

man with status independent of politics. In the mode of procedure adopted by the Commission in attempting to influence legislation it was thought to exceed its constitutional powers, and the criticisms which ensued were among the influences which determined the societies to a reconsideration of the general subject of their federation. Much attention has been given to the matter during the past winter, with the result that a 'Washington Academy of Sciences' has been determined on, which shall be the federal head of the existing scientific societies. It is to have no control over the 'affiliated societies,' which retain their autonomy, but its members are to be chosen exclusively from the membership of the societies, its vice-presidents are to be nominated by the societies, and it is to have charge of all matters affecting the general and collective interest of their membership. Great pains has been taken in the selection of its nucleus, so that it shall be a thoroughly representative body from the start. The Joint Commission, itself a body of 96 persons, has by ballot chosen from the full membership of the societies 75 men, the criterion of selection being 'original research or scientific attainment,' and the nucleus of 75 is to organize the Academy and enlarge its membership. The policy of the new Academy and the choice of functions to which special prominence shall be given are yet to be determined; but its progress will be watched with interest and expectation, especially by those who appreciate the importance of the problem to be solved by the national organizations.

# THE SMITHSONIAN INSTITUTION.\*

## FINANCES.

THE unexpended balance at the beginning of the fiscal year July 1, 1896, as stated in my last annual report, was \$57,065.78. Interest on the permanent fund in the Treasury and elsewhere, amounting to \$56,400, was received during the year, which, together with a sum of \$6,128.71 received from the sale of the publications and from miscellaneous sources, made the total receipts \$62,528.71.

The disbursements for the year amounted to \$58,061.99, the details of which are given in the report of the executive committee. The balance remaining to the credit of the Secretary on June 30, 1897, for the expenses of the Institution, was \$61,532.50, which includes the sum of \$10,000 referred to in previous reports, being \$5,000 received from the estate of Dr. J. H. Kidder, and a like sum from Dr. Alexander Graham Bell, the latter a gift made personally to the Secretary to promote certain physical researches. This latter sum was, with the donor's consent, deposited by the Secretary to the credit of the current funds of the Institution.

This balance also includes the interest accumulated on the Hodgkins donation, which is held against certain contingent obligations, besides relatively considerable sums held to meet obligations which may be expected to mature as the result of various scientific investigations or publications in progress.

The permanent funds of the Institution are as follows:

Bequest of Smithson, 1846.. .....	\$515,169.00
Residuary legacy of Smithson, 1867.....	26,210.63
Deposits from savings of income, 1867.....	108,620.37
Bequest of Jas. Hamilton, 1875..\$1,000.00	
Accumulated interest on Hamilton fund, 1895.....	1,000.00
	<hr/> 2,000.00

\*Abstract from the report of S. P. Langley, Secretary of the Smithsonian Institution, for the year ending June 30, 1897.

Bequest of Simeon Habel, 1880 .....	500.00
Deposits from proceeds of sale of bonds, 1881 .....	51,500.00
Gift of Thomas G. Hodgkins, 1891.....	200,000.00
Portion of residuary legacy, T. G. Hodg- kins, 1894 .....	8,000.00
Total permanent fund.....	912,000.00

The Regents also hold certain approved railroad bonds, forming a part of the fund established by Mr. Hodgkins for investigations of the properties of atmospheric air.

By Act of Congress approved by the President March 12, 1894, an amendment was made to Section 5591 of the Revised Statutes, the fundamental act organizing the Institution, as follows :

The Secretary of the Treasury is authorized and directed to receive into the Treasury, on the same terms as the original bequest of James Smithson, such sums as the Regents may, from time to time, see fit to deposit, not exceeding, with the original bequest, the sum of \$1,000,000; *Provided*, That this shall not operate as a limitation on the power of the Smithsonian Institution to receive money or other property by gift, bequest or devise, and to hold and dispose of the same in promotion of the purposes thereof.

Under this section, 5591 of the Revised Statutes, modified as above noted, the above fund of \$912,000 is deposited in the Treasury of the United States, bearing interest at 6 per cent. per annum, the interest alone being used in carrying out the aims of the Institution.

During the fiscal year 1886-97 Congress charged the Institution with the disbursement of the following appropriations :

For International Exