaii, collected many years ago by Rear Admiral J. V. B. Bleeker, United States Navy; a collection of carved horn dishes and spoons from the Flathead Indians, gift of Dr. E. A. Spitzka, of Washington, D. C.; and a group of ancient ivory fetishes from the Lower Congo, Africa.

The division of American archeology received a noteworthy collection from an ancient ruin near Taos, N. Mex., excavated by Mr. J. A. Jeancon for the Bureau of American Ethnology; antiquities from cliff dwellings, collected by Mr. N. M. Judd for the same bureau; and antiquities from the ruins of Chaco Canyon, N. Mex., collected by Mr. Judd while conducting the expedition of the National Geographic Society to this region. Very interesting carved stone fetishes and ancient pottery from Santo Domingo were contributed by Dr. W. L. Abbott.

Old World archeology reports the receipt of Buddhist bronze figurines from China and kakemonos from Japan, gift of Mrs. Murray Warner, of Eugene, Oreg.; other Buddhist bronze figures, given by Mrs. John Van Rensselaer Hoff, of Washington, D. C., fill gaps in the collection.

Physical anthropology received an immense consignment of skeletal material of individuals of known sex, age, color, and nationality. This collection, which doubles the value of the material in the division and will require several years' work to put in order and to catalogue, was received from the College of Physicians and Surgeons, New York City, through Dr. George S. Huntington. An important collection of human brains was donated by Dr. E. A. Spitzka, of Washington, D. C. A number of skulls and skeletons of American Indians was added to the collection through the University of South

Dakota and the Bureau of American Ethnology. These specimens are of much importance to the division.

Mr. Hugo Worch, of Washington, D. C., added to the Worch collection a copy of the Bach harpsichord and a dulcitone and 11 other pianos illustrating the history of the pianoforte. Mrs. Gouverneur Morris, of Washington, D. C., presented a piano handsomely decorated by Cottier, of New York.

A selection of rare oriental rugs from the collection of a connoisseur of Washington was hung in place of the collection previously on exhibit in the hall of art textiles.

The section of ceramics received a set of Japanese porcelain given Prof. Joseph Henry by the first Japanese minister to the United States, bequest from Miss Caroline Henry. Miss Freeman and Mrs. B. H. Buckingham, of Washington, D. C., presented some richly decorated Japanese plaques.

Biology.—From the numerical standpoint, as well as from the standpoint of the scientific interest of the collections, the year was a very prosperous one for the department of biology. The outstanding features of this year's accessions are the Australian collections made by Mr. Charles M. Hoy, which were the result of Dr. W. L. Abbott's continued interest in the Museum, and the great collection of Japanese mollusks donated by Mr. Y. Hirase, of Kioto, Japan, one of the most valuable accessions that has ever come to the division of mollusks. Dr. Abbott is also responsible for the addition of an important collection of birds and mammals made by Mr. C. Boden Kloss in Siam, Cochin China, and Anam. While engaged in geological work in the Rocky Mountains, Secretary Walcott procured for the Museum several desired Canadian mammals, including mule deer and mountain goats. Another valuable accession is that of Dr. J. P. Iddings's collection of butterflies and moths, presented by the heirs of Dr. Iddings, consisting of about 2,500 named species, mostly from the Tropics and mounted ready for exhibition. Through the continued generosity of Mr. B. H. Swales, bird skins, representing 38 species and 7 genera not hitherto contained in the national collection, were added. The botanical material accessioned during the year embraced over 14,000 specimens from Haiti and Santo Domingo, collected by Dr. Abbott and Mr. Leonard, besides a large number of valuable collections both from the Old and the New World.

Geology.—The additions to the collections in this department showed a marked increase over those recorded in any one of the past 15 years. The total number of accessions listed is 231, a gain of 51 over last year and of 29 over the number recorded in 1914-15, next highest on the list.

The greatest bulk of material was received by transfer from the United States Geological Survey, but numerous valuable specimens

were acquired chiefly by exchanges and gifts. These include a quantity of South American material comprising Bolivian tin and tungsten ores, and rare copper minerals from Chile, secured by Custodian F. L. Hess through Guggenheim Bros., New York City; Messrs. L. L. Ellis and Don Stewart, Oruro, Bolivia; and Prof. Joseph T. Singewald, of Johns Hopkins University. In addition a representative series of ores from Argentina was presented by the ambassador, Mr. Tomas A. Le Breton.

Interesting additions were made to the exhibit of radioactive minerals, including carnotite, euxenite, torbernite, and uraninite.

The meteorite collection was augmented by representatives of four falls, Forsyth County, N. C.; Chinautla, Guatemala; Troup, Tex.; and Owens Valley, Calif.

New and rare specimens were added to the mineral collection chiefly through exchanges. An attractive suite of precious opal in the matrix, ranging in color from the "black" opal to the pale, opalescent tints, was presented by the Rainbow Ridge Mining Co., operating in Humboldt County, Nev., and important additions to the collection of cut gems were acquired through the Frances Lea Chamberlain fund.

The petrological collection was enriched by the extensive series of igneous rocks from islands of the Pacific and Indian Oceans, collected by the late Dr. Joseph P. Iddings and presented by his sister, Mrs. Francis D. Cleveland. Including also the scientific portion of Dr. Iddings's library as well as valuable collections assigned to other departments of the Museum, this is considered one of the most notable accessions of the year.

Accessions of paleontological material aggregate at least 50,000 specimens and include much material from foreign sources. Several thousand specimens of Cambrian fossils, collected chiefly by Secretary Walcott, and approximately 25,000 specimens of Silurian and Devonian forms from Maine are also among the year's acquisitions.

Vertebrate remains of unusual interest and in large quantity were obtained by Mr. J. W. Gidley, collecting in Arizona under the joint auspices of the National Museum and United States Geological Survey. A portion of this, including a rare species of mastodon and a large glyptodon, is sufficiently complete to afford material for restoration and exhibition.

New exhibits include two cases containing gem minerals in the matrix, supplemental to the gem collection; an entirely new installment of the exhibit illustrating radioactivity, and instructive and showy biological series selected from the crinoid collection of Dr. Frank Springer; skeletons of the unique horned dinosaur, *Brachyceratops montanensis*, a wolverine, or Gulo, and a bear, and a biological series illustrating the evolution of fossil plants.

Textiles, medicine, wood technology, and foods.—The collections under the supervision of the curator of textiles, which, besides textiles, embrace medicine, food, wood technology, and miscellaneous animal and vegetable products, were increased by many gifts and by transfer from other Government bureaus, amounting to nearly 1,000 objects. The most important of these are as follows:

From the Director of Air Service, War Department, specimens of the fabrics used in the construction and equipment of airplanes for military use; also examples of the same fabrics which had been converted to demonstrate the value for civilian use of the large surplus sold by the War Department to the public. There were added by gift many beautiful specimens of silks, fur fabrics, plushes, and velvets contributed by American manufacturers to show the progress of textile industries in this country.

The collections in the division of medicine were enlarged by a series of the most frequently prescribed pharmaceutical preparations, arranged, according to their therapeutic action, into 26 groups, by a large series of models, specimens, and photographs illustrating vaccine and serum therapy and arranged to demonstrate the methods used to combat smallpox, lockjaw, pneumonia, cerebrospinal meningitis, and hay fever. The collection illustrating pharmacy received valuable specimens of pharmaceutical apparatus and a large number of additional documents and publications bearing on the history of the United States Pharmacopœia.

Increased interest in the exhibition collections of the section of wood technology resulted from the gift by the British Government of a large section of one of the heavy oak beams taken from the roof of Westminster Hall during recent repairs to that historic structure. The roof was built under the orders of Richard II, in 1399, and oak timbers used therein, allowing for the age of the tree, must be at least 1,000 years old. The timber presented to the Museum exemplifies the durability of British oak and gives an idea of the beauty of the old craftsman's work.

Interest in the exhibits of the section of foods was increased by the addition of over 100 examples of canned fruits, vegetables, fish, and meats, which had been packed and preserved so as to present a most attractive appearance. This appetizing array of canned foods was all put up by children according to the cold-pack method and represented a selection from the jars winning prizes in 17 State contests between members of boys' and girls' canning clubs.

Mechanical and mineral technology.—One of the most important fields of the division of mechanical technology is educational exhibits visualizing the developments in the transportation systems of the country and the details of such progress. In this connection there were received a number of accessions, among which might be men-

tioned the gasoline automobile designed and constructed by Charles E. Duryea in 1892-93, which represents probably the beginnings of the automotive industry in this country. Another valuable accession was that of an operating model showing the cylinder mechanism of the type of internal-combustion engine developed by the Willys-Overland Co., of Toledo, Ohio.

In the branch of aeronautics the extensive collections of the Institution were further enhanced by the receipt of the original experimental hydroplane model devised by Mr. Edson F. Gallaudet, chairman of the board of directors of the Gallaudet Aircraft Corporation, East Greenwich, R. I. This model was constructed and experimented with in 1898, and is particularly interesting in that means for lateral control and wing warping were incorporated but in practice were unsuccessful.

The collections devoted to horology were increased through the efforts of Mr. George W. Spier, honorary custodian of watches, by the receipt of 10 valuable old watches; and Mr. Emile Berliner, of Washington City, very generously presented two gramophones of importance in the development of the talking machine, namely, the first commercial type developed in 1893, and an electrically operated machine devised by Mr. Berliner in 1896.

Among the accessions received in mineral technology was one consisting of over 400 specimens visualizing the interrelationship of the several chemical industries of importance in the production of aniline dyes, war gases, pharmaceuticals, and explosives.

Graphic arts.—The increment in graphic arts included an exhibit of hand-made paper; two books made along sixteenth century lines, all the work of one man, type, composition, and paper; facsimiles in type metal of 50 characters of supposedly the first font of metal type ever cast; wood block prints by Thomas Bewick, the father of wood engraving as used to-day; engraved wood block with progressive proofs in color by Rudolph Ruzicka; an exhibit of lead molding electrotypes and the McKee treatment of electrotype plates; photogelatine and photogravure work extending over 30 or 40 years; historical examples of rotary photogravure; beautiful examples of modern printing in black and white and color; soft ground etchings in color by Benjamin C. Brown; etched plate with trial proofs by Frank W. Benson, and dry-point etchings of President Harding, taken from life by Walter Tittle. To the photographic section were added a Jenkins camera making 30,000 exposures a minute; a print from the first negative made in the United States by the Belin method of sending portraits by wire; Civil War photographs by Brady and large toned bromides of the World War showing comparative methods of warfare and photography; and illustrations of a number of hitherto unrepresented photographic processes.

History.—The historical collections received important additions during the past year. Those relating to the World War were for the most part of a naval character. The Navy Department transferred to the Museum a large aggregation of materials illustrating the part played by that branch of the service during the war, including naval airplanes of the type and design used for patrol and convoy duty during the conflict, models of naval vessels used during the same period, various examples of marine instruments used on these ships, and a large number of guns and miscellaneous ordnance material. The Navy Department also increased its exhibition by a number of naval objects captured from the enemy in the war zone. These include the engines of a German submarine, a submarine torpedo, and a number of smaller German naval projectiles. The exhibit of the Navy Department already presents in a striking and graphic manner the leading features of the work of the Navy during the war, and plans have been made to develop it into one of the most notable collections of the kind in existence. The numismatic and pictorial sections of the war collection received valuable additions the former including a number of war decorations and commemorative medals and the latter two large paintings by Arthur M. Hazard, entitled "Not by Might" and "The Spirit of the Armistice." The collection was increased by British and Canadian uniforms, and documents relating to the services of Lieut. Louis Bennett, of the Royal Air Force, killed in action in France, given the Museum by his mother, Mrs. Louis Bennett, of Weston, W. Va.; and a collection of French military objects, including a steel listening post, a steel cupola with guns, a catapult, a Brandt cannon, a number of hand and rifle grenades, and miscellaneous relics presented by the French Government.

Of the antiquarian material may be mentioned a watch seal of carnelian set in gold, bearing the Washington crest and owned by Gen. Washington subsequent to the War of the Revolution. This exceptionally interesting and valuable object was presented to the Museum by Mr. William Sloane, of New York. The National Society of Colonial Dames of America added to their collection a number of interesting pieces. Of special interest also is a very handsome silver punch bowl with tray, ladle, and 10 mugs, presented to Col. George Armistead by citizens of Baltimore in recognition of his services in connection with the defense of Fort McHenry, Baltimore Harbor, in 1814. These have been presented to the Museum by Mr. Alexander Gordon, jr., of Baltimore, a great grandson of Col. Armistead. The military, the naval, the numismatic, and the philatelic sections of the original historical collections also received large additions during the year.

The Herbert Ward collection.—The Herbert Ward collection of African ethnologica, together with sculptures of African subjects by Mr. Ward, forming a unique assemblage illustrative of the culture of the unmodified natives, was packed and shipped from Paris on June 25, 1921. Mr. Ward was born in London, England, in 1862. At the age of 15 he set out on travels which took him over many of the unexplored lands of the world, and at 21 he began his work in Africa. While in the Congo in the employ of the Belgian Government he rendered important aid to Stanley in his explorations. For more than five years Mr. Ward lived among the natives of Central Africa, and during this time he developed the idea of preserving an epitome of the primitive life with which he was then surrounded and which would be an index of the primitive life of all men. The African Negro that Mr. Ward studied impressed him as possessing fine qualities of simple dignity and loyalty. Mr. Ward was by instinct and training a lover of art and constantly recorded his impressions of the natives at first hand. The records which he made on the spot were used in his subsequent famous works of sculpture, which portray the soul of Africa. Mr. Ward in this collection has contributed a noble effort for the benefit of art, science, and humanity. This collection, in accordance with Mr. Ward's wishes, was forwarded to the Museum by his widow, Mrs. Sarita Sanford Ward.

Partello bequest.—By the terms of the will of Dwight J. Partello, offered for probate during the year, the Museum is bequeathed his collection of musical instruments, bows, and cases, gathered during many years of collecting; 37 paintings; a gold and silver bowl or casket presented to Mr. Partello by the Czar of Russia; and a diploma and medal awarded him for his exhibit of violins at the Chicago Exposition in 1893. This well-known collection illustrating the Italian school of violins is of great intrinsic value and numbers 25 instruments of the violin family, made by the best masters in pure construction, including Amati, Stradavari, Bergonzi, Guarnerius, and others. At the end of the year the estate had not been settled.

EXPLORATIONS AND FIELD-WORK.

Owing to very limited appropriations, the Museum is unable to undertake field-work except in cooperation with individuals or other scientific institutions where the expenses are mostly borne by them. The expeditions sent out during the past year have been financed almost entirely from outside sources.

Archeological survey in the Pueblo region.—Mr. N. M. Judd, curator of American archeology, made an extensive reconnaissance in Arizona and New Mexico in the summer of 1920 in connection

with the projected archeological work to be taken up by the National Geographic Society, resulting in valuable accessions to the Museum. At the date of this report he was in the field conducting explorations in the ancient ruins of Chaco Canyon, N. Mex., for that society. Good results are reported in the preliminary stages of this work, which is expected to cover five summers. Under the arrangement with the society most of the specimens obtained will come to the National Museum.

Australian expedition.—Mr. Charles M. Hoy, who has been collecting vertebrates in Australia since June, 1919, supported by a fund placed at the disposition of the institution by Dr. W. L. Abbott, continued his field-work during the year. He collected at several stations in South Australia, where he also visited Kangaroo Island, at two stations in West Australia, and in the Northern Territory. Forty-four days were spent in working an area of 30 miles in extent. Later on two camps were established in New South Wales, one near the highest point on the northern tableland at an elevation of 5,000 feet and one 1,000 feet lower. Altogether, the year's work was very successful. The two shipments received during the year totaled 571 mammals and 534 birds, well prepared, many of which were hitherto unrepresented in our collections. A number of interesting reptiles, amphibians, and marine invertebrates were also included.

Dr. Abbott's explorations in Santo Domingo.—Late in 1920 Dr. W. L. Abbott undertook personally another expedition, this time visiting the north side of Santo Domingo (Villa Riva, Pimentel, Catui, Mao, in the Yaqui Valley, and several points on the Samana Peninsula) and returning in May, 1921. He brought back a small but select collection of birds, but his main efforts were devoted to the collecting of plants, approximately 4,000 of which have been received and will doubtless prove of great value.

The Smithsonian African expedition.—The expedition mentioned in last year's report as having been sent out in conjunction with the Universal Film Manufacturing Co. to South and Central Africa concluded its biological work on July 14, 1920, after which Mr. H. C. Raven, the Smithsonian collector and naturalist, returned to the United States. Though not numerically large, the collections brought home are of unusual interest on account of the manner in which they supplement those obtained by other expeditions in which the Smithsonian Institution has been interested.

Field-work in vertebrate paleontology.—Early in the year Assistant Curator J. W. Gidley was detailed to visit Williamsburg, Va., to investigate a reported find of some fossil bones in that vicinity. These proved to be the remains of an extinct species of whale of Miocene age, but were incomplete and too badly damaged to make possible the recovery of a sufficient number for an exhibition mount.

Two other important field expeditions were undertaken by Mr. Gidley, the first as the result of reports from Mr. Kirk Bryan, of the United States Geological Survey, who had discovered some promising localities for fossil vertebrate remains while making an extensive survey of the underground water resources of the San Pedro Valley of Arizona. Mr. Gidley spent two months or more in the Arizona field, visiting three localities in the San Pedro Valley and one in Sulphur Springs Valley. The last yielded only fragmentary remains of Pleistocene mammals, but much better results were obtained in the San Pedro Valley, where two localities, one about 2 miles south of Benson, the other at the Curtis ranch, about 14 miles south of Benson, yielded remains of about 30 species, mostly mammals, which seem to represent a new or little-known Pliocene fauna. Mr. Gidley shipped 21 boxes, with an aggregate weight of about 4,630 pounds. A portion of this material will be suitable for exhibition, the most important being remains sufficiently complete to form the basis of skeleton restoration of a rare species of mastodon and a large edentate. Other remains represent extinct species of camels, carnivorous animals, rodents, turtles, and birds.

The second expedition, entirely under Museum auspices, included a trip to Agate Springs, Nebr., where was secured a large slab, or block of limestone, containing remains of the little rhinoceros, *Diceratherium cooki*. This will be cleaned and exhibited with the bones in situ.

Mr. C. W. Gilmore was detailed in April to visit a fossiliferous area some 36 miles north of Santa Fe, N. Mex., for the purpose of making collections of paleontological material, and for determining the advisability of reserving certain lands for national monument purposes. A skull, lower jaws, and other bones of an extinct rhinoceros, various limb and foot bones of a camel, and a small collection of miscellaneous specimens were obtained as a result of this trip.

Other expeditions in which the Museum was interested are briefly described in the first part of this report which relates to the affairs of the Smithsonian proper.

MEETINGS AND CONGRESSES.

The accommodations afforded by the auditorium and committee rooms in the Natural History Building were utilized on many occasions. A course of evening lectures on the history and nature of international relations, extending from October to May, was given under the auspices of the school of foreign service of Georgetown University, while two local scientific societies, the Anthropological Society of Washington and the Entomological Society of Washington, made the building their regular meeting place.

The National Academy of Sciences held its annual meeting from April 25 to 27, the first evening being given over to an address by His Serene Highness, the Prince of Monaco, followed by a reception by the Regents and secretary of the Institution in the halls assigned to the National Gallery of Art. Other societies holding here their annual gatherings, some lasting several days, included the Northern Nut Growers' Association; the American Ornithologists' Union; the American Farm Economic Association; the American Society of Mammalogists; the Audubon Society of the District of Columbia; and the American Institute of Architects. In connection with the last, the Second National Architectural Exhibition, installed in the near-by lobby and foyer, was inaugurated by a special evening opening of the building.

During its convention in Washington in May, the American Federation of Arts held an afternoon session in the Museum auditorium, and the delegates were tendered a reception by the Regents and secretary of the Institution in the National Gallery of Art on the evening of that date, with a special view of the collection of war portraits, brought together by the National Portrait Committee as a nucleus of a national portrait gallery. In connection with the visit of Madame Marie Curie to this country, a meeting was arranged in her honor in the auditorium with a lecture by Dr. R. A. Millikan on radium, the exhibition halls on the two lower floors being thrown open for inspection during the evening.

The program of the Washington convention of the American Bankers' Association also included an evening reception by the Board of Regents and secretary of the Smithsonian in the Natural History Building. The Southern Commercial Congress, during its meeting in Washington, used the auditorium for presenting to the Department of Agriculture a portrait of the late David Lubin, the Italian ambassador assisting in the ceremonies.

Meeting facilities were afforded governmental agencies as follows: The Bureau of Public Health Service of the Treasury Department, for an institute on venereal disease control, lasting several days, and for showing motion pictures relating to its work on several occasions; the Department of Agriculture, for numerous meetings and conferences in relation to the work of the Federal Horticultural Board, the Forest Service, the Bureau of Plant Industry, the States Relations Service, and the Bureau of Markets; the Army Medical School of the War Department, for a lecture by Dr. Hideyo Noguchi, and for the closing exercises of the 1920-21 session of the school; the Post Office Department, for a lecture by Mr. D. F. Garland; the Commission of Fine Arts; and the Federal Board of Vocational Education. Single lectures were given under the auspices of the National Research Council, the Geological Society of Wash-

ington, the Washington Academy of Sciences, Georgetown University, and the Osteopathic Association of the District of Columbia.

At the First Pan Pacific Scientific Congress, held in Hawaii from August 2 to 20, 1920, the Museum was represented by the following members of the staff of the Smithsonian Institution: Mr. John B. Henderson, Regent of the Institution; Dr. Paul Bartsch; Dr. Gerrit S. Miller, j.; Dr. T. Wayland Vaughan; and Mr. Gerard Fowke.

MISCELLANEOUS.

The attendance of visitors to the Natural History Building during the year aggregated 364,281 for week days and 103,018 for Sundays, being a daily average of 1,167 for the former and 1,981 for the latter. At the Arts and Industries Building the total attendance was 286,397, a daily average of 917. The Aircraft Building had an attendance of 31,235 for the portion of the year it was open, an average of 147 persons daily. The total attendance in the Smithsonian Building on week days was 90,097, an average of 288, and on the one Sunday 138.

The publications of the year comprised the annual report for 1920, 8 bulletins, and 60 separate papers. The latter consisted of 4 parts of bulletins, 5 parts of Contributions from the National Herbarium, and 51 proceedings papers. The total number of copies of publications distributed was about 89,000.

The library obtained, by purchase, gift, and exchange, 2,041 completed volumes and 2,719 pamphlets. The more important donations were from Mrs. Francis D. Cleveland, Dr. Charles D. Walcott, and Dr. W. H. Dall, the former contributing the scientific library of the late Joseph Paxson Iddings, petrologist.

While it is the primary duty of a museum to preserve the objects confided to its care, as it is that of a library to preserve its books and manuscripts, yet the importance of public collections rests not upon the mere basis of custodianship nor upon the number of specimens assembled and their money value, but upon the use to which they are put. Judged by this standard, the National Museum may claim to have reached a high state of efficiency. From an educational point of view it is of great value to those persons who are so fortunate as to reside in Washington or who are able to visit the Nation's capital. In its well-designed cases, in which every detail of structure, appointment, and color is considered, a selection of representative objects is placed on view to the public, all being carefully labeled individually and in groups. The child as well as the adult has been provided for, and the kindergarten pupil and the high school scholar can be seen here supplementing their classroom games or studies. Under authority from Congress, the small col-

leges and higher grades of schools and academies throughout the land, especially in places where museums do not exist, are also being aided in their educational work by sets of duplicate specimens, selected and labeled to meet the needs of both teachers and pupils.

Nor has the elementary or even the higher education been by any means the sole gainer from the work of the Museum. To advance knowledge, to gradually extend the boundaries of learning, has been one of the great tasks to which the Museum, in consonance with the spirit of the Institution, has set itself from the first. Its staff, though chiefly engaged in the duties incident to the care, classification, and labeling of collections in order that they may be accessible to the public and to students, has yet in these operations made important discoveries in every department of the Museum's activities, which have in turn been communicated to other scholars through its numerous publications. But the collections have not been held for the study of the staff nor for the scientific advancement of those belonging to the establishment. Most freely have they been put at the disposal of investigators connected with other institutions, without whose help the record of scientific progress based upon the material in the Museum would have been greatly curtailed. When it is possible to so arrange, the investigator comes to Washington; otherwise such collections as he needs are sent to him, whether he resides in this country or abroad. In this manner practically every prominent specialist throughout the world interested in the subjects here well represented has had some use of the collections, and thereby the National Museum has come to be recognized as a conspicuous factor in the advancement of knowledge wherever civilization has a foothold.

Respectfully submitted.

W. DE C. RAVENEL,

Administrative Assistant to the Secretary,

In charge United States National Museum.

DR. CHARLES D. WALCOTT,

Secretary of the Smithsonian Institution.

APPENDIX 2.

REPORT ON THE NATIONAL GALLERY OF ART.

SIR: I have the honor to submit herewith the following report on the affairs of the National Gallery of Art for the year ending June 30, 1921.

ORGANIZATION AND HISTORY OF THE GALLERY.

The National Gallery of Art, which is the legal depository of all objects of art belonging to the Nation, has heretofore been administered in connection with the United States National Museum. By the action of the Sixty-sixth Congress in providing "for the administration of the National Gallery of Art by the Smithsonian Institution, including compensation of necessary employees and necessary incidental expenses," its connection with the Museum was severed and it became the seventh administrative branch under the Institution on July 1, 1920.

A full account of the inception of the art activities of the Institution and of the early struggles of the incipient Gallery of Art, prepared by the late Assistant Secretary of the Institution, Dr. Richard Rathbun, is given in Bulletin 70 of the United States National Museum (edition of 1916), and a brief résumé may be given here as a suitable introduction to the first annual report of the gallery under the new régime, and at the same time emphasizing the imperfectly recognized fact that art was placed on an equal footing with science in the foundation of the Institution.

The Smithsonian Institution was founded in 1846 by a fund provided by James Smithson and was organized under the control of a board of regents. By act of the Congress of the United States approved August 10, 1846, establishing the Smithsonian Institution, it was provided:

That, so soon as the Board of Regents shall have selected the said site [for a building], they shall cause to be erected a suitable building, of plain and durable materials and structure, without unnecessary ornament, and of sufficient size, and with suitable rooms or halls, for the reception and arrangement, upon a liberal scale, of objects of natural history, including a geological and mineralogical cabinet; also a chemical laboratory, a library, a gallery of art, and the necessary lecture rooms, etc.

Immediately upon the organization of the Board of Regents, in September, 1846, a committee from its membership was appointed to digest a plan for carrying out the provisions of this act. The

committee's report, submitted on January 25, 1847, contained the following recommendations on the subject of the fine arts:

The gallery of art, your committee think, should include both paintings and sculpture, as well as engravings and architectural designs; and it is desirable to have in connexion with it one or more studios, in which young artists might copy without interruption, being admitted under such regulations as the board may prescribe. Your committee also think that as the collection of paintings and sculpture will probably accumulate slowly, the room destined for a gallery of art might properly and usefully meanwhile be occupied during the session of Congress as an exhibition room for the works of artists generally; and the extent and general usefulness of such an exhibition might probably be increased, if an arrangement could be effected with the Academy of Design, the Arts Union, the Artists' Fund Society, and other associations of similar character, so as to concentrate at the Metropolis, for a certain portion of each winter, the best results of talent in the fine arts.

The Smithsonian Building was completed in 1855, and served for a period of eight years to accommodate the collections of all classes. Serious discouragement of the art interests in the Institution resulted from the disastrous fire, which in 1865 burned out the second story of the building, destroying its contents, including portions of the art collections. The remaining works were removed, the paintings and statuary to the Corcoran Gallery and the engravings to the Library of Congress. Many years later they were in large part returned to the Institution, and but little of importance transpired until 1906, when a collection of paintings and other art works, was bequeathed to the Corcoran Gallery of Art by Harriet Lane Johnston, mistress of the White House during President Buchanan's administration, subject to the condition that should a national gallery be established in Washington they should become the property of that gallery. This led to an inquiry regarding the status of the Institution as a national gallery, and the question was referred to the Supreme Court of the District of Columbia, which rendered the decision that the Institution is the duly constituted National Gallery of Art. The text of the decision is as follows:

It is, therefore, on this eleventh day of July, in the year 1906, by the Supreme Court of the District of Columbia, sitting in Equity, and by the authority thereof, adjudged, ordered, and decreed,

That there has been established by the United States of America in the City of Washington a National Art Gallery, within the scope and meaning of that part of the codicil bearing date April 21, 1902, made by the said Harriet Lane Johnston to her Last Will and Testament, in the proceedings in this case mentioned, wherein she gave and bequeathed the pictures, miniatures, and other articles to the Trustees of the Corcoran Gallery of Art, and in the event of the Government establishing in the City of Washington a National Art Gallery, then that the said pictures and other articles above mentioned should be delivered to the said National Art Gallery and become its property; and that the said National Art Gallery is the National Art Gallery established by

the United States of America at, and in connection with, the Smithsonian Institution, located in the District of Columbia, and described in the Act of Congress entitled an Act to establish the "Smithsonian Institution" for the increase and diffusion of knowledge among men, approved August 10, 1846 (9 Stat. L., 103; Title LXXIII, sec. 5579, R. S., U. S.), and the subsequent acts of Congress amendatory thereof; and it is further adjudged, ordered, and decreed that the United States of America is entitled to demand and receive from the surviving Executors of the said Harriet Lane Johnston, the Complainants named in the bill of complaint in this case, all of the above-mentioned pictures, articles of sculpture, engravings, miniatures, and other articles, the same to be and become a part of the said National Art Gallery so established by the United States of America at, and in connection with, the said Smithsonian Institution.

* * * * *

WENDELL P. STAFFORD, *Justice*.

The collection was therefore assigned to its care. Since that time the national collections have increased rapidly, chiefly, however, through gifts and bequests of art works by patriotic citizens.

It is a noteworthy fact that until the beginning of the year 1920-21 no appropriation had been made for the gallery or for the purchase of art works, and no provision for the employment of a salaried curator or other employees of the gallery, all works of art being associated with the department of anthropology of the National Museum. It happened thus that the organization of the gallery as a separate unit of the Institution did not require any radical change in the personnel of the gallery, the curator of the department of anthropology, who had previously cared for the art collections, becoming director, and the recorder of that department becoming the recorder of the gallery.

THE HENRY WARD RANGER FUND.

Fortunately, a liberal private fund has recently become available for the increase of the collections. The will of the late Henry Ward Ranger provides the sum of \$200,000, the interest of which is to be devoted to the purchase of works of art for the National Gallery, the carrying out of the bequest being intrusted to the National Academy of Design. The provision is as follows:

All pictures so purchased are to be given by the Council to Art institutions in America, or to any library or other institutions in America maintaining a gallery open to the public, all such gifts to be upon the express condition that the National Gallery at Washington, administered by the Smithsonian Institute, shall have the option and right, without cost, to take, reclaim, and own any picture for their collection, provided they exercise such option and right at any time during the five-year period beginning ten years after the artist's death and ending fifteen years after his death; and, if such option and right is not exercised during such period, the picture shall remain and be the property of the institution to which it was first given.

The purchases so far made by the council of the academy are as follows:

Title.	Artist.	Date of purchase.	Assigned to—
1918-19.			
1. December Uplands. 1919-20.	Bruce Crane.....	Apr. 27, 1919	Syracuse Museum of Art.
2. Evening Tide, California.	Wm. Ritschel.....	Jan. 11, 1920	National Gallery.
3. Grey Day.....	W. Granville-Smith.....	do.....	Do.
4. The Rapids.....	W. Elmer Schofield...	May 2, 1920	Brooklyn Museum.
5. The Orange Bowl. 1920-21.	Anna Fisher.....	do.....	Rhode Island School of Design, Providence, R. I.
6. The Flower Girl...	Helen M. Turner.....	Apr. 4, 1921	Detroit Institute of Art, Detroit, Mich.
7. Shrine of the Rain Gods.	E. Irving Couse.....	do.....	Toledo Museum of Art, Toledo, Ohio.
8. The Moate Range..	Aldro T. Hibbard.....	do.....	Portland Society of Art, Portland, Me.
9. A Corner in Central Park.	Arthur J. E. Powell.....	do.....	Milwaukee Art Institute, Milwaukee, Wis.
10. Central Park and the Plaza.	Wm. A. Coffin.....	do.....	Brooks Memorial Art Gallery, Memphis, Tenn.

The advisory committee of the gallery took up the question of the acceptability of these works, but it was later decided that the question of acceptance could more appropriately await final consideration until the dates of recall provided for by the bequest, namely, the five-year period beginning ten years after the artist's death in each case.

THE NATIONAL PORTRAIT COMMITTEE.

A second agency of primary importance to the gallery and to American history is found in the organization and activities of the National Portrait Committee. In January, 1919, a number of patriotic citizens and patrons of art realized that if the United States was to have a pictorial record of the World War it would be necessary to take immediate steps. A number of the distinguished leaders of America and of the Allied Nations were approached and their consent secured for the painting of their portraits by prominent American artists. With the indorsement of the Smithsonian Institution as custodian of the National Gallery of Art, the American Federation of Arts, and the American Mission to Negotiate Peace, then in session at Paris, the National Portrait Committee came into being for the purpose of carrying out this idea and thus initiating and establishing in Washington a National Portrait Gallery. The members of the committee as organized are: Hon. Henry White, chairman; Herbert L. Pratt, secretary and treasurer; Mrs. W. H. Crocker, Robert W. deForest, Abram Garfield, Mrs. E. H. Harriman,

Arthur W. Meeker, J. Pierpont Morgan, Charles P. Taft, Charles D. Walcott, and Henry C. Frick (deceased).

That the gift of these paintings to the National Gallery might be thoroughly national in character, it was decided that a group of these portraits, financed by the art patrons of any city, would be inscribed as presented to the National Gallery by that city and that a representative of that city should become an honorary member of the National Portrait Committee. It was further decided that a tablet or other permanent record in the National Portrait Gallery should bear the names of the National Portrait Committee, including the chairmen of all local committees; and that there should be a record of the names of each subscriber to the purchase fund.

Twenty portraits completed under this arrangement were exhibited in the National Gallery during the month of May, 1921, and these, with such others as may be subsequently completed, will be shown in a number of cities throughout the United States before being permanently installed in Washington. The exhibition is being circulated under the auspices of the American Federation of Arts. The portraits available for exhibition at the close of the year are as follows:

By Cecilia Beaux:

Admiral, Sir David Beatty.
Premier Georges Clemenceau.
Cardinal Desire Joseph Mercier.

By Joseph De Camp:

Premier, Sir Robert Laird Borden.
General, Sir Arthur William Currie.

By Charles Hopkinson:

Premier Joan J. C. Bratiano.
Premier Nikola Pashich.
Prince Kimmochi Saionji.

By John C. Johansen:

Field-Marshal, Sir Douglas Haig.
Marshal Joseph Joffre.
Gen. Amando Diaz.
Premier Vittorio Emanuele Orlando.
Signing of the Peace Treaty, June 28, 1919.

By Edmund C. Tarbell:

Marshal Ferdinand Foch.
Gen. Georges Leman.
Woodrow Wilson.

By Douglas Volk:

His Majesty Albert I of Belgium.
Premier David Lloyd George.
Gen. John Joseph Pershing.

By Irving R. Wiles:

Admiral William Snowden Sims.

The portraits to be added, according to the plans of the committee, are:

By Jean McLane:

Her Majesty Elizabeth, Queen of the Belgians.

Premier William Morris Hughes.

Premier Eleutherios K. Venizelos.

By Edmund C. Tarbell:

Herbert Clark Hoover.

Through the courtesy of the American Federation of Arts these portraits were exhibited for a short period (May 5-22) in the large middle room of the gallery, where they attracted much attention. During this period the federation held its annual meeting in Washington, and on May 18 the Regents of the Smithsonian Institution gave a reception to the federation in the halls of the gallery, which was well attended by the members and by the citizens of Washington.

ART WORKS ACQUIRED DURING THE YEAR.

Aside from the Ranger purchases and the war portraits, the permanent acquisitions for the year are as follows:

An oil portrait of the late Julius Bien, painted by George Da Madura Peixotto in 1886. Gift of Mr. Julius Bien, of New York, through the Hon. Simon Wolf.

Monarch of the Farm (Norman bull), by William Henry Howe, N. A., painted in 1891. Gift of Mrs. William Henry Howe (Mrs. Julia May Clark Howe).

The Gathering Storm, by Eugène Louis Gabriel Isabey, 1864. Presented by Mrs. Gibson Fahnestock, in Memory of Maj. Clarence Fahnestock, of the American Expeditionary Forces.

Love and Life, by George Frederick Watts, R. A. Gift of the artist to the American people in 1898; accepted by act of Congress approved July 23, 1894; transferred to the gallery from the White House on March 24, 1921.

Portrait of a Gentleman (with white wig), attributed to Sir Godfrey Kneller (1646-1723). Bequeathed by Miss Caroline Henry.

Soldat de Crimée, by Harriet Blackstone. Gift of Mr. Barent G. Poucher and his wife, Florence Holbrook Poucher.

Portrait bust (white marble) of Hon. John Sherman, by Daniel Chester French, N. A., 1886. Gift of Lieut. John Sherman McCallum, through Mr. Charles Moore.

Portrait bust (bronze) of Brig. Gen. Joseph Wheeler, by William Rudolf O'Donovan, A. N. A. Gift of the memorial committee and contributors, through Mr. Henry Clews, surviving member of the committee.

The Wanderlusters' Rest, by William Henry Holmes. Gift of the artist.

The walk to Gethsemane, by Johannes Adam Simon Oertel. Gift of Mr. J. F. Oertel.

LOANS.

Although, on account of the shortage of space in the gallery, additional loans are not readily exhibited, the following were accepted during the year:

Portrait of Dr. William Healy Dall and a full-length portrait of George Washington, by Wilford Seymour Conrow. Lent by the artist. The latter was withdrawn before the close of the year.

Genevra dei Benci, attributed to Leonardo da Vinci (1452-1519). Lent by the Misses Janet R. and Mary Buttles.

Athena, attributed to Simon De Vos (1603-1676). Lent by Miss May Warner. Withdrawn before the close of the year.

Five portraits: lent by Mrs. Archibald Hopkins (Mrs. Charlotte Everett Wise Hopkins) as follows: Col. Mark Hopkins, Continental Army, artist not given; Dr. Mark Hopkins, pastel by Sarony of New York; Hon. Edward Everett, by Asher Brown Durand; Mrs. Edward Everett, by Gambadella; and Charlotte Brooks Everett (later Mrs. Henry Augustus Wise), by George P. A. Healy.

Portrait of Surgeon Baily Washington, jr., United States Navy, (1787-1854), artist not given. Lent by Miss Alice M. Reading, his granddaughter.

Portrait of Miss Ellen Day Hale, by Mrs. Margaret W. Lesley Bush-Brown. Lent by the artist.

Christ in the Temple, by J. B. Tiepolo; The Doctor's Visit, by Jan Steen; Dedham Vale, by John Constable; and A Young Dutch Girl, by N. Drost. Lent by Mr. Ralph Cross Johnson.

Portrait of Mrs. Charles Eames, by Gambadella. Lent by Mrs. A. Gordon-Cumming.

Portrait of George Washington, by Rembrandt Peale; portrait of John Van Schaick Lansing Pruyn, by Charles Loring Elliott. Lent by the Hon. Charles S. Hamlin.

Seven Cameos—the Pickering Dodge collection. Lent by Mrs. Charles W. Rae.

Portrait bust (bronze) of Maj. Gen. George Owen Squier, Chief Signal Officer, United States Army, by Moses Wainer Dykaar. Lent by Gen. Squier.

Portrait bust (marble) of the late Senator Justin Smith Morrill, of Vermont, by Preston Powers. Lent by Dr. Charles L. Swan through Senator W. P. Dillingham.

Statue of Pan (white marble). Lent by Brig. Gen. George P. Scriven, United States Army.

DISTRIBUTIONS.

Loans have been withdrawn by the owners as follows: Full-length portrait of George Washington, by Wilford S. Conrow, returned to Mr. Conrow on his request. Athena, attributed to Simon De Vos, was withdrawn by Miss May Warner.

In November, 1920, five paintings, the property of the National Gallery, by five living American artists, were lent to the American Federation of Arts to be associated with twelve other notable paintings from other sources on an exhibition circuit, which included Davenport, Iowa; Moline, Mich.; Syracuse, N. Y.; Memphis, Tenn.; Oklahoma City, Okla.; Jackson, Mich.; and Ann Arbor, Mich. The five paintings—*Caresse Infantine*, by Mary Cassatt; *A Family of Birches*, by Willard Metcalfe; *The White Parasol*, by Robert Reid; *November*, by Dwight Tryon; and *Southwesterly Gale*, by Frederick J. Waugh—were returned to the gallery near the close of the fiscal year.

Mrs. Augusta H. Saint-Gaudens withdrew her bust of Lincoln for a Saint-Gaudens exhibit at the Carnegie Institute, Pittsburgh, Pa., in the early part of 1921. It was returned to the gallery at the close of the exhibit.

THE NATIONAL GALLERY OF ART COMMISSION.

An important forward step in the development of the gallery was made during the year. On May 27, 1921, the Board of Regents of the Institution, having the future of the gallery in mind, took the initial steps in the establishment of the National Gallery of Art Commission, formulating a plan of organization and naming the following board to take the steps necessary to its elaboration:

Public men interested in fine arts: W. K. Bixby, Joseph H. Gest, Charles Moore, James Parmelee, Herbert L. Pratt.

Experts: John E. Lodge, Frank Jewett Mather, jr., Charles A. Platt, Edward W. Redfield.

Artists: Herbert Adams, Edwin H. Blashfield, Daniel Chester French, Gari Melchers, William H. Holmes.

Dr. Charles D. Walcott, secretary of the Institution, was named a member of the commission *ex officio*.

The primary functions of the commission are "to promote the administration, development, and utilization of the National Gallery of Art, including the acquisition of material of high quality representing the fine arts; and the study of the best methods of exhibiting material to the public and its utilization for instruction."

At the first meeting of the commission, June 8, the organization was completed and committees were appointed to take charge of the various branches of the work. These are: Executive committee,

Charles Moore (chairman) Herbert Adams, Daniel Chester French, W. H. Holmes (secretary), James Parmelee, and Charles D. Walcott; advisory committee (chairman to be named), Herbert Adams, Edwin H. Blashfield, W. H. Holmes, Gari Melchers, Charles A. Platt, and Edward W. Redfield; and 12 special committees: (*a*) On ancient European paintings, Frank Jewett Mather, jr., chairman; (*b*) on prints excepting the oriental, James Parmelee, chairman; (*c*) on sculpture, Herbert Adams, chairman; (*d*) on American paintings, Edward W. Redfield, chairman; (*e*) on mural paintings, Edwin H. Blashfield, chairman; (*f*) on ceramics, Joseph E. Gest, chairman; (*g*) on oriental art, John E. Lodge, chairman; (*h*) on modern European art, Gari Melchers, chairman; (*i*) on architecture, Charles A. Platt, chairman; (*j*) on portrait gallery, Herbert L. Pratt, chairman; (*k*) on textiles, ———, chairman; and on building, Charles Moore, chairman. The executive committee met and organized on June 17, 1921, and at the close of the year considerable progress had been made in the organization of the special committees.

The value of the National Gallery collections already in hand is estimated at several million dollars, their acquirement being due entirely to the generous attitude of American citizens toward the National Gallery of Art, no single work of painting or sculpture now in its possession having been acquired by purchase. It can hardly be doubted that when a building is provided in which contributions can be cared for, and exhibited to the public in the manner they deserve, many collectors seeking a permanent home for their treasures will welcome the opportunity of placing them in the custody of a national institution. The providing of a suitable building for the gallery is all that is necessary to make Washington in the years to come an art center fully worthy of the Nation.

The act of Congress establishing the institution provided for a department or gallery of the fine arts and limited its scope to paintings, sculpture, engravings, and architectural designs—limitations which experience has shown lack elasticity, since the fine arts extend in various directions into other fields of culture. The chief difficulty in confining the collections to this narrow field is that, while the institution has depended, and must depend very largely, on gifts and bequests for its development, these gifts and bequests contain a large percentage of art material quite outside of the limitations indicated, as illustrated in the Freer, the Harriet Lane Johnson, and the Pell collections. It would thus appear that the gallery may well anticipate that when a building is provided for art, the scope of the subject matter will necessarily extend to all branches furnishing art material rising into the realm of the fine arts as manifestly contemplated in the organization of the gallery commission.

A chief undertaking of the year was the preparation of an illustrated catalogue of the collections, which is practically ready for the printer at the close of the year. An illustrated catalogue of the Ralph Cross Johnson collection of paintings by old masters, written by Mr. George B. Rose of Little Rock, Ark., was published in the September (1920) number of the journal, *Art and Archaeology* (Vol. X, No. 3), and copies of this have been on sale during the year in the room devoted to these works.

LIST OF PUBLICATIONS.

FINE ARTS.

The National Art Committee Exhibition of War Portraits: Signing of the Peace Treaty, 1919, and Portraits of Distinguished Leaders of America and of the Allied Nations. Painted by Eminent American Artists for Presentation to the National Portrait Gallery. National Gallery of Art, under Direction of the Smithsonian Institution, Washington, D. C., May 5 to 22, 1921. Catalogue of the Portraits by Florence N. Levy. 30 pages and cover, illustrated. Irving Press, New York, 1921. Copyright, 1921, by The National Art Committee.

Rose, George B. The Ralph Cross Johnson Collection in the National Gallery at Washington, D. C. 24 illustrations. *Art and Archaeology*, Vol. X, No. 3, Sept. 1920, pp. 75-110.

A critical and appreciative review of the collection of twenty-four old masters of the Florentine, Bolognese, Venetian, Flemish, Dutch, and British schools presented to the National Gallery by Mr. Ralph Cross Johnson, of Washington, followed by an editorial announcement of the separate organization of the National Gallery of Art, pp. 109-10.

LIBRARY--THE HUGHES ALCOVE.

Considerable advance was made during the year in the accumulation of an art library, numerous art books and art periodicals having been added to the publications previously acquired by the gallery. By the will of the Rev. Bruce Hughes, of Lebanon, Pa., who died on March 20, 1916, a sum estimated at about \$9,000 was bequeathed to the institution, "the sum so received to be invested and the income alone used to found the Hughes Alcove of the said Smithsonian Institute." It is intended to devote this income to the interests of the National Gallery, as the Institution feels that the desire of the testator can most fittingly be accomplished by the establishment and maintenance of an alcove or section in the library of the gallery, for reference works on art which shall serve as a permanent memorial to the founder. No part of the fund has as yet been expended.

GALLERY HOUSING.

The national collection of art works so far as intrusted to the Smithsonian Institution, were first accommodated in the Smithsonian Building and later in the National Museum Building, now

the Museum of Arts and Industries. In 1910 they were transferred to the central sky-lighted hall of the recently erected Museum of Natural History. This hall was appropriately subdivided by partitions for the purpose. The space thus made available is, however, entirely inadequate to the actual needs of the gallery, and until an additional building is provided expansion must be at the further expense of the already seriously embarrassed natural history and associated departments.

The art collections are open to the public on every week day during the year, holidays included, from 9 o'clock a. m. to 4.30 o'clock p. m., and on Sundays from 1.30 to 4.30 p. m.

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 first annual report on the Freer Gallery of Art, for the year ending June 30, 1921.

THE COLLECTION.

The entire Freer collection and all other objects delivered to the Smithsonian Institution, Freer Gallery of Art, by the executors of the will of Charles L. Freer, reached the building by November, 1920, and on June 15, 1921, receipt in full of all objects thus delivered was formally acknowledged by the Institution. The following list is offered as an indication of the nature and number of the objects received.

WORKS OF ART.		Chinese.	
<i>American.</i>		Furniture -----	22
By James McNeill Whistler:		Glass -----	14
Drawings -----	117	Ivory, bone, horn, and mother-of-pearl -----	8
Engravings (wood) -----	3	Jade and other hard stones -----	503
Etchings, including dry-points -----	683	Lacquer -----	17
Lithographs -----	194	Metal work:	
Paintings—		Bronze -----	678
Oils -----	67	Iron -----	19
Watercolors -----	47	Pewter -----	8
Pastels -----	40	Silver -----	20
Peacock room and 17 wainscot panels.		Paintings -----	1,255
Plates (copper) -----	38	Pottery -----	481
By other artists:		Sculpture:	
Paintings—		Stone -----	183
Oils -----	96	Wood -----	13
Watercolors -----	6	Textiles -----	183
Pastels -----	47		
Silver-points -----	3	<i>Cypriote.</i>	
Pottery -----	34	Glass -----	1
Sculpture, bronze -----	2	Metal work, gold -----	1
<i>Babylonian.</i>			
Metal work, bronze -----	1	<i>Egyptian.</i>	
<i>Byzantine.</i>		Glass -----	1,391
Crystal -----	1	Ivory, bone -----	4
Manuscripts, Greek Biblical, complete and fragmentary -----	29	Metal work:	
Metal work, gold -----	8	Bronze -----	7
Paintings, illustrations -----	10	Gold -----	1
<i>Cambodian.</i>		Pottery -----	254
Ivory -----	6	Sculpture:	
Metal work, bronze -----	4	Stone -----	34
		Wood -----	6
		<i>Greek.</i>	
		Metal work, bronze -----	2
		Pottery -----	1

<i>Italian.</i>		<i>Near Eastern and East Indian—Cont.</i>	
Furniture -----	1	Pottery -----	317
Pottery -----	4	Textiles -----	16
Textiles -----	1		
<i>Japanese.</i>		<i>Palmyran.</i>	
Lacquer -----	29	Sculpture, stone -----	1
Metal work :		<i>Tibetan.</i>	
Bronze -----	42	Paintings -----	13
Iron -----	4		
Silver -----	1	<i>Unclassified.</i>	
Paintings -----	804	Metal work -----	49
Pottery -----	821	Pottery -----	10
Print blocks (wood) -----	20	Sculpture, stone -----	57
Sculpture :		Textiles -----	11
Stone -----	3	Miscellaneous materials -----	50
Wood -----	60		
Textiles -----	79	STUDY ACCESSORIES.	
<i>Korean.</i>		Dies -----	2
Glass -----	7	Electrotype plates -----	107
Jade and other hard stones -----	4	Library :	
Metal work :		Books -----	2, 344
Bronze -----	189	Manuscripts -----	3
Gold -----	6	Reproductions -----	170
Silver -----	2	Rubbings -----	222
Pottery -----	229	Photographs :	
Sculpture, stone -----	14	Lantern slides -----	3, 179
<i>Near Eastern and East Indian.</i>		Negatives -----	693
Books, illustrated -----	18	Print blocks (wood) -----	8
Ivory -----	1	Whistleriana.—19 portraits of Whistler, reproductions, photographs, clippings, Whistler letters, and other documents.	
Metal work :		EQUIPMENT.	
Bronze -----	3	Office, storage, and gallery furniture, etc. -----	122
Silver -----	19		
Paintings -----	139		

Work accomplished during the year includes unpacking and checking the collection and placing the objects in their respective storage spaces; examination and classification of the Japanese pottery and Chinese paintings; urgently needed restoration work on 27 oil paintings; renumbering, measuring and cataloguing of the entire collection. This latter task, though well under way, is by no means completed.

ACQUISITIONS BY PURCHASE.

Sculpture, stone :

Chinese, period of the Six Dynasties. Two large slabs carved in high relief with Buddhist scenes.

Chinese, T'ang? A tiger.

Photographic negatives—70, representing objects in the Freer collection.

BUILDING AND INSTALLATION.

The principal work accomplished during the year includes completion of certain electrical equipment and of gallery equipment such as register faces, pipe rails, and skylight glass; the installation of two additional lavatories and a carpenter's workshop; the provision of asbestos screens for the windows of the peacock room to prevent condensation of moisture on the glass; the building of partitions in

study room 2; the construction of storage cases for Chinese and Japanese panel pictures, for pottery, and for stone sculpture. Still under way is the rebuilding of the dais in gallery 18; the recoloring of the gallery walls throughout; the construction of storage bags and boxes for Japanese screens.

Early in June, the Institution formally and with certain reservations accepted the building from the architect, Mr. Charles A. Platt.

Thanks are due Mr. Stephen Warring, to whose care in packing and unpacking the collection may be attributed the transference of the whole from Detroit to the storages of the Freer Gallery without a mishap; Prof. Edward S. Morse for his expert opinion on the Japanese pottery; Mr. H. E. Thompson for his skillful work of restoration on the Whistler oil paintings; and, above all, Miss Rhoades and Miss Guest, both of the staff, without whose constant devotion to the Freer Gallery and its every interest, most of the progress here recorded would have been impossible.

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, 1921, conducted in accordance with the act of Congress approved June 5, 1920. 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 necessary employees and the purchase of necessary books and periodicals, \$44,000.

In the expenditure of this money the chief has tried to cover the field as economically as possible and to broaden the researches of the bureau staff in order to include as many stocks of Indians as the limited appropriation will allow. The science of ethnology is so comprehensive and its problems so numerous and intricate that to do this scientifically is extremely difficult. Work has been done on the Algonquian, Iroquois, various members of the Muskhogean stock, Kiowa, Pueblo, Osage, Pawnee, and others. The plan of work embraces many different aspects of the cultural life of the Indians, including their languages, social and religious customs, music, mythology, and ritual.

Researches have been made on the condition of the Indians in their aboriginal state before or directly after the advent of the Europeans, and the desire has been to increase the relative amount of field-work. Archeological explorations have been prosecuted in Texas, Missouri, Tennessee, Kentucky, Colorado, New Mexico, and the Hawaiian Islands. This line of study is destined to become the most popular in anthropology, and publications on the subject are always eagerly sought by the correspondents of the bureau.

To the development in recent years of the movement known as "See America First" we owe in part the creation of a bureau of the Department of the Interior called the National Park Service. Incidentally the movement has stimulated a desire for research in both ethnology and archeology. Several monuments and one national park have been set aside by presidential proclamation to preserve Indian relics which they contain. The main attractions of most of

these reserves are ancient buildings more or less dilapidated and buried underground, and to increase their educational value it is necessary that they be excavated under the supervision of men trained in the scientific methods of the archeologist. They should also be repaired by equally competent hands. This work is now being shared with other institutions, but it is desirable that the Bureau of American Ethnology should continue to occupy a very prominent place in this work, in which it was the pioneer, as its appropriation was made in part for this service.

While the majority of these monuments are prehistoric cliff dwellings or pueblos situated in our Southwest, there are others of equal interest in other parts of the country. For instance, among the most instructive of these monuments is the Kasaan Monument, an abandoned Haida village situated in Alaska. This village has many of the old totem poles, several "grave houses," and other buildings still standing, but rapidly going into ruin, liable to be destroyed by fire or by vandals. It is very desirable that steps should be taken to preserve this deserted town and that ethnological studies be made before these relics are lost to science. The bureau is also contributing its part, in an unobtrusive manner, in the efforts to preserve Cahokia, the largest aboriginal mound in North America.

In his previous reports the chief has annually called attention to the time consumed by the staff in answering correspondence asking information regarding American ethnology and related subjects. Some of these letters request elementary knowledge, others demand more or less research. Whether for the one or the other purpose, they often necessitate investigation and absorb considerable time, which tends to distract the attention of the experts from intensive scientific research, thus causing the scientific output to be reduced to a greater or less degree. The chief regards this aspect of the work of the bureau as a very important one and indicative of the respect in which the bureau is held by its correspondents. For this reason replies have been prepared with great care, so that they may be reliable and authoritative.

FIELD RESEARCHES OF THE STAFF.

Two members of the staff, the chief and Dr. Truman Michelson, engaged in field exploration at some time during the year.

During the past year the chief made three visits to the Mesa Verde National Park, Colo.; one in July and August and another in November, 1920. On the second visit he was the guest of Mr. Stephen T. Mather, Director of the National Park Service, Mr. F. A. Wadleigh, general passenger agent of the Denver & Rio Grande Railroad, and other gentlemen. The object of this visit was an inspection of past work in the park and formulation of plans for the future. The

work in July and August was a continuation of cooperative work of the Bureau of American Ethnology and the National Park Service, with an allotment by the latter for the excavation and repair of the ruins in the park. A third visit was made in May and June, 1921, at the expense of the bureau.

In the report for 1920 attention was called to the beginning of the work of excavating a ruin known as Painted House, which is situated near the head of Fewkes Canyon, $2\frac{1}{2}$ miles south of Spruce Tree Camp. The result of this work, which was not finished at the close of last year, intensified the suspicion that this large cliff building was used for some communal purpose, and that it was connected with the worship of fire. The further excavation of this ruin was continued in July, when the floor of a great court was laid bare, verifying this suspicion and giving undoubted evidence of the existence of a large fireplace in the middle of the court. Taken in connection with other evidence, the statement that this was a building devoted to fire worship is practically proven. Fire Temple, as it may be designated, was completely excavated and its walls repaired. Ladders were so placed as to make it accessible to the public.

To facilitate the opening of Fire Temple to visitors, a road was constructed along the southern rim of Fewkes Canyon, ending in what is now called Sun Point, from which a magnificent view can be obtained of Sun Temple, Cliff Palace, and other important ruins of the Mesa. The importance of this road is reflected by its popularity; it is now the most frequented road on the park. Its construction also opened to visitors two little-known ruins near Fire Temple, one of which has been known for several years as Oak-tree House and the other as Fire Temple House. The walls of the latter were deeply buried but were completely excavated, bringing to light a most interesting cliff dwelling with kivas in a lower and storage rooms in an upper cave. A number of large ollas and a few unique specimens of black and white pottery and other artifacts were found in this ruin. The indications are that this was the dwelling and granary of the New Fire clan or of the priests who controlled the ceremonies in the Fire Temple. The ventilator of one kiva of this cliff dwelling resembled those of Sun Temple.

Oak-tree House lies in a symmetrical cave in full sight of Sun Point Road, about midway between Fire Temple and Sun Temple. The excavation of this ruin, which has unique features, was completed in September, and it is now in condition for inspection by visitors. A trail was constructed along the top of the talus connecting the ruins in Fewkes Canyon and ladders placed on the rim of the canyon, making access to the ruins easy. These ladders follow the Indian trails, formed of foot holes cut in the perpendicular walls of the cliff.

One of the most interesting results of work in July, 1920, was the excavation of a tower situated in the cedars about a mile north of Spruce-tree Camp and described in 1892 by Baron G. Nordenskiöld. This tower, which will in the future be called Cedar-tree Tower, enlarges our knowledge of the use of towers, as it is a type of a large number of these structures found on the Mesa Verde and in McElmo and Yellowjacket Canyons. The special feature of this type before excavation is indicated by a saucer-like depression on the surface of the ground south of the walls above ground. The significance of this depression was unknown previously to the work here mentioned. It marks the existence of a circular subterranean kiva which once had a vaulted roof, and pilasters like those repeatedly described in cliff-house kivas. This tower was completely repaired and a road built around it to make it accessible to tourists.

In his field-work at Mesa Verde 30 years ago Baron Nordenskiöld, whose *Cliff Dwellers of the Mesa Verde* has become a classic, partially excavated a ruin in Soda Canyon about half a mile north of Cedar-tree Tower. The approach to this cliff dwelling was very difficult, but has been much improved by a trail constructed under the direction of the chief, making this ruin readily accessible, aided by several ladders where necessary.

The attractive feature of this ruin is a kiva, the inner wall of which still retains on its plastering decorations almost as brilliant as when they were first made. On this account "Ruin 9," as it was formerly called, will be referred to in the future as Painted Kiva House. The decoration consists of a red dado below and white above, with triangles in clusters of three at intervals on the upper border of the dado. These decorations are identical with those on the court and rooms of Fire Temple, and those used by the Hopi in decorating their walls 30 years ago. The row of dots which accompanies this mural decoration is also a common feature on the archaic black and white pottery from Step House, one of the most ancient cliff dwellings on the park.

Many specimens were found in Painted Kiva House, among which may be mentioned pottery, stone implements, metates, axes and celts, bone needles, fabrics, sandals and problematic wooden objects. Several ears of corn with kernels intact, seeds of squash and pumpkin, and abundant cornstalks and shucks left no doubt of the food of the inhabitants. A fragment of the so-called paper bread called by the Hopi piki, possibly over 500 years old, found at the bottom of an Oak-tree House kiva, allays any doubt on this point.

Future field-work on the Mesa Verde ought to be especially directed to the study of the relation of the Earth Lodge culture and that of the pueblo, in which is included the cliff dwellings and

pueblos on top of the mesa. Both are characterized by distinctive pottery as well as architecture, although the essential features of the former are not very well known. Aztec and the Chaco ruins have local differences from the Mesa Verde, but it is not known which area first lost its population. Both populations flourished at about the same time, and it is believed the cliff dwellings on the Mesa Verde were older than the community houses of the Chaco Canyon.

In May, 1921, the chief resumed his work on the Mesa Verde, remaining there until the close of the fiscal year. During this time he completed the excavation of Far View House, and protected with a cement groat the tops of about two-thirds of all the walls of rooms.

About 385 feet north of Far View House, on higher land, in about the center of the cluster of 16 mounds that are included in the Mummy Lake group, the excavation of a most interesting building wholly buried under fallen walls was begun. Enough work was done to show that it is a remarkable type of building, consisting of a central circular tower with several subterranean rooms or kivas on the south side, overlooking a large cemetery. It has all the appearance of a necropolis of the cluster, and important results await its final excavation. Unfortunately work on this mound had to be suspended at the close of the fiscal year.

The Mummy Lake cluster of mounds is a typical village and is duplicated again and again on the mesa and the surrounding valleys. The complete village consists of buildings of several forms and functions, isolated or united, although the components are largely habitations of the unit type. Evidently the tower, with its accompanying kivas and cemetery, was the necropolis but not a habitation. The spade alone can divine the true meaning of members of this group.

In May the tops of all the walls of Sun Temple were recemented with groat to protect the walls from snow and rain, a work of no small magnitude.

During the entire year Mr. James Mooney, ethnologist, remained in the office, engaged in formulating replies to ethnologic inquiries and in digesting material from former western field seasons. No new material was collected or completed. His work during the winter was interrupted by a period of serious illness.

During the last fiscal year Dr. John R. Swanton, ethnologist, practically completed the proof reading of Bulletin 73, *Early History of the Creek Indians and Their Neighbors*, which is now going through the press. He also copied the Koasati texts which were collected a few years ago, and completed the extraction of words from these texts, of which a beginning was made last year.

Dr. Swanton has added a few hundred cards to his material bearing on the economic basis of American Indian life, and has gone over

Mr. James Murie's paper on the Ceremonies of the Pawnee twice, in order to make certain necessary changes in the phonetic symbols employed. He has also devoted some time to studies of the Alabama, Hitchiti, and Muskogee languages.

Dr. Swanton also continued the preparation of a paper on the Social Organization and Social Customs of the Indians of the Creek Confederacy, covering over 700 manuscript pages.

During the entire fiscal year Mr. J. N. B. Hewitt, ethnologist, was engaged in office work. His first work was devoted to the completion of the preparation by retyping of the Onondaga texts of the second part of the Iroquoian Cosmology, the first part having appeared in the Twenty-first Annual Report of the Bureau. Not only is the orthography of a large number of the native terms being standardized to conform in spelling with the other Iroquoian texts recorded by Mr. Hewitt but the statements and phrasing of numerous passages are also amplified or amended in such manner as to utilize information obtained by Mr. Hewitt since the recording of the original texts.

Mr. Hewitt also took advantage of the opportunity presented by the presence in Washington of Mr. George Gaboosa, a mixed-blood Chippewa Indian of Garden River, Ontario, Canada, who speaks both Chippewa and Ottawa dialects of Algonquian, by securing his aid in revising and translating a number of Ottawa texts supplied in 1900 by John Miscogeeon, an Ottawa mixed-blood, then in Washington, D. C. These texts are either myths or traditions embodying myths. Mr. Gaboosa supplied the Chippewa versions of these stories. In addition to this work he supplied interlinear translations to all the texts. The following is a list of these texts: The Myth of Nanabozho's Mother; Living Men Visit the Sky-Land; The Myth of Summer and Winter; The Myth of Daylight-Maker, or Daymaker; The Myth of Nanabozho.

Mr. Hewitt is at work on some material relating to the general culture of the Muskogean peoples, especially that relating to the Creeks and the Choctaw. In 1881-82 Maj. J. W. Powell began to collect and record this matter at first hand from Mr. L. C. Perryman and Gen. Pleasant Porter, both well versed in the native customs, beliefs, culture, and social organization of their peoples. Mr. Hewitt assisted in this compilation and recording. In this way he became familiar with this material, which was laid aside for lack of careful revision, and a portion of which has been lost; but as there is still much that is valuable and not available in print it was deemed wise to prepare the matter for publication, especially in view of the fact that the objective activities treated in these records no longer form a part of the life of the Muskogean peoples, and so can not be obtained at first hand.

In addition to this material, it is designed to add as supplementary matter some Creek tales and mythic legends collected by Mr. Jeremiah Curtin.

The following brief list of topics treated may give some idea of the nature of these field notes: "Towns and clan lists," "Crime and murder," "The government of the clan," "The town government or organization of a town," "The council square," "The chief," "The system of councils," "The clan," "The ranks and the title of persons," "The busk or puskita," "Medicine practices," "Names and naming," "Festivals," "Marriage customs," "Insanity," "Prophets," "Souls or spirits," "Mythic notes," and the short list of tales collected by Mr. Curtin. Much of the material here recorded is not available either in any other manuscript or in print.

Mr. Francis La Flesche, ethnologist, devoted nearly all of his time to putting into book form his notes for the second volume of his work on the Osage tribe. This task was twice interrupted by the reading of the galley and the page proofs of the first volume.

The second volume is nearing completion and embraces two versions of an ancient rite entitled "No^{n'}-zhi^{n'}-zho^{n'} Wa-tho^{n'}, Songs of the Rite of Vigil." Up to this date the completed part of this manuscript, exclusive of the illustrations, contains 582 typewritten pages.

Sho^{n'}-ge-mo^{n'}-i^{n'}, who gave the No^{n'}-zhi^{n'}-zho^{n'} ritual of his gens, the Tsi'-zhu Wa-shta-ge, died in the autumn of 1919. He was the fourth to die of the old men who aided in the recording of the ancient tribal rites of the Osage. Two old men died before the time set by them to give the ceremonials of their gentes arrived. Sho^{n'}-ge-mo^{n'}-i^{n'} remarked, as he was recording the child-naming ritual, to be published in a later volume, "The Osage people are fast dying out since they abandoned the supplicatory rites formulated by their ancestors."

The beginning of the fiscal year found Mr. J. P. Harrington, ethnologist, engaged in the preparation of his material on the language of the Kiowa Indians. The entire material was copied, collated, and analyzed, and constitutes a manuscript of more than 1,000 pages.

Kiowa is a typical Tano-Kiowan dialect, closely related in phonetics, vocabulary, and structure with the Tanoan languages of New Mexico. This proves again, as in the case of the Hopi, that culture areas cut across linguistic ones. The Tano-Kiowan is furthermore genetically related to the Keresan and Zuñian groups of New Mexico also to the Shoshonean, and certain languages of California. Mr. Harrington has in hand a comparative study of these languages which is very bulky.

Upon finishing the manuscript of the Kiowa paper, Mr. Harrington took up the Taos material, aided by a set of excellent texts dic-

tated by Mr. R. Vargas, and comprising 400 typewritten pages. He finished this for publication before the close of the fiscal year.

On July 1, 1920, Dr. Truman Michelson, ethnologist, was at Tama, Iowa, engaged in researches among the Sauk and Fox of that State and preparing for publication by the Bureau a manuscript entitled "The Autobiography of a Fox Indian Woman," as far as practical in the field. A good deal of the work on this had been done in the previous fiscal year. Near the close of July he left for Saskatchewan, Canada, where he made a reconnaissance of the Plains Cree at File Hills Agency. From this study it appears that physically the Plains Cree have a cephalic index of about 79, thus belonging to the so-called Mississippi Valley type of North American Indian, which confirms the results of Dr. Boas's work many years ago. Linguistically Cree clearly belongs to the central division of Algonquian languages, but it is not as archaic as has usually been believed. The folklore and mythology here show from an analysis of the culture cycle that both woodland and plains elements are to be found, as well as a few plateau elements. Ethnologically we have the same combination, save that plateau elements are lacking.

Dr. Michelson returned to Washington at the close of August, where he completed the autobiography mentioned above, and in January submitted the manuscript for publication by the bureau. The remainder of his time at Washington was spent working out English translations of various Fox texts written in the current syllabary on mortuary customs and observances, as well as one or two folk tales.

Dr. Michelson left Washington in the latter part of May, 1921, to renew his researches among the Sauk and Fox of Iowa. Arriving at Tama near the end of the month, Dr. Michelson spent nearly all his time on Fox mortuary customs and observances, mentioned above, with a view to their publication by the bureau. The Indian texts were restored phonetically, the translations corrected where needed, a grammatical analysis begun, and additional data secured, so that with the close of the fiscal year only about two weeks more field-work was necessary to complete the preparation of the volume so far as practical in the field. He took advantage of a favorable opportunity just before the end of the year to obtain data on the society called "Ki wa ka mo A ki."

While in the field and also in the office Dr. Michelson corrected proofs of Bulletin 72, *The Owl Sacred Pack of the Fox Indians*.

SPECIAL RESEARCHES.

Four manuscripts have been submitted during the year, entitled "Papago Songs," "Legend Music of the Papago," "Songs Connected With Expeditions to Obtain Salt," and "Viikita and Wakita Cere-

monies of the Papago." This material comprises 148 pages of text, 75 transcriptions of songs (with phonographic records and technical analyses), and 27 photographic illustrations.

Special researches in the field were conducted by Miss Frances Densmore, Mr. W. E. Myer, Prof. J. E. Pearce, Mr. Gerard Fowke, and Mr. J. A. Jeancon.

In September Miss Densmore resumed her work on Papago music, and in December, 1920, returned to the Papago Reservation in Arizona, where she had worked a few months previously. She revisited San Xavier, but her work centered at Sells, formerly called Indian Oasis, but now the location of the Papago agency. Trips were made from there to Santa Rosa village, in the extreme north, and to Vomari village in the extreme south of the reservation. Photographs, specimens, and records of songs were obtained at these places.

The principal subject of study at this time was the belief of the Papago in supernatural agencies controlling their food supply. Information was obtained regarding two ceremonies connected with this belief, i. e., the making and drinking of "cactus wine," and the Viikita. Numerous songs connected with these ceremonies were recorded.

Other classes of songs not previously recorded among the Papago were those received in dreams, those sung on expeditions to obtain salt, and those connected with stories told to children; also songs for success in the kicking-ball race and in hunting. Songs of war and of medicine were recorded, as well as others concerning the deeds of Elder Brother and including songs he was said to have sung after creating the spirits, winds, and clouds. Mention may be made of a song that was said to have been sung in order to produce the death of an aged woman. It was said that "her grandsons decided to kill her by means of a song," as her advanced age made her an incumbrance to them. Many songs have been recorded whose purpose was to procure health, but this is the first instance of a song intended to cause death. An important phase of the musical work was the hearing of a certain class of very old dance songs, a portion of which was in three parts, i. e., the voices of the men, the voices of the women singing the same melody an octave higher, and the voices of two or three women singing (for a brief period) a still higher part, different from the melody. This song was accompanied by the shaking of a gourd rattle and the striking of a basket drum, also by stamping the feet, which is the most primitive manner of marking time. This dance is seldom held at the present time, but was witnessed on the desert late Christmas night.

As a development of the year's work Miss Densmore notes the importance of recognizing estheticism as a factor in Indian music. Her analyses have shown the presence of tones whose interval distances

correspond to those of the first, second, third, and fourth upper partial tones of a fundamental. Thus, in a portion of his melody, the Indian appears to find satisfaction in intervals which are under natural laws. Apart from these tones and intervals it appears, from the evidence in hand, that his choice of tonal material is controlled by a sense of pleasure rather than by "keys" or "modes."

Miss Densmore continued work on her manuscript entitled "Chippewa Arts and Customs." Tabulations of the botanical portions of this book were made as follows: Lists of botanical names, with bibliography, showing the uses of these plants by other tribes; lists of plants used as food, dyes, charms, and for general utility. Miss Densmore made more than 100 blue prints of birch-bark transparencies, showing a wide variety of interesting patterns. These transparencies are made by folding thin birch bark and indenting it with the teeth, the bark, when unfolded and held toward the light, revealing the pattern. This form of Chippewa art is almost extinct at the present time.

In September and October Mr. W. E. Myer, of Nashville, Tenn., excavated, under the auspices of the bureau, Indian village sites on the Gordon farm near Brentwood, Davidson County, Tenn., and also the Fewkes Group at Boiling Spring Academy, Williamson County, in the same State. The remains of an old Indian town at the Gordon site had walls and towers very similar to those of Pacaha, visited by De Soto in 1541. The walls covered an area of 11.2 acres.

When the former inhabitants for some unknown reason abandoned this site they appear to have left nearly all the buildings still standing. The locality was never again occupied or disturbed, but gradually the buildings of the silent and deserted town decayed and whatever vestiges were not destroyed by the elements were slowly buried under a layer of black loam which is now from 14 to 20 inches deep.

In the course of time the site of the buried village gradually became a beautiful grassy glade set here and there with giant forest trees. The charm of the site appealed to one of the first white settlers, who built his home here and preserved the grassy glade for a lawn. No one suspected that an ancient Indian town was lying buried a few inches beneath the surface; but on the surface of this undisturbed lawn there were very faint saucer-shaped depressions and other evidences marking the sites of about 125 dwellings.

When the accumulated superficial black loam was removed from some of these circular depressions floors made of hard packed clay were brought to light. Some of these floors were very pleasing to the eye, being covered with a smoothed and polished coating of fine black, glossy material. The stone slab tops of the coffins of little children were exposed here and there projecting an inch or two above the level of the floor.

A building was uncovered in the center of which was an altar filled with the pure white ashes of the ancient perpetual fire. The neighboring buildings were dwellings with fire beds used for domestic cooking. Stone metates, mullers, and other utensils used for household purposes were likewise found on the floors of these rooms.

Mr. Myer also explored an unnamed group of five mounds and a surrounding village site at Boiling Spring Academy in Williamson County, Tenn. At the request of many citizens of Tennessee he gave this the name of Fewkes Group in honor of Dr. J. Walter Fewkes, Chief of the Bureau of American Ethnology, who had visited the site, recognized its importance, and caused it to be explored.

Archeological field-work was carried on by Prof. J. E. Pearce, of the University of Texas, in cooperation with the bureau. The area examined is situated in the vicinity of the city of Athens, in Henderson County, and during this work Prof. Pearce received many courtesies from Judge A. B. Watkins, who has long manifested an interest in the archeology of the region. Prof. Pearce finds that the eastern Texas region contains numerous mounds, village sites, and burial places, the objects from which are quite different from those found in the central and western portions of Texas. Three interesting mounds on the Morrall farm, 4 miles east of Cherokee County, were investigated. The highest of these mounds measures 80 feet across the base and 45 feet above the level of the base. The second mound is 180 feet long by 75 feet wide, but is only 15 feet high. Most of the mounds in the neighborhood of Athens have been plowed over and have no regularity in form. Several mounds situated in Harrison County, particularly those on the farm of Mr. Lane Mitchell, of Marshall, were examined and remains of earth lodges discovered, in the floor of which are central fire pits. These are probably recent. Numerous other sites were explored, yielding collections of pottery, stone implements, and other objects illustrating the life of the prehistoric aborigines of eastern Texas. Everything found implies that the Indians of this region lived in settled villages, were agriculturists, and made pottery of a high grade of excellence. Their culture was higher than that of the Indians who occupied the central region of Texas, investigated in 1919.

With a small allotment, Mr. J. A. Jeancon carried on important archeological work on a ruin at Llano, near Rancho de Taos, N. Mex., and obtained a valuable collection from a locality not represented in the Museum.

The architectural features and relations of the kiva and secular rooms of this ruin recall those of the cliff dwellings and pueblos of the Mesa Verde. The circular subterranean kiva that was excavated proved to be almost identical with a typical Mesa Verde kiva, veri-

fying the legends that the modern Taos Indians are a mixed type containing Pueblo elements, probably of northern origin.

This kiva was embedded in house walls not free from secular buildings as in modern Taos and showed evidences of two occupations, or one kiva built inside another. It had no pilasters for the support of a vaulted roof, but there were in the floor four upright posts upon which a flat roof formerly rested. In the floor was an excellent fireplace and a plastered pit the purpose of which is problematical.

Mr. Jeancon's work attracted wide attention, and many persons visited the site while he was at work. Members of the chamber of commerce in Taos declared their intention to protect the excavated walls by means of a shed.

The chief visited the ruin before excavation began and inspected the excavations after they had been completed.

Mr. Gerard Fowke represented the bureau at the meeting of the Pan Pacific Congress in Honolulu and made a special study of the archeology of the Hawaiian Islands. He found that all the aboriginal remains on the islands are the work of the present Hawaiian race, indicating that when the earliest of these people came there the islands were without inhabitants. No archeological evidences were found of any prehistoric population; and, so far as can be ascertained, excavations would not result in the discovery of any specimens essentially different from those that can be seen on the surface or may be found slightly covered by very recent natural accumulation. At the same time, as all the remains are well worthy of study and preservation, the islands furnish opportunity for further research. His report on the temples, terraces, and other remains has been received and awaits publication.

Dr. Clark Wissler has given what time he could spare from his duties as chairman of the division of anthropology and psychology of the National Research Council to the completion of a Pawnee manuscript, in which he has been aided by Mr. James R. Murie. The music necessary for this has been transcribed by Miss Helen Roberts, and Dr. John R. Swanton has also assisted in this work.

During the fiscal year Mr. D. I. Bushnell, jr., completed a manuscript bearing the title: "Villages of the Algonquian, Siouan, and Caddoan Tribes West of the Mississippi." While engaged in the preparation of this manuscript he also secured many notes on the burial customs of the same tribes, and these, together with much additional material, are being used in the preparation of another manuscript, entitled "Burials of the Algonquian, Siouan, and Caddoan Tribes West of the Mississippi."

Miss Mary Lois Kissell has begun the preparation of the manuscript of a bulletin on weaving of the Northwest Coast Indians, which

it is hoped will be later followed by others on other geographical areas.

A small allotment was given to Mr. Gerard Fowke to carry on special archeological work in Greenup, Ky., near Portsmouth, Ohio, on mounds figured and described by Squier and Davis and T. H. Lewis. On the opposite bank of the Ohio River a celebrated cache of pipes has been found, and it was hoped that a similar deposit might be discovered near the effigy mound on the south side. The results of this examination are negative so far as the object desired was concerned, but resulted in several interesting observations of a nature too technical to discuss in this place.

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.

- Bulletin 67. Alesá Texts and Myths (Frachtenberg). 304 pp.
- Bulletin 71. Native Cemeteries and Forms of Burial East of the Mississippi (Bushnell). 160 pp., 17 pl.
- Bulletin 72. The Owl Sacred Pack of the Fox Indians (Michelson). 83 pp., 4 pl.
- List of Publications of the Bureau of American Ethnology. 44 pp.

PUBLICATIONS IN PRESS OR IN PREPARATION.

- Thirty-fourth Annual Report. Accompanying paper: A Prehistoric Island Culture Area of America (Fewkes).
- Thirty-fifth Annual Report.—Accompanying paper: Ethnology of the Kwakiutl (Boas).
- Thirty-sixth Annual Report. Accompanying paper: The Osage Tribe: Rite of the Chiefs; Sayings of the Ancient Men (La Flesche).
- 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).
- Bulletin 73. Early History of the Creek Indians and Their Neighbors (Swanton).
- Bulletin 74. Excavation of a Site at Santiago Ahuitzotla, D. F. Mexico (Tozzer).
- Bulletin 75. Northern Ute Music (Densmore).
- Bulletin 76. Archeological Excavations in the Ozark Region of Central Missouri (Fowke).
- Bulletin 77. Villages of the Algonquian, Siouan, and Caddoan Tribes West of the Mississippi (Bushnell).
- Bulletin —. Handbook of the Indians of California (Kroeber).
- Bulletin —. Mandan and Hidatsa Music (Densmore).

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:

	Copies.
Annual reports and separates.....	1, 998
Bulletins and separates.....	10, 288
Contributions to North American Ethnology.....	34
Miscellaneous publications.....	475
Total.....	12, 795

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:

Photographic illustrations for distribution and office use.....	645
Negatives of ethnological and archeological subjects.....	351
Negative films developed from field exposures.....	70
Photostat prints made from books and manuscripts.....	120
Illustrations prepared and submitted for publication.....	391
Line and color drawings.....	195
Illustrations proofs edited.....	158
Lithographic proofs examined at Government Printing Office.....	25, 000

LIBRARY.

The reference library continued in the immediate care of Miss Ella Leary, librarian, assisted by Mr. Charles B. Newman and Mr. Samuel H. Miller.

During the year 775 books were accessioned, of which 50 were acquired by purchase, 325 by binding of periodicals, and 400 by gift and exchange. The periodicals currently received number about 900, of which 30 were received by subscription, the remainder being received through exchange. The bureau has also received 269 pamphlets, giving at the close of the year a working library of 24,155 volumes, 14,777 pamphlets, and several thousand unbound periodicals.

During the year an increasing number of visitors have applied to the library for books. Information has been furnished and bibliographic notes compiled for the use of correspondents. The officials of the Library of Congress and of the Government departments have also made use of the library through frequent loans during the year.

In addition to the use of its own library, which is becoming more and more valuable through exchange and by limited purchase, it was found necessary to draw on the Library of Congress for the loan of about 500 books.

As mentioned in the last annual report, one of the most urgent needs of the library at the present time is more shelf room for its books.

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:

Stone arrow polisher, presented to the bureau by Dr. Walter E. Roth, of Georgetown, British Guiana. (65625.)

Collection of archeological material, collected in the spring of 1920 in northwestern Arizona and southwestern Utah by Mr. Neil M. Judd. (65764.)

Pseudo stone implement, found by Rev. E. N. Kremer near Camphill, Cumberland County, Pa. (65795.)

Three human skulls and bones, collected by Dr. J. Walter Fewkes at Fire Temple Group, Mesa Verde National Park, Colo. (66011.)

Skeletons collected during the summer of 1920 near Nashville, Tenn., by Mr. W. E. Myer. (65115.)

Archeologica and skeleton, collected by Mr. J. A. Jeancon from a ruin near Taos, N. Mex., in the summer of 1920. (66156.)

Archeologica and human bones, found at Indian Hill, Fla., by Mr. Charles T. Earle. (65551.)

Skull bones and lower jaw, found at village site near Gatesville, Tex., by Prof. J. E. Pearce. (65334.)

PROPERTY.

Furniture and office equipment were purchased to the amount of \$140.83.

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 Wilding served as messenger and typist to the chief.

Personnel.—Mr. Samuel H. Miller has been appointed to assist Miss Leary in the library in place of Mr. Charles B. Newman, transferred to the Smithsonian.

Mr. J. A. Jeancon, who served as assistant to the chief in the work at Mesa Verde, was later appointed temporary ethnologist, but at the close of two months' work in Washington, resigned to accept a position in the State Historical Museum, Denver, Colo.

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, 1921:

The estimate submitted for the support of the service during 1921, including the allotment for printing and binding, was \$50,200, and this amount was granted by Congress. The repayments from departmental and various other establishments aggregated \$4,779.47, making the total resources available for carrying on the system of exchanges during the year \$54,979.47.

The work of the exchange service during the past year has been very heavy, due, principally, to the reopening of relations with Germany. One hundred and eighty-eight boxes were received from Germany and 691 boxes were forwarded to that country. These consignments weighed a total of 186,037 pounds, or about 31 per cent of the weight of all the packages handled by the exchange service during the year.

The total number of packages passing through the service during the year was 451,471—an increase over the number for the preceding year of 82,099. The weight of these packages was 605,312 pounds—a gain of 108,934. For statistical purposes the packages handled by the exchange service are divided into several classes.

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

	Packages.		Weight.	
	Sent.	Received.	Sent.	Received.
			<i>Pounds.</i>	<i>Pounds.</i>
United States parliamentary documents sent abroad.....	147,133		72,549	
Publications received in return for parliamentary documents...		1,419		6,268
United States departmental documents sent abroad.....	175,007		243,288	
Publications received in return for departmental documents...		5,591		9,747
Miscellaneous scientific and literary publications sent abroad...	90,014		181,575	
Miscellaneous scientific and literary publications received from abroad for distribution in the United States.....		32,307		91,885
Total.....	412,154	39,317	497,412	107,900
Grand total.....	451,471		605,312	

As explained in previous reports, the disparity between the number of publications sent abroad and those received in return is not so great as would appear from the above figures. Packages sent abroad in many instances contain only a single publication, while those received in return often comprise several volumes—in some cases the term “package” being applied to large boxes containing a hundred or more publications. Furthermore, some foreign establishments send their publications directly to their destinations in this country by mail and not through exchange channels.

As I have already stated, shipments were resumed during the year to Germany. Relations have also been reestablished with Austria. The steps taken by the Institution toward the reopening of exchanges with Roumania and the establishment of relations with the newly formed Government of Jugoslavia, referred to in my last report, have not yet led to a successful result. The Roumanian authorities state that, in view of the difficulties of railroad transportation, the service can not at the present time be reorganized, but as soon as those difficulties are overcome the Roumanian Government will at once resume the service. The Government of Jugoslavia, in a note received near the close of the year, states that it will be glad to renew the interchange of publications as soon as the Belgrade Exchange Bureau is reorganized. Conditions in Russia and Turkey have not yet reached a state where steps can be taken to renew the exchange of publications between those countries and the United States.

Reference was made in my 1920 report to the fact that an exchange of publications had been inaugurated with the Czechoslovak Republic. As a matter of record it should be stated here that notification was received through the Department of State from the Belgian ambassador in Washington of the adherence of the Government of Czechoslovakia to the exchange conventions concluded at Brussels on March 15, 1886. One of those conventions provides for the international exchange of official documents and scientific and literary publications; the other, for the immediate exchange of the official journal, parliamentary annals, and documents. Articles II and IX of the conventions provide that the States which have not taken part in the convention are admitted to adhere to it on their request, this adherence to be notified diplomatically to the Belgian Government and by that Government to all the other signatory States.

I am glad to report that the Polish Government has also adhered to the Brussels convention providing for the establishment of a system of international exchanges and that the *Bibliothèque du Ministère des Relations Extérieures*, at Warsaw, has been designated to assume charge of the Polish International Exchange Service. Under

date of May 14, 1921, the first shipment, consisting of 18 boxes, was dispatched to Poland.

The Government of the free city of Danzig, in reply to a letter from this Institution asking whether it would be willing to undertake the distribution of packages intended for correspondents in the territory comprising that city, stated that the Stadtbibliothek has been designated to act as its exchange bureau.

Among the requests received from foreign establishments for assistance in procuring especially desired publications may be mentioned one from the Société Belge d'Études et d'Expansion at Liège. That society stated that having in view a closer relationship between its peoples and the nationals of friendly and allied countries, it had established a new service of general documentation, and was anxious to receive for the use of that service publications which would tend to make the United States better known in the Kingdom of Belgium. The Institution procured for the Society of Studies and Expansion from the various bureaus of this Government such publications as it was thought would answer the purpose in question.

Last year mention was made of the fact that a shipment weighing over 25,000 pounds had been made to the library of the University of Louvain, and that that consignment was the largest single shipment ever forwarded through the Smithsonian Exchange Service to one address at one time. While that statement still holds good, it might be of interest to note here that during the last three months of the current fiscal year three shipments were made to the German Exchange Agency for distribution to various addresses throughout Germany which weighed over 30,000 pounds each. These shipments, as I have mentioned in the foregoing part of this report, were made up of exchanges suspended during the war.

During the year 2,752 boxes were used in forwarding exchanges to foreign agencies for distribution, being an increase of 393 over the number for the preceding 12 months. This is the largest number of boxes shipped abroad through the exchange service in one year, being about 300 more than are handled during a normal year. It is, of course, due to the accumulations received for the countries with which exchange relations were resumed. The gross weight of the boxes forwarded abroad aggregated a total of 546,279 pounds, being an increase of 81,093 pounds over the preceding year.

Of the total number of boxes sent abroad, 383 contained full sets of United States official documents for authorized depositories and 2,369 included departmental and other publications for depositories of partial sets and for miscellaneous correspondents.

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.....	58	Jamaica.....	5
Austria.....	99	Japan.....	54
Barbados.....	1	Korea.....	2
Belgium.....	142	Netherlands.....	77
Bolivia.....	8	New South Wales.....	22
Brazl.....	37	New Zealand.....	25
British Colonies.....	25	Nicaragua.....	2
British Guiana.....	5	Norway.....	36
Bulgaria.....	8	Paraguay.....	7
Canada.....	20	Peru.....	16
Chile.....	22	Poland.....	18
China.....	105	Portugal.....	18
Colombia.....	13	Queensland.....	15
Costa Rica.....	11	Salvador.....	2
Cuba.....	5	Siam.....	5
Czechoslovakia.....	104	South Australia.....	16
Denmark.....	32	Spain.....	63
Ecuador.....	9	Sweden.....	58
Egypt.....	9	Switzerland.....	14
Finland.....	16	Tasmania.....	29
France.....	218	Trinidad.....	2
Germany.....	691	Union of South Africa.....	36
Great Britain and Ireland.....	331	Uruguay.....	16
Greece.....	12	Venezuela.....	11
Guatemala.....	2	Victoria.....	30
Honduras.....	2	Western Australia.....	14
Hungary.....	27		
India.....	41	Total.....	2,752
Italy.....	106		

FOREIGN DEPOSITORIES OF UNITED STATES GOVERNMENTAL DOCUMENTS.

In accordance with the terms of a convention concluded at Brussels March 15, 1886, and under authority granted by Congress in resolutions approved March 2, 1867, and March 2, 1901, there are now sent through the exchange service regularly to depositories abroad 57 full sets of United States official documents and 39 partial sets—Poland having been added during the year to the list of those countries receiving full sets, and Latvia and the Library of the League of Nations, located in Geneva, Switzerland, to the list of those receiving partial sets. The number of full and partial sets now being sent abroad, it will be seen, is 96. The total number provided by law for the use of the Library of Congress and for international exchange is 100.

The full set of documents sent to Poland is deposited in the Bibliothèque du Ministère des Relations Extérieures, Warsaw. The

partial set for Latvia is deposited in the office of the prime minister at Riga.

I stated last year that it was understood that the Czechoslovak depository would be the Ministère de l'Instruction Publique, at Prague. Information has since been received from the Government of Czechoslovakia to the effect that the United States official documents would be deposited in the Bibliothèque de l'Assemblée Nationale in Prague.

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: Statistische Zentral-Kommission, Vienna.
 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'État 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 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 Relations Extérieures, 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.
 SERBIA: Section Administrative du Ministère des Affaires Étrangères, Belgrade.
 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 Canje 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.

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, Nictheroy.
 BREMEN: Senatskommission für Reichs- und Auswärtige Angelegenheiten.
 BRITISH COLUMBIA: Legislative Library, Victoria.
 BRITISH GUIANA: Government Secretary's Office, Georgetown, Demerara.
 BULGARIA: Ministère des Affaires Étrangères, 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.
 LATVIA: Office of the Prime Minister, 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, Valetta.
 MONTENEGRO: Ministère des Affaires Étrangères, Cetinje.
 NEW BRUNSWICK: Legislative Library, Fredericton.
 NEWFOUNDLAND: Colonial Secretary, St. John's.

- NICARAGUA: Superintendente de Archivos Nacionales, Managua.
 NORTHWEST TERRITORIES: Government Library, Regina.
 NOVA SCOTIA: Provincial Secretary of Nova Scotia, Halifax.
 PANAMA: Secretaria de Relaciones Exteriores, Panama.
 PARAGUAY: Oficina General de Inmigracion, Asuncion.
 PRINCE EDWARD ISLAND: Legislative Library, Charlottetown.
 ROUMANIA: Academia Romana, Bucharest.
 SALVADOR: Ministerio de Relaciones Exteriores, San Salvador.
 SIAM: Department of Foreign Affairs, Bangkok.
 STRAITS SETTLEMENTS: Colonial Secretary, Singapore.
 SWITZERLAND: Library of the League of Nations, Palace of Nations, Quai de
 Leman, Geneva.
 UNITED PROVINCES OF AGRA AND OUDH: Undersecretary to Government, Alla-
 habad.
 VIENNA: Bürgermeister-Amt der Stadt Wien.

INTERPARLIAMENTARY EXCHANGE OF OFFICIAL JOURNALS.

The interparliamentary exchange is separate and distinct from the exchange of official documents referred to above and is carried on by this Institution in behalf of the United States Government in accordance with authority granted in a resolution of Congress approved March 4, 1909, the purpose of that resolution being to carry into effect the provisions of the second convention, concluded at Brussels March 15, 1886, providing for the immediate exchange of the official journal as well as of the parliamentary annals and documents, to which the United States was one of the signatories.

While the Government of Poland has not signified its adherence to the above-mentioned convention, it has entered into the immediate exchange with the United States.

A complete list of the countries now taking part in this exchange is given below, together with the names of the establishments to which the daily issue of the Congressional Record is forwarded:

- 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: Bibliothèque de l'Assemblée Nationale, Prague.
 DENMARK: Rigsdagens Bureau, København.
 FRANCE:
 Bibliothèque de la Chambre des Députés, au Palais Bourbon, Paris.
 Bibliothèque 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 Abgeordnetenhaus, 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.

JUGOSLAVIA: Library of the Skupshtina, Belgrade.

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 das Cortes, Lisbon.

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

QUEENSLAND: The Chief Secretary's Office, Brisbane.

ROUMANIA: Bibliothèque de la Chambre des Députés, Bucharest.

RUSSIA: Sendings temporarily suspended.

SPAIN:

Biblioteca del Congreso de los Diputados, Madrid.

Biblioteca del Senado, Madrid.

SWITZERLAND: Bibliothèque de l'Assemblée Fédérale Suisse, Berne.

TRANSVAAL: State Library, Pretoria.

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

URUGUAY: Biblioteca de la Cámara de Representantes, Montevideo.

VENEZUELA: Cámara de Diputados, Congreso Nacional, Carácas.

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

It will be noted from the above list that there are at present 38 different foreign States or Provinces with which the immediate exchange of the official journal is carried on. To some two copies of the Congressional Record are forwarded—one to the Upper and one to the Lower House of Parliament—the total number transmitted being 43. The number provided by law for this exchange is limited to 100.

FOREIGN EXCHANGE AGENCIES.

Agencies have been established during the year by the Governments of Danzig and Poland. Shipments to Czechoslovakia were inaugurated last year, consignments being sent to the Ministère de l'Instruction Publique. The Czechoslovak Government has since established an international exchange service under the direction of the Bibliothèque de l'Assemblée Nationale.

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, Lavalle 1216, Buenos Aires.

- AUSTRIA: Statistische Zentral-Kommission, Vienna.
- 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.
- 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.
- 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, 28 Essex Street, Strand, London.
- GREECE: Bibliothèque Nationale, Athens.
- GREENLAND, *via* Denmark.
- GUADELOUPE, *via* France.
- GUATEMALA: Instituto Nacional de Varones, Guatemala.
- GUINEA, *via* Portugal.
- HAITI: Secrétaire d'Etat des Relations Extérieures, Port au Prince.
- HONDURAS: Biblioteca Nacional, Tegucigalpa.
- HUNGARY: Dr. Julius Pikler, Fővárosi Telekértéknnyilvántartó Hivatal (City Land Valuation Office), Központi Városház, Budapest IV.
- 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.
- KOREA: Government General, Keijo.
- LIBERIA: Bureau of Exchanges, Department of State, Monrovia.
- LOURENÇO MARQUEZ: Government Library, Lourenço Marquez.
- LUXEMBURG, *via* Germany.
- MADAGASCAR, *via* France.
- MADEIRA, *via* Portugal.

- MOZAMBIQUE, *via* Portugal.
- NETHERLANDS: Bureau Scientifique Central Néerlandais, Bibliothèque 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 Relations Extérieures, Warsaw.
- PORTUGAL: Secção de Trocas Internacionais, Bibliotheca Nacional, Lisbon.
- QUEENSLAND: Bureau of Exchanges of International Publications, Chief Secretary's Office, Brisbane.
- RUMANIA: Shipments temporarily suspended.
- 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.
- UNION OF SOUTH AFRICA: Government Printing Works, Pretoria, Transvaal.
- URUGUAY: Oficina de Canje Internacional, Montevideo.
- VENEZUELA: Biblioteca Nacional, Caracas.
- VICTORIA: Public Library of Victoria, Melbourne.
- WESTERN AUSTRALIA: Public Library of Western Australia, Perth.
- WINDWARD AND LEEWARD ISLANDS: Imperial Department of Agriculture, Bridgetown, Barbados.

In conclusion, I beg to express my appreciation of the conscientious attention to duty by the employees of the Exchange Office, without which it would not have been possible to handle the large volume of work passing through the service during the year.

Respectfully submitted.

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

DR. CHARLES D. WALCOTT,
Secretary of the 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, 1921:

The appropriations allowed by Congress in the sundry civil act included \$125,000 for the regular maintenance of the park, \$80,000 for the purchase of additional land, and \$200 for miscellaneous printing and binding.

Prices on almost all necessary supplies remained high during the early months of the year and, as a consequence, only very limited funds were available for repairs or permanent improvements. In the later months there was a decided drop in the prices of several items of food for animals, and particularly in forage, so that a few long-delayed repairs and improvements, some of them begun five years ago but discontinued for lack of funds, could be undertaken.

The number of animals on exhibition is greater than at any period since 1912; the number of species represented is greater than ever before; and the scientific importance and actual monetary value of the collections far exceed any previous year in the history of the park. A new record for attendance was also reached, due in a measure to the recent rapid development of near-by residential sections, but in a greater measure due to increased interest by the public in the animal collections and in the recreational features offered by such an establishment.

ACCESSIONS.

Gifts.—An unusual number of animals were added to the collection as gifts, or were placed by friends of the park on indefinite deposit. The total number of specimens received in this manner was 178, and the donations included numerous rare and important species.

Mr. Isaac Ellison, of Singapore, presented to the park a fine young male orang-utan, about 3½ years old. No specimen of this ape had been on exhibition in Washington for many years, and the addition to the collection of an example so thrifty is gratifying. Mr. Ellison brought the orang-utan, together with a Javan macaque, with him from Singapore, while on a visit to America.

The Canadian Government, through Mr. J. B. Harkin, Commissioner of Dominion Parks, presented four mountain goats and two

Rocky Mountain sheep, all captured in the Rocky Mountains Park and shipped from Banff, Alberta. The sheep, both ewes, are most welcome additions to the small herd received from the same source in 1917, which has done so well in our paddocks. The mountain goats are the first on exhibition here in many years, and in the large range prepared especially for them have attracted great attention. A young male, born here May 20, 1921, appears to be a thrifty animal.

Mr. Victor J. Evans, of Washington, D. C., who has for many years taken great interest in the National Zoological Park, and has, from time to time, added many rare and unusual animals to the collection, presented during the year a young male Kadiak bear, a pair of Count Raggi's birds of paradise, and some valuable parrots. The bear gives promise of becoming an exceptionally large individual, and no species of bird of paradise has before been shown in the park.

Four shipments from tropical America added, by gift, a number of species new to the collections. Dr. F. W. Goding, American consul general at Guayaquil, Ecuador, transmitted specimens of the giant Galapagos tortoise, one each from Albemarle Island and Indefatigable Island. The Indefatigable Island species is very rare and had never before been on exhibition. Hon. Henry D. Baker, American consul at Trinidad, British West Indies, sent specimens of the Trinidad brocket deer and agouti. Mr. Stuart H. Gillmore and Mr. Walter C. B. Morse, of Washington, brought with them from Surinam a small collection of animals, including specimens of the golden-hooded oriole and weeping capuchin. Dr. Paul Bartsch, of the National Museum, collected and presented four large ground iguanas from Andros Island and an additional specimen of the great white heron from the Florida Keys.

Mr. A. K. Haagner, director of the zoological garden at Pretoria, South Africa, brought to America, as a gift to the park, a specimen of his recently discovered Rhodesian baboon.

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

Mr. H. E. Allen, Washington, D. C., red-and-blue-and-yellow macaw.

Dr. Wade H. Atkinson, Washington, D. C., Virginia opossum.

Mr. Carl Aylor, Washington, D. C., screech owl.

Miss Henriette A. Bagnell, Washington, D. C., two grass paroquets.

Hon. Henry D. Baker, Trinidad, British West Indies, Trinidad brocket and two Trinidad agoutis.

Dr. Paul Bartsch, Washington, D. C., white heron and four ground iguanas.

Miss Dorothy Beers, Washington, D. C., alligator.

Mr. Harmon B. Bell, jr., Ruxton, Md., alligator.

Mr. I. E. Bennett, West Palm Beach, Fla., laughing gull.

Mr. K. M. Bradshaw, Bristow, Va., barn owl.

Ensign Richard H. Brazeal, U. S. S. *Penguin*, San Francisco, Calif., Panama agouti.

Mr. F. E. Briggs, Bristow, Va., great horned owl.

- Miss G. R. Brigham, Washington, D. C., red-billed hill-tit.
 Caffisch Lumber Co., Albright, W. Va., banded rattlesnake, copperhead, and
 blacksnake.
- Mr. Jas. E. Cameron, Washington, D. C., red fox.
 Canadian Government through Hon. J. B. Harkin, two Rocky Mountain sheep
 and four mountain goats.
- Mr. W. B. Carpenter, Washington, D. C., red-billed hill-tit, two Gouldian
 finches, two canaries, and two grass paroquets.
- Mr. Milton Curtis, St. David, Ariz., Gila monster.
- Mr. James Y. Davis, Washington, D. C., sparrowhawk.
- Mr. E. B. Dewey, Washington, D. C., sparrowhawk.
- Mr. Blaine Elkins, Washington, D. C., two raccoons.
- Mr. Ernest B. Ellis, Millboro, N. C., horned toad.
- Mr. Isaac Ellison, Singapore, Straits Settlements, orang-utan and Javan
 macaque.
- Mr. Louis C. Etchison, Jefferson, Md., red-tailed hawk and barn owl.
- Mr. Victor J. Evans, Washington, D. C., Kadiak bear, king paroquet, red-
 sided ecleetus parrot, and two Count Raggi's birds of paradise.
- Mr. Arthur H. Fisher, Washington, D. C., coach-whip snake and spreading
 adder.
- Mr. H. B. Fisher, Takoma Park, Md., mourning dove.
- Mr. Stuart H. Gillmore and Mr. Walter C. B. Morse, Washington, D. C.,
 coatimundi, capuchin monkey, yellow-rumped agouti, and golden-hooded oriole.
- Dr. Frederic W. Goding, Guayaquil, Ecuador, two Galapagos tortoises.
- Mr. Leonard C. Gunnell, Washington, D. C., woodcock.
- Mr. A. K. Haagner, Pretoria, South Africa, Rhodesian baboon.
- Mr. E. B. Harden, Washington, D. C., three horned toads.
- Hon. Warren G. Harding, White House, Washington, D. C., Alaskan bald
 eagle.
- Mrs. E. P. Hopkins, Washington, D. C., two canaries.
- Mrs. John F. Hord, Washington, D. C., grass paroquet, red-billed weaver,
 nutmeg finch, European goldfinch, two strawberry finches, two black-headed
 finches, three Java finches, four canaries, and seven bengalees.
- Mr. L. M. Humphrey, Glen Echo, Md., pilot blacksnake.
- Miss May E. Irish, Hillside, Me., duck hawk.
- Mrs. H. S. Johnson, Washington, D. C., canary.
- Mr. Ellis S. Joseph, Sydney, Australia, sulphur-crested cockatoo and four
 red-rumped paroquets.
- Maj. Howard C. Judson, United States Marine Corps, Washington, D. C.,
 red-crowned parrot and yellow-cheeked parrot.
- Mr. Charles R. Kengla, Washington, D. C., great horned owl.
- Mr. J. C. Lindsey, Clarendon, Va., ringed turtledove.
- Mrs. L. D. Lunt, Landover, Md., alligator.
- Mr. George Marshall, Laurel, Md., garter snake and blacksnake.
- Mrs. W. S. Moore, Washington, D. C., tovi paroquet.
- Dr. F. H. Morhart, Washington, D. C., raccoon.
- Mrs. Louis Nulton, Winchester, Va., two marmosets.
- Mr. L. C. Painter, Alexandria, Va., three red-shouldered hawks.
- Miss Mary Dixon Palmer, Washington, D. C., alligator.
- Pan American Union, Washington, D. C., 16 alligators.
- Mr. L. V. Pearson, Washington, D. C., red-tailed hawk.
- Mr. Jack Polkinhorn, Washington, D. C., painted turtle.
- Mrs. N. C. Reid, Cristobal, Canal Zone, Panama deer.
- Mrs. E. T. Ryan, Washington, D. C., canary.

- Mr. Edw. S. Schmid, Washington, D. C., blacksnake and two skunks.
 Dr. R. W. Shufeldt, Washington, D. C., box tortoise, ground rattlesnake, two king snakes, and two wood turtles.
 Mr. Lubert Sisco, Washington, D. C., pilot blacksnake.
 Mr. H. N. Slater, New York, N. Y., East African baboon.
 Mr. G. T. Smallwood, Washington, D. C., 15 opossums.
 Mr. Albert Stabler, Washington, D. C., barred owl.
 Mr. Robert M. Stabler, Washington, D. C., five Virginia opossums.
 Mrs. Ida Stanley, Washington, D. C., raccoon.
 Mr. J. F. Steffey, Fort Washington, Md., great horned owl.
 Mr. Arthur Tew, Washington, D. C., alligator.
 Mrs. E. F. Townsend, Washington, D. C., alligator.
 Mrs. Russell Tyson, Brattleboro, Vt., albino woodchuck.
 Mr. Titus Ulke, Washington, D. C., painted turtle and milk snake.
 Mr. F. L. Van Patten, Great Falls, Va., barred owl.
 Mrs. O. D. Wayland, Washington, D. C., canary.
 Mr. J. T. Wenchel, Takoma Park, Md., rabbit.
 Mr. Ira Cartright Wetherill, Machadoc, Va., diamond-back terrapin.
 Mr. Allen H. Whisner, Washington, D. C., fox squirrel.

Births.—Fifty-five mammals were born and 21 birds were hatched in the park during the year. As usual, 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. The births include: European brown bear, 4; dingo, 2; great gray kangaroo, 1; red kangaroo, 3; black-tailed wallaby, 2; rufous-bellied wallaby, 1; brush-tailed rock wallaby, 1; Australian opossum, 1; rhesus monkey, 4; mona, 1; mountain goat, 1; Rocky Mountain sheep, 1; Indian antelope, 2; American bison, 3; llama, 3; guanaco, 1; Virginia deer, 4; black-tailed deer, 3; fallow deer, 1; Japanese deer, 3; hog deer, 3; barasingha, 2; red deer, 6; American elk, 2. Birds hatched were of the following species: White ibis, American coot, wood duck, canary, and peafowl.

Exchanges.—There were received during the year, in exchange for surplus stock, 57 mammals, 152 birds, and 6 reptiles. The most important of these accessions were a large collection of Australasian birds from Mr. E. S. Joseph, the well-known animal dealer of Sydney, Australia; and a collection of African mammals from Mr. A. K. Haagner, Pretoria, South Africa. Among the birds received from Mr. Joseph are such desirable species as the pied goose, Eyton's tree duck, Australian black duck, Pacific gull, white-bellied sea eagle, golden-shouldered parouquet, and satin bower-bird. African mammals included in the exchange from Mr. Haagner were a lechwe antelope, 2 blesboks, a springbok, an African porcupine, a chacma baboon, and a specimen of Wahlberg's mongoose. Other valuable mammals received in exchange from miscellaneous sources are 2 Barbary apes from Gibraltar, white-collared, black, and sooty mangabays, an Arabian baboon, 2 ruffed lemurs, 2 Malay porcupines, 2 palm civets, and a Florida manatee.

The birds received in exchange include also 2 sun-bitterns, 2 black-necked swans, 2 Cape Barren geese, 4 upland geese, an Indian jabiru, a sarus crane, scarlet ibis, yellow-wattled lapwing, and numerous small birds of various kinds. Five tree iguanas and a large boa constrictor were received from South America.

Purchases.—Only 9 mammals, 45 birds, and 9 reptiles were purchased during the year, as the limited funds available would not permit of much expenditure for stock. The mammals purchased were 4 armadillos, 2 gray foxes, a Florida lynx, a pigtailed monkey, and one bandicoot. Birds purchased were mostly hawks, owls, and waterfowl at low cost, but some exceptionally valuable specimens were also obtained. A specimen of the rare kagu from New Caledonia Island, and of the Nepalese paroquet from India, represent species new to the collection.

Transfers.—The Biological Survey of the Department of Agriculture continued its contributions to the collection. Two young pumas or mountain lions from the Kaibab Forest, Utah, through Mr. George E. Holman; and three young pumas from Arizona, through Mr. M. E. Musgrave, were among the most valuable transfers from the survey. Mr. Vernon Bailey, chief field naturalist, contributed an interesting collection of small mammals, including various species of pocket mice, kangaroo rats, spermophiles, and other rodents. Two little brown cranes from Nebraska were also transferred from field agents of the Biological Survey.

Captured in the park.—Five birds and 2 reptiles, captured within the National Zoological Park, were added to the collection.

Deposited.—A few parrots and other birds and one reptile, needed for exhibition, were accepted on deposit. Owing to the greatly increased work at the park and the small force of keepers employed to care for the growing collections, it has been necessary to refuse birds and mammals offered on deposit, and subject to recall by the owner, unless the specimens represent species which add distinctly to the exhibition value of the collection.

REMOVALS.

Surplus animals sent away in exchange for other stock during the year included 62 mammals, 45 birds, and 12 reptiles. Most of the surplus animals were born in the park. Among the specimens so exchanged were a young hippopotamus, 5 American bison, 1 yak, 1 East African eland, 1 Indian antelope, 4 llamas, 2 American elk, 11 European red deer, 2 Japanese deer, 2 red kangaroos, 2 European brown bears, 2 African lions, 1 mountain lion, 4 gray foxes, 2 wolves, 2 coypus, 3 rhesus monkeys, a number of waterfowl, peafowl, and other birds, and 12 alligators.

A number of animals on deposit were returned to owners.

The death rate remains very low; for mammals and birds about as in the past four years; for reptiles much lower. Among the most serious losses of mammals long in the collection must be mentioned the death of the vicuña (*Lama vicugna*) from enteritis on September 7, 1920. This animal was received at the park on November 24, 1908, and thus had been in the collection nearly 12 years. A female zebu (*Bos indicus*), received when about 3 years old, on April 11, 1899, died on March 25, 1921, only a few days under 22 years from date of arrival. A male American elk, born in the park May 31, 1910, died November 5, 1920. The male Kenai Peninsula black bear (*Ursus americanus perniger*), received when a cub of about 2 years of age, March 5, 1903, died of internal hemorrhage, June 23, 1921, after 18 years and 3 months in the park. A coyote (*Canis latrans*), received April 26, 1906, died September 28, 1920; a paca (*Cuniculus paca*), received April 11, 1908, died January 3, 1921, of acute congestion of the lungs; and a brown macaque (*Macaca speciosa*), received July 30, 1910, died of gastroenteritis on November 26, 1920.

Three birds with long records were lost during the year. A red-and-blue macaw (*Ara chloroptera*), received as a gift from the governor of the State of Para, Brazil, August 7, 1899, died nearly 21 years later, on July 3, 1920. A yellow-shouldered parrot (*Amazona barbadensis*), received from Hon. E. H. Plumacher, American consul at Maracaibo, Venezuela, September 10, 1902, died on January 26, 1921; and a demoiselle crane, received July 2, 1903, died on June 18, 1921.

Other serious losses were a female bison, died of metritis, July 7, 1920; a male llama, acute congestion of lungs, July 25, 1920; and a male prong-horned antelope, anemia, October 13, 1920.

Post-mortem examinations were made by the pathological division of the Bureau of Animal Industry, and, in four cases, by the Army Medical Museum. The following list shows the results of autopsies, the cases being arranged by groups:

CAUSES OF DEATH.

MAMMALS.

Marsupialia: Tuberculosis, 2; congestion of lungs, 1; pleurisy and pericarditis, 1; enteritis, 1; peritonitis, 1; pyemia, 1; septicemia, 1.

Carnivora: Pneumonia, 2; tuberculosis, 1; gastroenteritis, 2; internal hemorrhage, 3; leukemia, 1.

Rodentia: Congestion of lungs, 1.

Primates: Tuberculosis, 5; enteritis, 5; gastroenteritis, 2; colitis, 1; echinococcus infestation, 1; cage paralysis, 1.

Artiodactyla: Pneumonia, 1; verminous broncho-pneumonia, 1; tuberculosis, 1; congestion of lungs, 1; enteritis, 2; gastritis, 1; gastroenteritis, 1; metritis, 1; anemia, 3; accident, 1.

BIRDS.

Ciconiiformes: Impaction of stomach, 1; anemia, 1; septicemia, 2; no cause found, 3.

Anseriformes: Pneumonia, 1; enteritis, 2; no cause found, 3.

Falconiformes: No cause found, 1.

Galliformes: Tuberculosis, 1; aspergillosis, 2; enteritis, 3; coccidiosis, 6; wry-neck, 1; no cause found, 2.

Gruiformes: Aspergillosis, 1; enteritis, 1; no cause found, 2.

Charadriiformes: Tuberculosis, 1; enteritis, 1; internal hemorrhage, 1.

Psittaciformes: Enteritis, 3; anemia, 1; internal hemorrhage, 1.

Coraciiformes: Enteritis, 1; abdominal tumor and enteritis, 1.

Passeriformes: Enteritis, 6.

REPTILES.

Serpentes: Pneumonia, 1; no cause found, 1.

Thirty-two specimens of special scientific importance, or needed for exhibition purposes, were transferred after death to the United States National Museum. These included 16 mammals, 11 birds, and 5 reptiles. Four specimens of mammals, desired for anatomical work, were sent to the Army Medical Museum. The skins of 17 birds were added to the reference collection of "dealers' cage birds" in the office of the superintendent, National Zoological Park.

ANIMALS IN THE COLLECTION JUNE 30, 1921.

MAMMALS.

MARSUPIALIA.

Virginia opossum (<i>Didelphis virginiana</i>)-----	18	Apache grizzly (<i>Ursus apache</i>)-----	1
Tasmanian devil (<i>Sarcophilus harrisi</i>)-----	2	Himalayan bear (<i>Ursus thibetanus</i>)--	1
Australian opossum (<i>Trichosurus vulpecula</i>)-----	2	Black bear (<i>Ursus americanus</i>)-----	1
Dusky phalanger (<i>Trichosurus fuliginosus</i>)-----	1	Cinnamon bear (<i>Ursus americanus cinnamomum</i>)-----	2
Flying phalanger (<i>Petaurus breviceps</i>)--	8	Florida bear (<i>Ursus floridanus</i>)-----	2
Brush-tailed rock wallaby (<i>Petrogale penicillata</i>)-----	4	Glacier bear (<i>Ursus emmonsii</i>)-----	1
Rufous-bellied wallaby (<i>Macropus bilardieri</i>)-----	6	Sun bear (<i>Helarctos malayanus</i>)-----	1
Parma wallaby (<i>Macropus parma</i>)-----	1	Sloth bear (<i>Melursus ursinus</i>)-----	1
Black-tailed wallaby (<i>Macropus bicolor</i>)-----	3	Polar bear (<i>Thalarctos maritimus</i>)--	2
Great gray kangaroo (<i>Macropus giganteus</i>)-----	2	Dingo (<i>Canis dingo</i>)-----	4
Black-faced kangaroo (<i>Macropus melanops</i>)-----	2	Eskimo dog (<i>Canis familiaris</i>)-----	2
Wallaroo (<i>Macropus robustus</i>)-----	2	Gray wolf (<i>Canis nubilus</i>)-----	8
Red kangaroo (<i>Macropus rufus</i>)-----	8	Southern wolf (<i>Canis floridanus</i>)-----	1
		Woodhouse's wolf (<i>Canis frustror</i>)--	2
		Coyote (<i>Canis latrans</i>)-----	1
		Red fox (<i>Vulpes fulva</i>)-----	5
		Kit fox (<i>Vulpes velox</i>)-----	2
		Gray fox (<i>Urocyon cinereoargenteus</i>)--	4
		Cacomistle (<i>Bassariscus astutus</i>)-----	1
		Raccoon (<i>Procyon lotor</i>)-----	12
		Gray coatimundi (<i>Nasua narica</i>)-----	2
		Red coatimundi (<i>Nasua nasua</i>)-----	2
		Kinkajou (<i>Potos flavus</i>)-----	2
		Mexican kinkajou (<i>Potos flavus actecus</i>)-----	1
		Marten (<i>Martes americana</i>)-----	1
		Ferret (<i>Mustela furo</i>)-----	1
		Tayra (<i>Tayra barbara</i>)-----	1
		Skunk (<i>Mephitis nigra</i>)-----	3
		Florida skunk (<i>Mephitis elongata</i>)--	2
		American badger (<i>Taxidea taxus</i>)-----	1

CARNIVORA.

European badger (<i>Meles meles</i>)-----	1	Montana white-footed mouse (<i>Peromyscus leucopus aridulus</i>)-----	1
Florida otter (<i>Lutra canadensis vaga</i>)--	2	Desert mouse (<i>Peromyscus eremicus</i>)--	4
Palm civet (<i>Paradoxurus hermaphroditus</i>)-----	2	Nebraska white-footed mouse (<i>Peromyscus maniculatus osgoodi</i>)-----	2
Wahlberg's mongoose (<i>Helogale parvula</i>)-----	1	Parasitic mouse (<i>Peromyscus californicus</i>)-----	1
Spotted hyena (<i>Crocuta crocuta</i>)-----	1	Wood rat (<i>Neotoma albigula</i>)-----	2
Striped hyena (<i>Hyæna hyæna</i>)-----	2	African porcupine (<i>Hystrix africanæ australis</i>)-----	1
African cheetah (<i>Acinonyx jubatus</i>)--	2	Malay porcupine (<i>Acanthion brachyurum</i>)-----	2
Lion (<i>Felis leo</i>)-----	2	Coypu (<i>Myocastor coypus</i>)-----	3
Bengal tiger (<i>Felis tigris</i>)-----	1	Paca (<i>Cuniculus paca</i>)-----	2
Manchurian tiger (<i>Felis tigris longipilis</i>)-----	2	Central American paca (<i>Cuniculus paca virgatus</i>)-----	1
Leopard (<i>Felis pardus</i>)-----	1	Mexican agouti (<i>Dasyprocta mexicana</i>)-----	1
East African leopard (<i>Felis pardus suahelica</i>)-----	1	Speckled agouti (<i>Dasyprocta punctata</i>)-----	2
Jaguar (<i>Felis onca</i>)-----	1	Panama agouti (<i>Dasyprocta punctata isthmica</i>)-----	1
Brazilian ocelot (<i>Felis pardalis brasiliensis</i>)-----	1	Azara's agouti (<i>Dasyprocta azarae</i>)--	2
Margay cat (<i>Felis tigrina</i>)-----	1	Trinidad agouti (<i>Dasyprocta rubrata</i>)-----	2
Snow leopard (<i>Felis uncia</i>)-----	1	Crested agouti (<i>Dasyprocta cristata</i>)--	2
Mexican puma (<i>Felis azteca</i>)-----	4	Yellow-rumped agouti (<i>Dasyprocta lucifer cayennæ</i>)-----	1
Mountain lion (<i>Felis hipposlestes</i>)--	3	Peruvian guinea pig (<i>Cavia tschudii pallidior</i>)-----	2
Canada lynx (<i>Lynx canadensis</i>)-----	1	Guinea pig (<i>Cavia porcellus</i>)-----	20
Northern wild cat (<i>Lynx uinta</i>)-----	3	Capybara (<i>Hydrochaerus hydrochaeris</i>)	1
Bay lynx (<i>Lynx rufus</i>)-----	2		
Florida lynx (<i>Lynx rufus floridanus</i>)--	1		
PINNIPEDIA.			
California sea lion (<i>Zalophus californianus</i>)-----	2		
Harbor seal (<i>Phoca vitulina</i>)-----	1		
RODENTIA.			
Woodchuck (<i>Marmota monax</i>)-----	2	Domestic rabbit (<i>Oryctolagus cuniculus</i>)-----	10
Dusky marmot (<i>Marmota flaviventris obscura</i>)-----	1		
Prairie dog (<i>Cynomys ludovicianus</i>)--	5	EDENTATA.	
White-tailed prairie dog (<i>Cynomys gunnisoni</i>)-----	2	Nine-banded armadillo (<i>Dasypus noveboracensis</i>)-----	2
Antelope squirrel (<i>Ammospermophilus leucurus</i>)-----	1	PRIMATES.	
Arizona antelope squirrel (<i>Ammospermophilus harrisi</i>)-----	1	Ruffed lemur (<i>Lemur variegatus</i>)-----	2
Round-tailed spermophile (<i>Citellus tereticaudus</i>)-----	3	Black spider monkey (<i>Ateles ater</i>)-----	1
Spotted spermophile (<i>Citellus pilosoma</i>)-----	1	Gray spider monkey (<i>Ateles geoffroyi</i>)	1
Honduras squirrel (<i>Sciurus boothia</i>)--	1	White-throated capuchin (<i>Cebus capucinus</i>)-----	4
Fox squirrel (<i>Sciurus niger</i>)-----	1	Weeping capuchin (<i>Cebus apella</i>)-----	1
Albino squirrel (<i>Sciurus carolinensis</i>)--	2	Brown capuchin (<i>Cebus fatuellus</i>)--	1
Baird's pocket mouse (<i>Perognathus flavus</i>)-----	1	Margarita capuchin (<i>Cebus margaritæ</i>)-----	1
Bailey's pocket mouse (<i>Perognathus baileyi</i>)-----	4	Marmoset (<i>Callithrix jacchus</i>)-----	2
Dusky pocket mouse (<i>Perognathus flavescens penniger</i>)-----	3	Chacma (<i>Papio porcarius</i>)-----	2
Kangaroo rat (<i>Dipodomys spectabilis</i>)--	1	Rhodesian baboon (<i>Papio rhodesia</i>)--	1
Merriam's kangaroo rat (<i>Dipodomys merriami</i>)-----	3	Hamadryas baboon (<i>Papio hamadryas</i>)-----	1
Ord's kangaroo rat (<i>Perodipus ordii</i>)--	2	East African baboon (<i>Papio ibeanus</i>)--	1
American beaver (<i>Castor canadensis</i>)--	1	Mandrill (<i>Papio sphinx</i>)-----	1
Grasshopper mouse (<i>Onychomys torridus</i>)-----	3	Drill (<i>Papio leucophaeus</i>)-----	1
Gray grasshopper mouse (<i>Onychomys leucogaster fuscogrisus</i>)-----	1	Moor macaque (<i>Cynopithecus maurus</i>)	1
		Barbary ape (<i>Simia sylvanus</i>)-----	2
		Brown macaque (<i>Macaca speciosa</i>)--	1
		Pig-tailed monkey (<i>Macaca nemestrina</i>)-----	1
		Burmese macaque (<i>Macaca andamanensis</i>)-----	1

Rhesus monkey (<i>Macaca rhesus</i>)-----	29	Black-tailed deer (<i>Odocoileus columbianus</i>)-----	5
Bonnet monkey (<i>Macaca sinica</i>)-----	1	Trinidad brocket (<i>Mazama simplicicornis</i>)-----	1
Javan macaque (<i>Macaca mordax</i>)-----	4	Blesbok (<i>Damaliscus albifrons</i>)-----	3
Black mangabey (<i>Cercocebus atterimus</i>)-----	1	White-tailed gnu (<i>Connochates gnou</i>)-----	1
Sooty mangabey (<i>Cercocebus fuliginosus</i>)-----	2	Lechwe (<i>Onotragus lechwe</i>)-----	1
White-collared mangabey (<i>Cercocebus torquatus</i>)-----	1	Indian antelope (<i>Antelope cervicapra</i>)-----	5
Green guenon (<i>Lasiopyga callitrichus</i>)-----	2	Nilgai (<i>Boselaphus tragocamelus</i>)-----	2
Vervet guenon (<i>Lasiopyga pygerythra</i>)-----	1	East African eland (<i>Taurotragus oryx livingstonii</i>)-----	2
Mona (<i>Lasiopyga mona</i>)-----	4	Angora goat (<i>Capra hircus</i>)-----	1
Röloway guenon (<i>Lasiopyga roloway</i>)-----	1	Tahr (<i>Hemitragus jemlahicus</i>)-----	3
Patas monkey (<i>Erythrocebus patas</i>)-----	2	Mountain goat (<i>Oreamnos americanus</i>)-----	4
Chimpanzee (<i>Pan troglodytes</i>)-----	1	Aoudad (<i>Ammotragus lervia</i>)-----	1
Orang-utan (<i>Pongo pygmaeus</i>)-----	1	Rocky Mountain sheep (<i>Ovis canadensis</i>)-----	6

ARTIODACTYLA.

Wild boar (<i>Sus scrofa</i>)-----	1	Arizona mountain sheep (<i>Ovis canadensis gaillardii</i>)-----	1
Wart-hog (<i>Phacochærus æthiopicus</i>)-----	2	Barbados sheep (<i>Ovis aries</i>)-----	5
Collared peccary (<i>Pecari angulatus</i>)-----	1	Zebu (<i>Bos indicus</i>)-----	1
Hippopotamus (<i>Hippopotamus amphibius</i>)-----	2	Yak (<i>Poëphagus grunniens</i>)-----	4
Bactrian camel (<i>Camelus bactrianus</i>)-----	2	American bison (<i>Bison bison</i>)-----	13
Arabian camel (<i>Camelus dromedarius</i>)-----	2	Indian buffalo (<i>Bubalus bubalis</i>)-----	3
Guanaco (<i>Lama guanicoe</i>)-----	4		

PERISSODACTYLA.

Llama (<i>Lama glama</i>)-----	7	Brazilian tapir (<i>Tapirus terrestris</i>)-----	2
Alpaca (<i>Lama pacos</i>)-----	1	Mongolian horse (<i>Equus przewalskii</i>)-----	1
Fallow deer (<i>Dama dama</i>)-----	5	Grant's zebra (<i>Equus burchelli granti</i>)-----	1
Axis deer (<i>Axis axis</i>)-----	4	Grevy's zebra (<i>Equus grevyi</i>)-----	1
Hog deer (<i>Hylaphus porcinus</i>)-----	6	Zebra-horse hybrid (<i>Equus grevyi-caballus</i>)-----	1
Sambur (<i>Rusa unicolor</i>)-----	2	Zebra-ass hybrid (<i>Equus grevyi-asinus</i>)-----	1
Barasingha (<i>Rucervus duvaucelii</i>)-----	9		
Burmese deer (<i>Rucervus eldii</i>)-----	1		

PROBOSCIDEA.

Japanese deer (<i>Sika nippon</i>)-----	12	Abyssinian elephant (<i>Loxodonta africana oxyotis</i>)-----	1
Red deer (<i>Cervus elaphus</i>)-----	15	Sumatran elephant (<i>Elephas sumatranus</i>)-----	2
Kashmir deer (<i>Cervus hanglu</i>)-----	2		
Bedford deer (<i>Cervus xanthopygus</i>)-----	6		
American elk (<i>Cervus canadensis</i>)-----	6		
Virginia deer (<i>Odocoileus virginianus</i>)-----	12		
Panama deer (<i>Odocoileus chiriquensis</i>)-----	1	Florida manatee (<i>Trichechus latirostris</i>)-----	1
Mule deer (<i>Odocoileus hemionus</i>)-----	2		

SIRENIA.

BIRDS.

		Brown pelican (<i>Pelecanus occidentalis</i>)-----	9
		Florida cormorant (<i>Phalacrocorax auritus floridanus</i>)-----	13
		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>)-----	4
		Black-crowned night heron (<i>Nycticorax nycticorax navius</i>)-----	28
		Boatbill (<i>Cochlearius cochlearius</i>)-----	2
		White stork (<i>Ciconia ciconia</i>)-----	3
		Black stork (<i>Ciconia nigra</i>)-----	1
		Indian jabiru (<i>Xenorhynchus asiaticus</i>)-----	1
		Straw-necked ibis (<i>Carphibis spinicollis</i>)-----	1
		Sacred ibis (<i>Threskiornis æthiopicus</i>)-----	3
		Australian ibis (<i>Threskiornis strictipennis</i>)-----	2

RATITÆ.

South African ostrich (<i>Struthio australis</i>)-----	4
Somaliland ostrich (<i>Struthio molybdophanes</i>)-----	1
Rhea (<i>Rhea americana</i>)-----	2
Sclater's cassowary (<i>Casuarus philipi</i>)-----	1
Emu (<i>Dromiceius novæhollandiæ</i>)-----	2

CICONIIFORMES.

Water-turkey (<i>Anhinga anhinga</i>)-----	4
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

White ibis (*Guara alba*)----- 13
 Scarlet ibis (*Guara rubra*)----- 1
 Roseate spoonbill (*Ajaja ajaja*)----- 2
 European flamingo (*Phanicopterus roseus*)----- 1

ANSERIFORMES.

Mallard (*Anas platyrhynchos*)----- 18
 East Indian black duck (*Anas platyrhynchos* var.)----- 3
 Black duck (*Anas rubripes*)----- 23
 Australian black duck (*Anas superciliosa*)----- 4
 Gadwall (*Chaulelasmus streperus*)----- 2
 European widegeon (*Mareca penelope*)----- 5
 Baldpate (*Mareca americana*)----- 7
 Green-winged teal (*Nettion carolinense*)----- 7
 European teal (*Nettion crecca*)----- 10
 Baikal teal (*Nettion formosum*)----- 2
 Blue-winged teal (*Querquedula discors*)----- 6
 Garganey (*Querquedula querquedula*)----- 1
 Cinnamon teal (*Querquedula cyanoptera*)----- 1
 Shoveller (*Spatula clypeata*)----- 4
 Pintail (*Daifila acuta*)----- 6
 Wood duck (*Aix sponsa*)----- 15
 Mandarin duck (*Dendronessa galericulata*)----- 17
 Rufous-crested duck (*Netta rufina*)----- 3
 Canvas-back (*Marila valisineria*)----- 2
 Redhead (*Marila americana*)----- 8
 Ring-necked duck (*Marila collaris*)----- 1
 Lesser scaup duck (*Marila affinis*)----- 9
 White-eyed duck (*Marila nyroca*)----- 1
 Rosy-billed pochard (*Metopiana peposaca*)----- 4
 Egyptian goose (*Chenalopez aegyptiacus*)----- 2
 Upland goose (*Chloephaga leucoptera*)----- 2
 Snow goose (*Chen hyperboreus*)----- 2
 Greater snow goose (*Chen hyperboreus nivalis*)----- 2
 Blue goose (*Chen caerulescens*)----- 7
 White-fronted goose (*Anser albifrons*)----- 3
 American white-fronted goose (*Anser albifrons gambeli*)----- 3
 Bar-headed goose (*Eulabeia indica*)----- 1
 Canada goose (*Branta canadensis*)----- 12
 Hutchins's goose (*Branta canadensis hutchinsii*)----- 9
 Cackling goose (*Branta canadensis minima*)----- 2
 Brant (*Branta bernicla glaucogastra*)----- 11
 Barnacle goose (*Branta leucopsis*)----- 7
 Cape Barren goose (*Cercopsis novaehollandia*)----- 2
 Spur-winged goose (*Plectropterus gambensis*)----- 2
 Pied goose (*Anseranas semipalmata*)----- 2
 Black-bellied tree duck (*Dendrocygna autumnalis*)----- 6
 Eyton's tree duck (*Dendrocygna eytoni*)----- 4
 White-faced tree duck (*Dendrocygna viduata*)----- 2
 Coscoroba swan (*Coscoroba coscoroba*)----- 1
 Mute swan (*Cygnus gibbus*)----- 3

Whistling swan (*Olor columbianus*)-- 1
 Trumpeter swan (*Olor buccinator*)--- 1
 Black swan (*Chenopsis atrata*)----- 2

FALCONIFORMES.

South American condor (*Vultur gryphus*)----- 1
 California condor (*Gymnogyps californianus*)----- 3
 Turkey vulture (*Cathartes aura*)----- 3
 Black vulture (*Coragyps urubu*)----- 2
 King vulture (*Sarcoramphus papa*)-- 2
 Secretary bird (*Sagittarius serpentarius*)----- 1
 Griffon vulture (*Gyps fulvus*)----- 1
 Cinereous vulture (*Aegyptius monachus*)----- 2
 Caracara (*Polyborus cheriway*)----- 2
 Wedge-tailed eagle (*Uroaëtus audax*)-- 2
 Golden eagle (*Aquila chrysaëtus*)--- 3
 White-bellied sea eagle (*Concuma leucogaster*)----- 2
 Bald eagle (*Haliæetus leucocephalus*)-- 11
 Alaskan bald eagle (*Haliæetus leucocephalus alascanus*)----- 2
 Broad-winged hawk (*Buteo platypterus*)----- 1
 Red-tailed hawk (*Buteo borealis*)----- 6
 Red-shouldered hawk (*Buteo lineatus*)-- 3
 Sparrow hawk (*Falco sparverius*)--- 4
 Duck hawk (*Falco peregrinus anatum*)-- 1

GALLIFORMES.

Razor-billed curassow (*Mitu mitu*)-- 1
 Wild turkey (*Meleagris gallopavo silvestris*)----- 1
 Peafowl (*Pavo cristatus*)----- 41
 Peacock pheasant (*Polyplectron bicalcaratum*)----- 1
 Silver pheasant (*Gennæus nycthemerus*)----- 1
 Ring-necked pheasant (*Phasianus torquatus*)----- 2
 Bobwhite (*Colinus virginianus*)----- 1
 Gambel's quail (*Lophortyx gambelii*)-- 3
 Valley quail (*Lophortyx californica vallicola*)----- 2

GRUIFORMES.

East Indian gallinule (*Porphyrio calvus*)----- 5
 American coot (*Fulica americana*)----- 2
 South Island weka rail (*Ocydromus australis*)----- 3
 Short-winged weka (*Ocydromus brachypterus*)----- 2
 Earl's weka (*Ocydromus earli*)----- 1
 Whooping crane (*Grus americana*)--- 1
 Sandhill crane (*Grus mexicana*)----- 2
 Little brown crane (*Grus canadensis*)-- 6
 White-necked crane (*Grus leucauchen*)-- 1
 Indian white crane (*Grus leucogeranus*)----- 1
 Lilford's crane (*Grus lilfordi*)----- 2
 Sarus crane (*Grus collaris*)----- 1
 Australian crane (*Grus rubicunda*)--- 2
 Demoiselle crane (*Anthropoides virgo*)-- 4

Crowned crane (<i>Balearica pavonina</i>)-----	1	Red-crowned parrot (<i>Amazona viridigenalis</i>)-----	6
White-backed trumpeter (<i>Psophia leucoptera</i>)-----	1	Double yellow-head parrot (<i>Amazona oratrix</i>)-----	8
Cariama (<i>Cariama cristata</i>)-----	1	Yellow-headed parrot (<i>Amazona ochrocephala</i>)-----	2
Kagu (<i>Rhynochetos jubatus</i>)-----	1	Festive parrot (<i>Amazona festiva</i>)-----	1
CHARADRIIFORMES.			
Yellow-wattled lapwing (<i>Lobivanellus indicus</i>)-----	1	Cuban parrot (<i>Amazona leucocephala</i>)-----	1
Pacific gull (<i>Gabianus pacificus</i>)-----	2	Gray parrot (<i>Psittacus erithacus</i>)-----	2
Great black-backed gull (<i>Larus marinus</i>)-----	1	Lesser vasa parrot (<i>Coracopsis nigra</i>)-----	1
Herring gull (<i>Larus argentatus</i>)-----	4	Pennant's paroquet (<i>Platycercus elegans</i>)-----	1
Laughing gull (<i>Larus atricilla</i>)-----	3	Rosella paroquet (<i>Platycercus eximius</i>)-----	1
Australian crested pigeon (<i>Ocyphaps lophotes</i>)-----	5	Black-tailed paroquet (<i>Polytelis melanura</i>)-----	2
Bronze-wing pigeon (<i>Phaps chalcoptera</i>)-----	2	Red-rumped paroquet (<i>Psephotus haematonotus</i>)-----	1
Wonga-wonga pigeon (<i>Leucosarcia pictata</i>)-----	6	Ring-necked paroquet (<i>Conurus torquatus</i>)-----	1
Wood pigeon (<i>Columba palumbus</i>)-----	7	Nepalese paroquet (<i>Conurus nepalensis</i>)-----	1
Mourning dove (<i>Zenaidura macroura</i>)-----	2	Grass paroquet (<i>Melopsittacus undulatus</i>)-----	6
Necklaced dove (<i>Spilopelia tigrina</i>)-----	4	CORACIFORMES.	
Zebra dove (<i>Geopelia striata</i>)-----	4	Giant kingfisher (<i>Dacelo gigas</i>)-----	4
Bar-shouldered dove (<i>Geopelia humeralis</i>)-----	2	Short-keeled toucan (<i>Ramphastos piscivorus brevicarinatus</i>)-----	1
Inca dove (<i>Scardafella inca</i>)-----	2	Barred owl (<i>Strix varia</i>)-----	7
Cuban ground dove (<i>Chamaepelia passerina aflavida</i>)-----	2	Snowy owl (<i>Nyctea nyctea</i>)-----	2
Green-winged dove (<i>Chalcophaps indica</i>)-----	3	Screech owl (<i>Otus asio</i>)-----	3
New Guinea green dove (<i>Chalcophaps chrysochlora</i>)-----	6	Great horned owl (<i>Bubo virginianus</i>)-----	11
Ringed turtle-dove (<i>Streptopelia risoria</i>)-----	2	Western horned owl (<i>Bubo virginianus pallascens</i>)-----	1
PSITTACIFORMES.			
Kea (<i>Nestor notabilis</i>)-----	4	American barn owl (<i>Tyto perlata praticola</i>)-----	3
Cockateel (<i>Calopsitta novæhollandiæ</i>)-----	2	PASSERIFORMES.	
Roseate cockatoo (<i>Kakatoe roseicapilla</i>)-----	22	Silver-eared hill-tit (<i>Mesia argenteauris</i>)-----	3
Bare-eyed cockatoo (<i>Kakatoe gymnopus</i>)-----	3	Red-billed hill-tit (<i>Liothrix luteus</i>)-----	8
Leadbeater's cockatoo (<i>Kakatoe leadbeateri</i>)-----	1	Black-gorgeted laughing-thrush (<i>Garrulax pectoralis</i>)-----	3
White cockatoo (<i>Kakatoe alba</i>)-----	2	White-eared bulbul (<i>Otocompsa leucotis</i>)-----	3
Sulphur-crested cockatoo (<i>Kakatoe galericita</i>)-----	8	European blackbird (<i>Turdus merula</i>)-----	2
Great red-crested cockatoo (<i>Kakatoe moluccensis</i>)-----	1	Robin (<i>Planesticus migratorius</i>)-----	1
Mexican green macaw (<i>Ara mexicana</i>)-----	2	Cedar waxwing (<i>Bombycilla cedrorum</i>)-----	1
Blue-and-yellow macaw (<i>Ara arauna</i>)-----	2	Piping crow-shrike (<i>Gymnorhina tibicen</i>)-----	4
Red-and-blue-and-yellow macaw (<i>Ara macao</i>)-----	8	Count Raggi's bird of paradise (<i>Paradisca raggiana</i>)-----	2
Yellow-winged paroquet (<i>Tirica virescens</i>)-----	1	Satin bower-bird (<i>Ptilonorhynchus violaceus</i>)-----	2
Tui paroquet (<i>Brotogeris sthomas</i>)-----	2	European raven (<i>Corvus corax</i>)-----	1
Tovi paroquet (<i>Brotogeris jugularis</i>)-----	2	Australian crow (<i>Corvus coronoides</i>)-----	1
Yellow-naped parrot (<i>Amazona auro-palliata</i>)-----	2	Jackdaw (<i>Corvus monedula</i>)-----	1
Yellow-checked parrot (<i>Amazona autumnalis</i>)-----	1	Yucatan jay (<i>Cissilopha yucatanica</i>)-----	1
Orange-winged parrot (<i>Amazona amazonica</i>)-----	1	Blue jay (<i>Cyanocitta cristata</i>)-----	3
		Green jay (<i>Xanthoura leucosa</i>)-----	1
		Australian gray jumper (<i>Struthidca cinerea</i>)-----	1
		Starling (<i>Sturnus vulgaris</i>)-----	9
		Crimson tanager (<i>Ramphocelus dimidiatus</i>)-----	1
		Blue tanager (<i>Thraupis cana</i>)-----	2

Shaft-tailed whydah (<i>Tetraonura regia</i>)		Bullfinch (<i>Pyrrhula pyrrhula</i>)-----	5
Napoleon weaver (<i>Pyromelana afro</i>)---	1	Greenfinch (<i>Chloris chloris</i>)-----	3
Red-billed weaver (<i>Quelea quelea</i>)---	1	Yellowhammer (<i>Emberiza citrinella</i>)--	4
Madagascar weaver (<i>Foudia madagascariensis</i>)	3	European goldfinch (<i>Carduelis carduelis</i>)	1
Fire finch (<i>Lagonosticta senegalensis</i>)	2	Bramblefinch (<i>Fringilla montifringilla</i>)	6
Strawberry finch (<i>Amandava amandava</i>)	6	European siskin (<i>Spinus spinus</i>)-----	2
Cordon bleu (<i>Estrilda phœnicotis</i>)---	1	Mexican goldfinch (<i>Astragalinus psaltria mexicanus</i>)	1
Nutmeg finch (<i>Munia punctulata</i>)----	7	House finch (<i>Carpodacus mexicanus frontalis</i>)	2
White-headed nun (<i>Munia maja</i>)-----	4	Purple finch (<i>Carpodacus purpureus</i>)--	1
Black-headed nun (<i>Munia atricapilla</i>)--	2	Canary (<i>Serinus canarius</i>)-----	15
Java finch (<i>Munia oryzivora</i>)-----	6	Green singing finch (<i>Serinus icterus</i>)--	1
White Java finch (<i>Munia oryzivora</i>)--	3	Slate-colored junco (<i>Junco hyemalis</i>)--	2
Fawn-and-white bengalee (<i>Uroloncha flavomaculata</i>)	4	Tree sparrow (<i>Spizella monticola</i>)---	1
Brown-and-white bengalee (<i>Uroloncha griseomaculata</i>)-----	3	White-throated sparrow (<i>Zonotrichia albicollis</i>)	4
Black-faced Gouldian finch (<i>Poephila gouldiæ</i>)	4	Song sparrow (<i>Melospiza melodia</i>)----	1
Diamond finch (<i>Steganopleura guttata</i>)--	8	San Diego song sparrow (<i>Melospiza melodia cooperi</i>)	4
Zebra finch (<i>Tœniopygia castanotis</i>)--	4	Fox sparrow (<i>Passercella iliaca</i>)-----	2
Cutthroat finch (<i>Amadina fasciata</i>)---	3	California towhee (<i>Pipilo crissalis</i>)---	2
Vera Cruz red wing (<i>Agelaius phœnicæus richmondi</i>)	2	Saffron finch (<i>Sicalis flaveola</i>)-----	3
Golden-hooded oriole (<i>Icterus chrysoccephalus</i>)-----	1	Seed eater (<i>Sporophila gutturalis</i>)---	2
Purple grackle (<i>Quiscalus quiscula</i>)--	5	Nonpareil (<i>Passerina ciris</i>)-----	15
Yellow-backed cacique (<i>Cacicus cela</i>)---	2	Blue grosbeak (<i>Guiraca cærulea</i>)-----	1
Black-tailed hawkfinch (<i>Eophona melanura</i>)-----	1	Red-crested cardinal (<i>Paroaria cucullata</i>)-----	1
		Cardinal (<i>Cardinalis cardinalis</i>)-----	2

REPTILES.

Alligator (<i>Alligator mississippiensis</i>)--	36	Garter snake (<i>Thamnophis sirtalis</i>)---	3
Teguexin (<i>Tupinambis teguixin</i>)-----	2	Moccasin (<i>Agkistrodon piscivorus</i>)---	1
Gila monster (<i>Heloderma suspectum</i>)--	7	Western diamond rattler (<i>Crotalus atrox</i>)	2
Tree iguana (<i>Iguana iguana</i>)-----	5	Ground rattler (<i>Sistrurus miliarius</i>)--	2
Rock iguana (<i>Cyclura bœolopha</i>)-----	4	Snapping turtle (<i>Chelydra serpentina</i>)	2
Horned toad (<i>Phrynosoma cornutum</i>)--	1	Rossignol's snapping turtle (<i>Chelydra rossignoni</i>)	1
Rock python (<i>Python molurus</i>)-----	2	Wood turtle (<i>Clemmys insculpta</i>)-----	2
Anaconda (<i>Eunectes murinus</i>)-----	2	Diamond-back terrapin (<i>Malaclemys centrata</i>)-----	1
Boa constrictor (<i>Constrictor constrictor</i>)	4	Painted turtle (<i>Chrysemys picta</i>)-----	1
Spreading adder (<i>Heterodon contortrix</i>)	1	Cooter (<i>Pseudemys scripta</i>)-----	1
Blacksnake (<i>Coluber constrictor</i>)-----	1	Central American cooter (<i>Pseudemys ornata</i>)	1
Coach-whip snake (<i>Coluber flagellum</i>)--	1	Gopher tortoise (<i>Gopherus polyphemus</i>)--	2
Chicken snake (<i>Elaphe quadrivittata</i>)	1	Duncan Island tortoise (<i>Testudo ephippium</i>)	1
Gopher snake (<i>Drymarchon corais couperi</i>)	1	Indefatigable Island tortoise (<i>Testudo porteri</i>)	1
Pine snake (<i>Pituophis melanoleucus</i>)--	5	Albemarle Island tortoise (<i>Testudo vicina</i>)-----	2
King snake (<i>Lampropeltis getulus</i>)-----	2		
Milk snake (<i>Lampropeltis triangulum</i>)	1		
Water snake (<i>Natrix sipedon</i>)-----	3		
Queen snake (<i>Natrix septemvittata</i>)---	1		

STATEMENT OF THE COLLECTION.

Accessions during the year.

	Mammals	Birds.	Reptiles.	Totals.
Presented.....	52	73	53	178
Born and hatched in National Zoological Park.....	55	21		76
Received in exchange.....	57	152	6	215
Purchased.....	9	45	9	63
Transferred from other Government departments.....	62	2		64
Captured in National Zoological Park.....		5	2	7
Deposited.....		9	1	10
Total.....	235	307	71	613

SUMMARY.

Animals on hand July 1, 1920.....	1,427
Accessions during the year.....	613
Total animals handled.....	2,040
Deduct loss (by exchange, death, and return of animals on deposit).....	495
Animals on hand June 30, 1921.....	1,545

Class.	Species.	Individuals.
Mammals.....	198	541
Birds.....	246	901
Reptiles.....	34	103
Total, June 30, 1921.....	478	1,545

This is a gain in the collection of 59 species and 118 individuals over the total for June 30, 1920. The number of species shown is greater than ever before in the history of the park.

VISITORS.

For the second time the official attendance records exceed 2,000,000. The total number of visitors to the park for the fiscal year, as determined by count and estimate, was 2,400,837, a gain of 171,232 over the record of last year. The greatest attendance in any one month was 390,988, in March, 1921, an average per day of 12,612.

The attendance by months was as follows: In 1920—July, 172,509; August, 211,600; September, 190,900; October, 323,150; November, 104,548; December, 78,050. In 1921—January, 171,776; February, 103,375; March, 390,988; April, 193,975; May, 276,475; June, 183,500.

One hundred and twenty-four schools and classes, with a total of 13,629 individuals, visited the park during the year. The number is greatly in excess of previous years, which have shown a steady increase. The American Ornithologists' Union, then in convention

in Washington, visited the park on November 12, 1920; and the American Society of Mammalogists held an informal meeting, with luncheon, at the superintendent's office May 4, 1921.

IMPROVEMENTS.

About 150 chestnut trees, many of large size, that had been killed during the past few years by the prevalent bark disease, were logged during the winter. A small, second-hand sawmill and a shingle mill were purchased at low cost, and 140,000 feet of choice chestnut lumber and about 80,000 shingles were salvaged by the operations. The dead chestnut trees were scattered through the undeveloped forest area in the northwestern part of the park, bordering Klinge Road; and as great care was taken in logging, there has resulted very little damage to the beauty of the wood. A few young chestnut trees not yet affected by the blight were left standing. With the sawmill on hand it will be possible to save much choice lumber from time to time as trees die or are removed in the development of the park.

In continuation of the policy inaugurated two years ago, of widening the main automobile roads crossing the park, the section of roadway between the concourse and the scales near the camel yards and stable was broken up and rebuilt. Other sections of the roads were repaired, and the ford across Rock Creek near Klinge entrance was rebuilt with cement and the approaches improved. A cement sidewalk, 10 feet wide, corresponding to the walk on the north side of the entrance road at the Harvard Street gate was constructed on the south side from this entrance to the cement bridge. The number of visitors entering the park by this gate has greatly increased with the development of the Mount Pleasant section of the city, and the increased sidewalk area has been badly needed for several years.

The great flight cage for large birds has been entirely cleaned, the steel framework and wire covering scraped, and treated to two coats of paint. The roof of the camel and llama house has been repaired; and a new hot-water heating boiler installed in the monkey house.

Minor improvements made during the year include Telford pavements in several of the paddocks, a shed for tools at the machine shop, preparation of a large paddock for the mountain goats, new guard rails bordering the inclosure for the Sumatran elephants, painting of the puma cages and other ironwork, and the construction of new trash receptacles and park benches.

CLEAN-PARK CAMPAIGN.

Regardless of park regulations, the paper and trash nuisance reached such serious proportions during the early spring months that a special campaign to enforce the laws against throwing and

leaving rubbish on the lawns was inaugurated. With few exceptions visitors have taken kindly to the requests of officers that all papers and other refuse be gathered up and deposited in the trash receptacles, and a very distinct improvement in the appearance of the grounds has resulted.

With the greatly increased attendance, and especially with the present popularity of the grounds for picnic purposes, the absolute enforcement of the rubbish law is imperative. Additional trash baskets have been provided, and it is the intention to carry the campaign to a point where every visitor will realize the importance of the regulations and the seriousness of a disregard for park cleanliness. The aid of the public has been solicited by signs calling attention to the paper and trash nuisance, with a request for help. The response from the majority of visitors is gratifying, and the untidy small minority will, if necessary, be dealt with by sterner methods.

ALTERATIONS OF BOUNDARIES.

The purchase of the land necessary for the protection of the Connecticut Avenue entrance was completed during the year. The area acquired by purchase, and the included highways which by the same act become a part of the National Zoological Park, make an addition of 247,261.9 square feet or approximately $5\frac{3}{4}$ acres. The total area of the National Zoological Park is now about 175 acres. The unexpended balance of \$2,403.66, left from the appropriation of \$80,000 made for the purchase of this land, is reappropriated in the sundry civil bill for 1922 toward the purchase of certain lots near the Adams Mill Road entrance to the park, between the park and Adams Mill Road. The owners having declined to sell these lots within the price limits set by the act, steps have been taken toward the institution of proceedings of condemnation.

IMPORTANT NEEDS.

Restaurant.—The most urgent improvement needed for the park is a suitable public restaurant. As pointed out in previous reports, the old refreshment stand, originally constructed as a temporary building when the attendance was only a small fraction of its present figures, is not only in a bad state of repair but is wholly inadequate for the required service. The estimated cost of a suitable building a year ago was \$65,400. Since the park has now obtained, as mentioned above, a large quantity of first-class chestnut lumber, including many heavy timbers, new plans have recently been drawn by the municipal architect with the idea of utilizing this lumber to advantage. It is now believed that a restaurant building in every way suitable to the demands of the place, and probably more in keeping with the surroundings, can be constructed for \$40,000.

Small-mammal house.—A building properly constructed for the exhibition of small mammals has long been needed, but never so much as at the present time. Numerous small animals now in the collection can not be shown for lack of quarters, and it is evident that more and more interest is being taken by visitors in the smaller species now on exhibition.

Grading banks and filling ravines.—During the present year some progress will be made in continuing the work of grading in the west-central part of the park. This work was begun five years ago but was discontinued during the war. Not only will a large area of comparatively flat space for deer yards and other paddocks result from the work, but the filling in of a near-by ravine will make possible the elimination of a dangerous curve in the main automobile road. It is greatly to be hoped that it will be possible to complete this work within the next year, so that the unsightly condition of that portion of the park adjoining the principal highway of traffic can be corrected and the ground utilized to advantage for the exhibition of animals.

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 June 5, 1919:

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, \$13,000.

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 was erected in July, 1920, at the expense of funds donated for the purpose by Mr. John A. Roebling, 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 preparation of the manuscript for Volume IV of the Annals of the Observatory was continued. Owing to the postponement of its publication, it has required to be brought up to date by repeated additions and modifications, and it is now expected to publish in Volume IV all the results up to September, 1920, when the solar radiation apparatus which had been employed on Mount Wilson was removed to Mount Harqua Hala, Ariz. A great deal of measuring and computing was required to bring up to date the work of 1919 and 1920 on the solar constant of radiation and to work up the results of the observations of the distribution of light over the sun's disk, which have been carried on since 1916 with only partial reduction. This work went on under Mr. Fowle's direction, assisted by Mrs. Bond, computer, and for a few months by temporary computers, Miss Inez Ensign and Miss Esther Weaver. The cost of employing

these computers temporarily was borne by a gift of Mr. John A. Roebing. At the close of the fiscal year the computations of the Annals had been very nearly completed. The manuscript of the volume was also almost ready for publication, and it is hoped to put the whole to press early in the autumn of 1921.

As usual, a large amount of delicate instrument work has been done by Mr. A. Kramer, instrument maker, and still more delicate parts have been prepared by Mr. L. B. Aldrich, of the observatory staff. They have prepared and standardized a number of pyrheliometers, pyranometers, galvanometers, and bolometers for the use of the observatory and its stations.

By invitation of Dr. George E. Hale, director of the Solar Observatory at Mount Wilson, Calif., Dr. Abbot has undertaken the preparation of a special spectrobolometer for the observation of the energy spectra of the stars in the same manner in which we are accustomed to observe the energy spectrum of the sun. This outfit comprises a special spectroscope, a vacuum bolometer of special dimensions and construction, and a vacuum galvanometer designed to be of the very highest order of sensitiveness. The construction of this apparatus had been almost completed at the close of the fiscal year.

Work in the field.—As stated in last year's report, by the generosity of Mr. John A. Roebing, of Bernardsville, N. J., not only has the private station of the Smithsonian Institution located near Calama, Chile, been removed to the top of a mountain about 8 miles farther south, but the station of the Astrophysical Observatory has been relocated on the mountain called Harqua Hala, situated about 100 miles to the northwest of Phoenix, Ariz. In June, 1920, Dr. Abbot selected the site for the latter station and arranged with local contractors for the erection of an adobe building about 40 feet long, 10 feet wide, of two stories. The lower story, underground, was designed for the instruments, and the upper story for a dwelling house and computing rooms for the observers. Proceeding from Arizona to Mount Wilson, Dr. Abbot was joined early in July by Mr. L. B. Aldrich, and together they carried out at Mount Wilson, in July, August, and part of September, the usual observations on the solar constant of radiation and on the distribution of radiation over the sun's disk. In addition, they conducted a number of other investigations, including a redetermination of the constants of the secondary pyrheliometers employed in the research, a redetermination of the transmission of the spectrobolometer for different wave lengths, various investigations with the pyranometer and the Ångström pyrgeometer, and, assisted by Mrs. Abbot, investigations on the use of solar radiation for cooking purposes.

The solar cooking outfit erected on Mount Wilson some years ago was in 1920, for the first time, brought to a reasonable degree of per-

fection. The mirror, which is of parabolic cylindrical shape, about 10 feet long and 7 feet wide, brings the solar radiation to focus on a tube filled with oil which passes up the axis of the mirror, parallel to the earth's axis, and about this tube, on suitable rollers, the mirror is rotated by means of a simple and inexpensive clockwork, in order that it may always face toward the sun. The oil tube is connected with a reservoir of oil about 10 feet higher up and from this a return tube goes underneath the mirror, thus completing the circuit for the flow of oil which the mirror, by focusing the sun rays, strongly heats. The reservoir contains about a barrel of oil, which is such as is used for lubricating gas-engine cylinders. The reservoir and the oil circuit tubes are protected from the loss of heat, as far as possible, by insulation. The greatest loss of heat, however, occurs with the naked tube which passes through the mirror. This, however, is protected by a glass tube 4 inches in diameter, and this, in turn, by flat sheets of glass covering the whole mirror and protecting it from dust and wind. Two ovens are inserted in the rear of the reservoir, which is just outside the door of the observer's cottage on Mount Wilson, and food after being prepared in the kitchen, may be baked, boiled, or stewed in these ovens, according to the character of the dish. Nearly all of the food prepared for the use of the observers during their stay on Mount Wilson, from July 1 to September 15, was cooked by this solar cooker. The great advantage of the cooking is that the reservoir stays hot for a good many hours, so that cooking may be continued through the night or even through a partially cloudy day. The apparatus proved to be especially satisfactory for the canning of fruit.

In the early part of September Messrs. Abbot and Aldrich packed the apparatus which had been used on Mount Wilson for observing the solar constant of radiation and shipped the same to Wenden, Ariz., the nearest railroad station leading to Mount Harqua Hala. The apparatus was set up for observations by the end of September, and Dr. Abbot, with Mr. F. A. Greeley as assistant, carried on solar radiation measurements beginning October 3 continuously until January 20, 1921, when Dr. Abbot was relieved by Mr. L. B. Aldrich, who in turn was relieved by Mr. A. F. Moore, formerly director of the observatory at Calama and Montezuma, Chile, who reported for duty about April 20. It is intended to carry on the solar constant observations at Mount Harqua Hala on all days when the weather permits for several years in cooperation with the similar observations being made at Montezuma, Chile. With the results of the two stations, it is hoped to furnish a sound basis for the study of solar variation and the dependence of terrestrial weather conditions thereon. The station at Mount Harqua Hala was erected after a considerable investigation by the United States Weather Bureau of

sites in California, Arizona, and Nevada. From the middle of September, when Messrs. Abbot and Aldrich arrived in the vicinity, until some time in February the conditions were found to be superior to what had been expected. About 70 per cent of the days during that interval were fit for observation. The months of March, April, and May proved to be less satisfactory than was anticipated, owing to a thick haziness and much cirrus cloud. This defect, however, seems to be attending the generally unusual character of the weather in large areas of the globe. During the first four months of the year 1921, for instance, hardly more than half of the usual number of observations were made at the station in Chile, and other facts might be cited which would tend to show that the earlier part of the year 1921 was of very unusual character from a weather standpoint.

The station on Mount Harqua Hala, being 15 miles from Wenden, the railroad station, and 5 miles from a wagon road, is very isolated. The effect of such isolation on the morale of observers was very thoughtfully considered by Mr. John A. Roebeling, and he added considerably to his first gift in order to provide a great many things for the comfort and recreation of the observers, both in Arizona and South America. Not all of these arrangements had been completed at the close of the fiscal year, so that mention of them may be deferred more properly to next year's report.

PERSONNEL.

Miss F. A. Graves resigned as computer on August 10, 1920.

SUMMARY.

The year has been marked by the transfer of the solar radiation measurements from Mount Wilson, Calif., to Mount Harqua Hala, Ariz., to secure more perfect weather conditions. It is intended to continue solar constant observations there daily when possible throughout the entire year for several years. Similar duplicate observations are to be carried on at Montezuma, Chile, at the private station of the Smithsonian. Thus it is hoped to provide an excellent basis of solar radiation measurements to compare with weather phenomena. This may lead to advance in methods of weather forecasting. Volume IV of the annals, covering the years 1912 to 1920, is practically ready for the press.

Respectfully submitted.

C. G. ABBOT,
Director.

Dr. C. 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, 1921:

All volumes of the fourteenth annual issue have been published, completing the catalogue through the year 1914. Financial conditions, brought about by the war and the excessive advance in the cost of publication, have since made it necessary to temporarily suspend printing the catalogue. Much of the material for 1915 and subsequent years is in the hands of the London central bureau ready for publication as soon as financial support is assured and publication costs are more nearly normal.

The work of this bureau during the year has consisted in collecting data from periodicals regularly publishing scientific papers, of which there are about 550 in the United States. In addition to these there are over 400 occasionally containing scientific matter. Book notices, reviews, and publishers' lists and the publications received through exchange by the Smithsonian Institution are also systematically used in order to make sure that no paper coming within the scope of the catalogue is overlooked. Reference slips are prepared for each paper thus collected, and the contents classified to conform to the International Catalogue subject schedule. Practically all of the classification is done by specialists, and much difficulty is experienced in obtaining suitable aid for this part of the work, owing to the very limited funds available. This lack of funds has always seriously interfered with the work of the bureau; but as much of the data through the year 1920 have been classified and are now held pending the resumption of publication, it is hoped that by the time it is called for by the central bureau most of the index cards will be ready, and that when the published volumes have been brought up to date a larger annual appropriation will be granted, so that all current publications may be immediately dealt with.

When it is considered that between 25,000 and 30,000 reference cards have annually been furnished by this bureau, some idea of the amount of expert and clerical labor involved is apparent.

As a résumé of the history of the enterprise was published in the report of this bureau for the last fiscal year, it is unnecessary to again repeat it excepting to state that financial difficulties have not been relieved, although, owing to assurances made by influential delegates

to a conference held under the auspices of the Royal Society in London during September, 1920, it appears that if certain conditions can be met financial support may be looked for from the United States. This conference, called by the Royal Society to consider the future of the International Catalogue of Scientific Literature, was held in London September 28 and 29, 1920. The following delegates attended, representing the countries named: Denmark, Prof. M. Knudsen; France, M. A. Lacroix; Holland, Dr. G. van Rijnberk; Japan, Dr. Hantaro Nagaoka; Norway, Mr. Rolf Laache; Sweden, Baron Alströmer; Switzerland, Dr. Hermann Escher, Dr. Marcel Godet, Dr. H. Field; United States, Dr. Robert M. Yerkes (National Research Council), Dr. L. E. Dickson (National Academy of Sciences), Mr. L. C. Gunnell (Smithsonian Institution); India, Sir H. H. Hayden, F. R. S.; New Zealand, Prof. A. Denby, F. R. S.; Victoria, Prof. E. W. Skeats; South Africa, Sir Thomas Muir, F. R. S.; West Australia, Mr. C. B. Rushton. Representing the Royal Society: Sir Joseph Thomson, president R. S.; Sir David Prain, treasurer R. S.; Mr. J. H. Jeans, secretary R. S.; Prof. H. E. Armstrong, F. R. S.; Dr. F. A. Bather, F. R. S.; Dr. P. C. Mitchell, F. R. S.; Sir Arthur Schuster, F. R. S. There were also present Dr. S. I. Franz (United States of America), representing the Rockefeller Foundation, and Sir F. G. Ogilvie and Mr. L. S. Lloyd (Great Britain). Two Italian delegates, Prof. Raffaello Nasini and Comm. Ing. Ernesto Mancini, were delayed on the journey and did not arrive until the end of the conference. These two distinguished Italian representatives were very earnest in their desire to see the catalogue continued, and both agreed with the decisions, of the other delegates.

After two days taken up in considering the financial situation as presented by the Royal Society, and discussion of the general affairs of the enterprise, the following resolutions were agreed on unanimously:

1. That the catalogue should be temporarily continued in its present form for the year 1915 and possibly also as a single issue for the period 1916-1920 provided adequate financial support can be obtained.

That at the earliest possible date opportunity be taken to reconsider the whole character of the subsequent work of organization.

That one of the first questions to be considered be the possibility of converting the International Catalogue of Scientific Literature into a cumulative subject and authors' index, the volumes of which shall be published at intervals of 3, 5, or 10 years, in accordance with the status and needs of their respective sciences; and that the materials shall be obtained so far as practicable in co-operation with the abstracting journals of the world and other agencies affording rapid information, including regional bureaus.

It was also agreed unanimously—

2. That, inasmuch as the Royal Society is no longer able to accept financial responsibility for the catalogue, it is essential that adequate financial support, including working capital, be provided.

Further, the opinion was expressed by the delegates generally (other than those representing the Royal Society) that the Royal Society, being relieved of financial responsibility, should otherwise act as heretofore.

Finally the conference resolved—

3. That a committee be appointed to draw up definite proposals in accordance with the above resolutions and that the report of the committee be forwarded to the council of the Royal Society.

4. That the council of the Royal Society be requested to take such steps with regard to the recommendations of this committee as they think fit.

The committee appointed under the resolution 3 made the following recommendations, subject to adequate financial provision being assured:

(a) That the central bureau be instructed to proceed with publication of the 1915 issue.

(b) That the central bureau be further instructed to collect material for the period 1916–1920 with a view to the early publication of the issue 1916–1920.

The committee further recommended—

(c) That the council of the Royal Society request the executive committee of the International Council of the Catalogue to proceed to collect information as to the various issues raised in the foregoing resolutions of the conference and to report at as early a date as possible.

The fourteenth issue was not completed at the time of the meeting. Below is a table showing the receipts and expenditures of the London central bureau on account of the first 13 issues:

	Receipts.			Expenditures.		
	£.	s.	d.	£.	s.	d.
First issue.....	7,083	10	3	7,117	0	0
Second issue.....	7,168	16	4	7,115	2	7
Third issue.....	7,152	15	10	6,807	5	1
Fourth issue.....	7,010	14	1	7,009	19	5
Fifth issue.....	6,745	13	10	8,216	17	8
Sixth issue.....	6,747	14	7	7,895	10	1
Seventh issue.....	7,372	17	1	7,493	1	10
Eighth issue.....	7,079	4	6	7,281	1	5
Ninth issue.....	7,212	17	7	6,917	3	8
Tenth issue.....	7,183	14	5	7,271	12	7
Eleventh issue ¹	6,796	18	4	6,894	16	8
Twelfth issue.....	5,580	17	10	6,752	11	6
Thirteenth issue ²	5,611	9	10	8,783	11	6
	88,747	4	6	95,555	14	0

¹ The war began before the eleventh issue was completed, so that the falling off in receipts during the last three years may be attributed to loss of subscriptions from Germany, Austria, Hungary, Poland, and Belgium.

² The increased expenditures on the thirteenth issue arises from that issue having taken two years instead of one to complete.

From this table it will be seen that on the completion of the tenth issue, before war conditions interfered, receipts and expenditures

practically balanced, and it is apparent that had not these unexpected conditions arisen the whole enterprise would have been self-sustaining. Before war began many changes were contemplated to improve the service rendered by the catalogue and bring it more nearly to the high standard set by the original brilliantly conceived plan which so many of the world's leading men of science had taken part in formulating and which was referred to in some detail in the last annual report of this bureau.

There is and has been no question of the need and value of an International Catalogue of Scientific Literature, and it is the opinion of almost everyone interested in such matters that no better plan has ever been presented to accomplish the ends sought. Any new enterprise would lack the greatest present asset of the catalogue, which is the official support of most of the civilized nations, and it is with this support practically assured for the future that the catalogue will start in its endeavor to gain the financial assistance necessary to compensate for losses caused by the late war.

New agencies, such as abstract journals representing all branches of science, are to be undertaken by other organizations, and it is through cooperation with these that the catalogue is to be produced in the future, thus meeting all requirements of scientific workers as well as those of reference libraries and of those engaged in general investigation.

From the attitude of the foreign delegates at the conference it is apparent that there exists no lack of interest or desire to continue the work, but all of these countries are now under unprecedented financial strain, which is greatly increased by abnormal rates of exchange, so for the present, at least, their aid must be less than it would be during normal times. There is in this country a growing interest in supplying the needs of scientific workers, and plans are under way to publish abstract journals in all branches of science not already represented. These plans were brought to the notice of the conference by the American delegates, representing the National Academy of Sciences, the National Research Council, and by a representative of the Rockefeller Foundation, who was present. From statements there made it appears that the money needed to establish these enterprises is available and the resolutions of the conference took into account cooperation with these new organizations for the common benefit of the publishing bodies and of scientific investigators.

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, 1921:

The number of packages received was 27,327, an increase over the preceding year of 3,577. Of these 25,156 were received by mail and 2,171 through the International Exchange Service. Many of the packages received through the international exchanges, it might be mentioned, were exceptionally large, consisting of publications issued during the years 1914 to 1920, when it was not possible to send them on account of the war.

SMITHSONIAN MAIN LIBRARY.

In order that material received for the Smithsonian 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 was 6,250, composed of 4,910 complete volumes, 607 parts of volumes, 721 pamphlets, and 12 charts. The accession numbers extended from 534,619 to 537,229. Four thousand four hundred and sixty-four foreign government documents, presented to the Smithsonian Institution, were transferred to the Library of Congress in accordance with the established practice.

Material from abroad has been steadily coming in, and the receipts for the year have been much larger than was anticipated. The number of authors' reprints and theses from German universities and institutes of technology has been exceptionally large, covering the years 1914 to 1920. These were received from the universities of Berlin, Breslau, Frankfurt-am-Main, Freiburg-im-Breisgau, Halle-an-der-Saale, Heidelberg, Kiel, Leipzig, Marburg, Zürich, Dorpat, Helsingfors, Lund, Paris, Amsterdam, Brussels, Delft, Ghent, Leiden, and Utrecht; and from the institutes of technology at Berlin, Braunschweig, Stockholm, Utrecht and Zürich.

Cataloguing.—As will be seen by comparison, the cataloguing accomplished has been more than double that of last year.

	1921	1920
Volumes catalogued.....	6,252	2,332
Volumes recatalogued.....	75	848
Library of Congress cards filed.....	757	618
Catalogue cards typed.....	4,920	2,280
New titles added to author catalogue.....	2,517	869

Large as the amount of cataloguing has been, however, in comparison with last year, it has not been sufficient to meet the demands occasioned by the receipts; and many of the reprints and theses remain uncatalogued.

Periodicals.—The number of entries at the periodical desk was 14,008. Nine hundred and forty-five volumes were completed.

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

Number of want cards received from—

Smithsonian division.....	291
Periodical division.....	90
Order division.....	48
Total.....	429

Number of publications secured for—

	Vols.	Parts.
Smithsonian division.....	290	255
Periodical division.....	19	201
Order division.....	5	3
Total.....	324	459

OFFICE LIBRARY.

Accessions to the office library, including the aeronautical collection, the collection of Buonaparteana, the art room collection, and the employees' library, numbered 317 volumes, 4 parts of volumes, and 468 pamphlets. This does not include many periodicals, of which the current numbers are kept on file in the reading room, and the completed volumes transmitted at the end of the year to the Library of Congress. The library is greatly indebted to Dr. Frank Wigglesworth Clarke for the presentation of his unique collection of authors' reprints on the determination of the atomic weights, numbering 482 titles.

Circulation.—The total circulation of the Library was 3,485, consisting of 2,708 magazines borrowed from the reading room, 506 books from the employees' library, and 171 from the reference room. Many volumes which are not permitted to leave the building were consulted, especially reference works and the books of the aeronautical collection and the De Peyster collection.

Bibliography.—The second volume of the Bibliography of Aeronautics, prepared by the assistant librarian, covering the period from 1909 to 1916, was completed and published by the National Advisory Committee for Aeronautics. This volume contains approximately 35,000 citations and cross references, and supplements the material contained in the volume published by the Smithsonian Institution as volume 55 of the Smithsonian Miscellaneous Collections. The

aeronautical library is growing and becoming more and more important.

MUSEUM LIBRARY.

Continued interest has been manifested during the year in the increase of the scientific collections of the United States National Museum. Among those who have donated valuable material to the library may be mentioned Dr. J. M. Aldrich, Mr. H. S. Barber, Mr. A. H. Clark, Dr. William H. Dall, Dr. O. P. Hay, Dr. W. H. Holmes, Dr. Walter Hough, Dr. Aleš Hrdlička, Mr. W. R. Maxon, Dr. G. S. Miller, Dr. C. W. Richmond, Mr. J. H. Riley, Mr. S. A. Rohwer, Mr. W. Schaus, Mr. W. L. Schmitt, Dr. R. W. Schufeldt, Dr. L. Stejneger, Mr. H. B. Swales, Dr. Charles D. Walcott, and the late Dr. Joseph Paxson Iddings.

Especially worthy of mention is the library of the late Dr. Iddings, comprising upward of 1,000 books and pamphlets, chiefly on geological subjects. Dr. Iddings, as is well known, was one of America's leading petrologists, and his 40 years' accumulation of authors' excerpts on this branch of science was unusually large. The donation, made through his sister, Mrs. Francis D. Cleveland, is therefore important. Indeed it forms the most important single acquisition to the geological section of the library since the foundation of the department in 1880.

The geological and paleontological collections have been further augmented during the year by the continued gifts of the Secretary of the Smithsonian Institution, Dr. Charles D. Walcott, most of the books donated being volumes of highly technical content and of great value to those undertaking advanced researches along these lines.

The additions to the sectional library of the division of mollusks through the gift of Dr. William H. Dall have made possible a continued study in the United States National Museum of the more recently discovered mollusks and tertiary fossils. The library is greatly indebted to Dr. Dall, during these times when scientific books of this character are so expensive and so difficult to secure, for the continued interest year by year in the selection and presentation of so many volumes for this section. The number of titles added this year by Dr. Dall was 317.

Accessions.—Four thousand seven hundred and sixty volumes were accessioned during the year, including 2,041 completed volumes and 2,719 pamphlets. The number of books in the library is now 150,067, of which 58,658 are bound volumes and 91,409 pamphlets and unbound papers.

Cataloguing.—Seven hundred and seventy-seven volumes and 2,643 pamphlets were catalogued.

Periodicals.—The number of periodicals entered was 15,427.

Loans.—The number of books loaned was 7,432. Of these, 1,778 were borrowed from the Library of Congress, and 105 from other libraries.

Binding.—Owing to the increased cost of binding, it has been possible to have only 692 books bound, most of these being volumes which could not be bound last year, when the funds for this purpose were exhausted in January, the allotment being sufficient for a period of six months only. This year the funds were exhausted in November, some two months earlier. An increased allotment for binding is earnestly recommended.

Technological series.—The compiling of a subject and title catalogue for material in the technological series is slowly progressing, and it is hoped that it may be brought to completion within the course of a year. Additions to the series, exclusive of duplicates, number 216 bound volumes, 133 pamphlets, 6,372 periodicals. To the scientific depository catalogue, 1,180 cards have been added, including author, title, and subject entries. The books and periodicals loaned number 210.

Sectional libraries.—Following is a list of sectional libraries:

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

ASTROPHYSICAL OBSERVATORY LIBRARY.

Additions to the library of the Astrophysical Observatory numbered 72 volumes, 12 parts of volumes, and 37 pamphlets.

BUREAU OF AMERICAN ETHNOLOGY LIBRARY.

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

NATIONAL GALLERY OF ART LIBRARY.

The library of the National Gallery of Art was during the past fiscal year administered under the direction of the library of the United States National Museum, and its accessions are included in the statistics given for that library.

FREER GALLERY OF ART LIBRARY.

Accessions to the library of the Freer Gallery of Art, including publications presented to the Smithsonian Institution and deposited there for reference use in connection with the Freer collections, number 113. Especially worthy of mention is the gift by Messrs. Ton-Ying & Co., of New York, in commemoration of Mr. Charles L. Freer, of 33 rare Chinese manuscripts of the Ming period, constituting 108 volumes.

NATIONAL ZOOLOGICAL PARK LIBRARY.

Eleven volumes were added to the library of the National Zoological Park during the year.

SUMMARY OF ACCESSIONS.

The accessions during the year, with the exception of those for the library of the Bureau of American Ethnology, may be summarized as follows:

To the Smithsonian deposit in the Library of Congress, including parts to complete sets.....	6,250
To the Smithsonian office, Astrophysical Observatory, Freer Gallery of Art, and National Zoological Park libraries.....	938
To the United States National Museum library, including accessions for the National Gallery of Art.....	4,760
Total.....	11,948

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, 1921.

The Institution proper published during the year 7 papers in the series of Miscellaneous Collections, 1 annual report and pamphlet copies of 27 articles in the appendix to the report, a reprint of the Smithsonian Mathematical Tables, and two special publications. The Bureau of American Ethnology published three bulletins and a list of the publications of the bureau. The United States National Museum issued 1 annual report, 8 bulletins, 4 separate parts of bulletins, 51 separate papers from the proceedings, and 5 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 142,208, which includes 255 volumes and separates of the Smithsonian Contributions to Knowledge, 12,922 volumes and separates of the Smithsonian Miscellaneous Collections, 24,423 volumes and separates of the Smithsonian annual reports, 89,000 volumes and separates of the National Museum publications, 12,795 publications of the Bureau of American Ethnology, 2,000 special publications, 14 volumes of the Annals of the Astrophysical Observatory, 40 reports on the Harriman Alaska expedition, 414 reports of the American Historical Society, and 345 publications presented to but not issued by the Smithsonian Institution.

SMITHSONIAN MISCELLANEOUS COLLECTIONS.

Of the Smithsonian Miscellaneous Collections, volume 71, 1 paper was issued; volume 72, 6 papers; in all, 7 papers, as follows:

VOLUME 71.

No. 1. Smithsonian Physical Tables, Seventh Revised Edition. Prepared by Frederick E. Fowle. September 21, 1920. xlvi+450 pp. (Publ. 2539.)

VOLUME 72.

No. 3. Reports upon two collections of mosses from British East Africa. By H. N. Dixon. September 1, 1920. 20 pp., 2 pls. (Publ. 2583.)

No. 4. Diagnoses of some new genera of birds. By Robert Ridgway. December 6, 1920. 4 pp. (Publ. 2588.)

- No. 5. New selaginellas from the western United States. By William R. Maxon. December 22, 1920. 10 pp., 6 pls. (Publ. 2589.)
- No. 6. Explorations and field-work of the Smithsonian Institution in 1920. May 12, 1921. 126 pp., 138 figs. (Publ. 2619.)
- No. 7. Sea-lilies and feather stars. By Austin H. Clark. April 28, 1921. 43 pp., 16 pls. (Publ. 2620.)
- No. 9. *Neoabbottia*, a new cactus genus from Hispaniola. By N. L. Britton and J. N. Rose. June 15, 1921. 6 pp., 4 pls. (Publ. 2651.)

SMITHSONIAN ANNUAL REPORTS.

REPORT FOR 1918.

The complete volume of the Annual Report of the Board of Regents for 1918, together with pamphlet copies of the papers in the general appendix, was received from the Public 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, 1918. xii+612 pp., 54 pls., 128 text figs. (Publ. 2549.)

The appendix contained the following papers:

- The Discovery of Helium, and What Came of It, by C. G. Abbot. 5 pp. (Publ. 2550.)
- An Account of the Rise of Navigation, by R. H. Curtiss. 11 pp. (Publ. 2551.)
- The Tornadoes of the United States, by Prof. Robert DeC. Ward. 6 pp., 1 pl. (Publ. 2552.)
- Wind Power, by James Carlill. 9 pp. (Publ. 2553.)
- A Tribute. Samuel Pierpont Langley: Pioneer in Practical Aviation, by Henry Leffman. 10 pp., 9 pls. (Publ. 2554.)
- Twentieth Century Physics, by R. A. Millikan. 19 pp. (Publ. 2555.)
- The Experiments of Dr. P. W. Bridgman on the Properties of Matter When Under High Pressure. Introductory Note by C. G. Abbot. 19 pp., 1 pl. (Publ. 2556.)
- The Problem of Radioactive Lead, by Theodore W. Richards. 14 pp. (Publ. 2557.)
- Sphagnum Moss: War Substitute for Cotton in Absorbent Surgical Dressings, by Prof. George E. Nichols. 13 pp., 4 pls. (Publ. 2558.)
- History of Military Medicine and its Contributions to Science, by Col. W. P. Chamberlain. 14 pp. (Publ. 2559.)
- Some Problems of International Readjustment of Mineral Supplies as Indicated in Recent Foreign Literature, by Eleanor F. Bliss. 18 pp. (Publ. 2560.)
- Reptile Reconstructions in the United States National Museum, by Charles W. Gilmore. 10 pp., 6 pls. (Publ. 2561.)
- A Pleistocene Cave Deposit in Western Maryland, by J. W. Gidley. 6 pp., 6 pls. (Publ. 2562.)
- Paleobotany: A Sketch of the Origin and Evolution of Floras, by Edward W. Berry. 118 pp., 6 pls. (Publ. 2563.)
- The Direct Action of Environment and Evolution, by Prince Kropotkin. 18 pp. (Publ. 2564.)
- The Law of Irreversible Evolution, by Branislav Petronievics. 11 pp. (Publ. 2565.)

- The Fundamental Factor of Insect Evolution, by S. S. Chetverikov. 8 pp., 1 pl. (Publ. 2566.)
- The Psychic Life of Insects, by E. L. Bouvier. 8 pp. (Publ. 2567.)
- Sexual Selection and Bird Song, by Chauncey J. Hawkins. 12 pp. (Publ. 2568.)
- Marine Camoufleurs and Their Camouflage: The Present and Prospective Significance of Facts Regarding the Coloration of Tropical Fishes, by W. H. Longley. 10 pp., 5 pls. (Publ. 2569.)
- Foot-Plow Agriculture in Peru, by O. F. Cook. 4 pp., 4 pls. (Publ. 2570.)
- Sun Worship of the Hopi Indians, by J. Walter Fewkes. 33 pp., 11 pls. (Publ. 2571.)
- A Constitutional League of Peace in the Stone Age of America: The League of the Iroquis and Its Constitution, by J. N. B. Hewitt. 18 pp. (Publ. 2572.)
- The Problem of Degeneracy, by H. F. Tredgold. 15 pp. (Publ. 2573.)
- History in Tools, by W. M. Flinders Petrie. 10 pp. (Publ. 2574.)
- The Background of Totemism, by E. Washburn Hopkins. 11 pp. (Publ. 2575.)
- A Great Naturalist: Sir Joseph Hooker, by Sir E. Ray Lankester. 16 pp. (Publ. 2576.)

REPORT FOR 1919.

The general appendix to the report for 1919, which was still in press at the close of the year, contains the following papers:

- Modern theories of the spiral nebulae, by Heber D. Curt's.
- 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 Guiana, 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 report of the executive committee and proceedings of the Board of Regents of the Institution and 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, 1920.

Report of the executive committee and proceedings of the Board of Regents of the Smithsonian Institution for the year ending June 30, 1920. 19 pp. (Publ. 2587.)

Report of the Secretary of the Smithsonian Institution for the year ending June 30, 1920. 110 pp., 1 pl. (Publ. 2586.)

The general appendix to this report, which was in press at the close of the year, contains 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.
 Narcotic daturas of the Old and New World; an account of their remarkable properties and their uses as intoxicants and in divination, 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.

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, 1921, the Museum published 1 annual report, 8 complete bulletins, 4 parts of bulletins, 5 parts of volumes in the series Contributions from the United States National Herbarium, and 51 separates from the proceedings.

The issues of the bulletin were as follows:

- Bulletin No. 106 (plates). North American early tertiary Bryozoa. By Ferdinand Canu and Ray S. Bassler.
 Bulletin No. 109. Contributions to a history of American State geological and natural history surveys. By George P. Merrill.
 Bulletin No. 110. Osteology of the carnivorous dinosauria in the United States National Museum, with special reference to the genera *Antrodemus* (*Allosaurus*) and *Ceratosaurus*. By Charles Whitney Gilmore.
 Bulletin No. 111. A monograph of the east American scaphopod mollusks. By John B. Henderson.
 Bulletin No. 112. Summary of the marine shell-bearing mollusks of the north-west coast of America, from San Diego, Calif., to the Polar Sea, mostly contained in the collection of the United States National Museum, with illustrations of hitherto unfigured species. By William Healey Dall.
 Bulletin No. 115. The fossil crinoid genus *Dolatocrinus* and its allies. By Frank Springer.
 Bulletin No. 116. The dipterous genus *Dolichopus* Latreille in North America. By M. C. Van Duzee, F. R. Cole, and J. M. Aldrich.
 Bulletin No. 117. The distribution of bird life in the Urubamba Valley of Peru. A report on the birds collected by the Yale University—National Geographic Society's expeditions. By Frank M. Chapman.

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

- Bulletin 100. Contributions to the biology of the Philippine Archipelago and adjacent regions. Volume 1, part 7: The macrouroid fishes of the Philippine Islands and the East Indies. By Charles Henry Gilbert and Carl L. Hubbs.
 Bulletin 100. Contributions to the biology of the Philippine Archipelago and Adjacent Regions. Volume 1, part 8: Polychaetous annelids collected by the United States Fisheries steamer *Albatross* in the waters adjacent to the Philippine Islands in 1907–1910. By A. L. Treadwell.

Bulletin 100. Contributions to the biology of the Philippine Archipelago and adjacent regions. Volume 1, part 9: Polychaetous annelids collected by the United States Fisheries steamer *Albatross* during the Philippine Expedition of 1907-1909. By Ruth A. Hoagland.

Bulletin 104. The Foraminifera of the Atlantic Ocean. Part 2, Lituolidae. By Joseph Augustine Cushman.

Of the separates from the proceedings, 5 were from volume 57, 29 from volume 58, and 17 from volume 59.

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 three bulletins and a list of the publications of the bureau were published, as follows:

Bulletin 67. Alesá texts and myths. By Leo Frachtenberg. 304 pp.

Bulletin 71. Native cemeteries and forms of burial east of the Mississippi. By David I. Bushnell, jr. 160 pp., 17 pls.

Bulletin 72. The owl sacred pack of the Fox Indians. By Truman Michelson. 83 pp., 4 pls.

List of the publications of the Bureau of American Ethnology.

There were in press at the close of the year five annual reports and seven bulletins. The bulletins were as follows:

Bulletin 73. Early history of the Creek Indians and their neighbors. By John R. Swanton.

Bulletin 74. Excavation of a site at Santiago Ahuizotla, D. F., Mexico. By Alfred M. Tozzer.

Bulletin 75. Northern Ute music. By Frances Densmore.

Bulletin 76. Archeological excavations in the Ozark region of central Missouri. By Gerard Fowke.

Bulletin —. Handbook of the Indians of California. By A. L. Kroeber.

Bulletin —. Mandan and Hidatsa music. By Frances Densmore.

Bulletin —. Villages of the Algonquian, Siouan, and Caddoan tribes west of the Mississippi. By David I. Bushnell, jr.

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 the provisions of the act of incorporation of the association.

There were published during the year the report for 1917 and volume 2 of the report for 1918. Volume 1 of the report for 1918, volumes 1 and 2 of the report for 1919, and the supplements to the reports for 1918 and 1919, entitled "Writings in American History," 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-third Annual Report of the National Society of the Daughters of the American Revolution was transmitted to Congress according to law in December, 1920.

THE SMITHSONIAN ADVISORY COMMITTEE ON PRINTING AND
PUBLICATION.

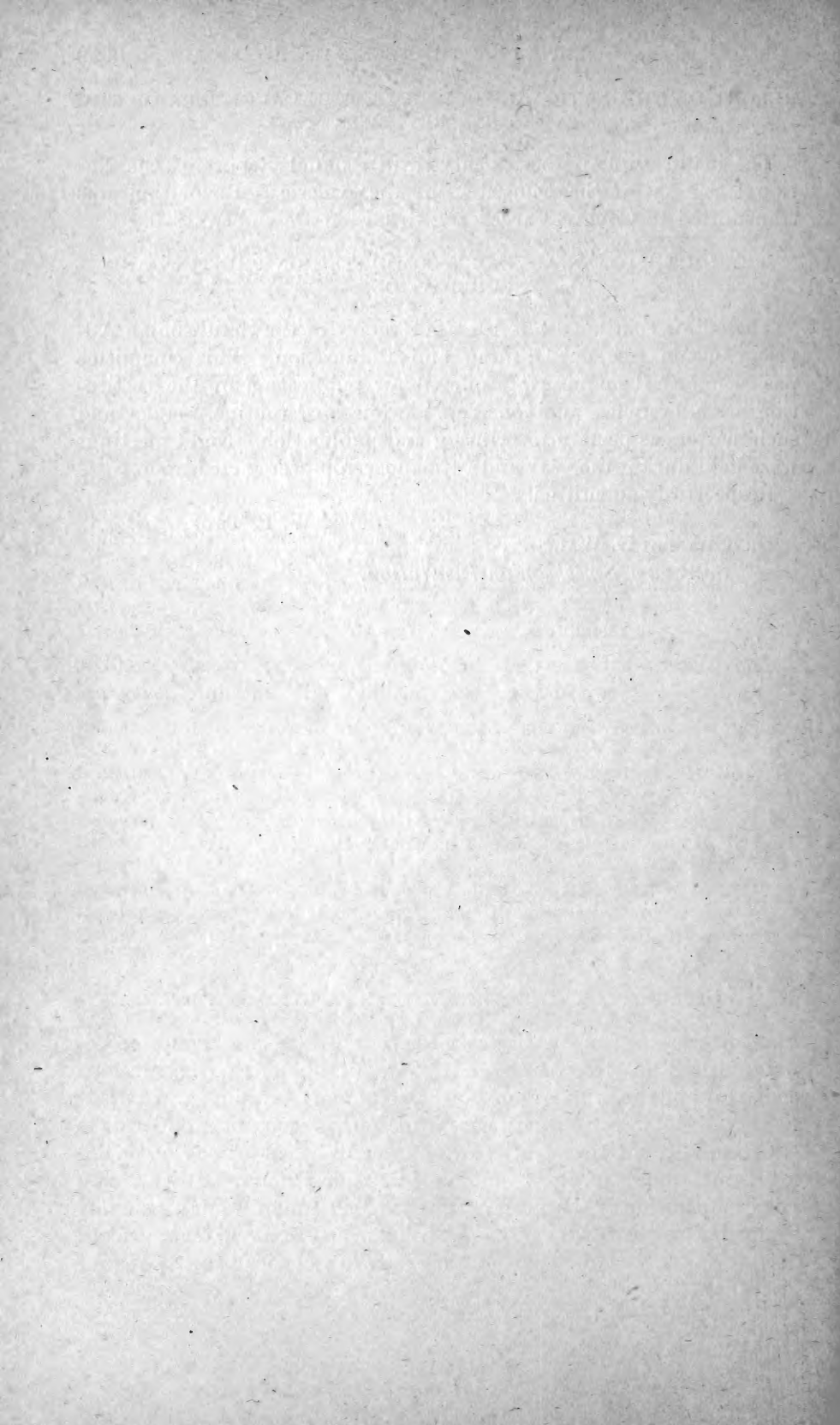
The editor continued to serve as secretary of the Smithsonian Advisory Committee on Printing and Publication. This committee passes upon all manuscripts offered for publication by the Institution or its branches and considers all forms of routine, blanks, and such matters as pertain to printing and publication. Eight meetings were held during the year and 94 manuscripts were acted upon.

Respectfully submitted.

W. P. TRUE, *Editor.*

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







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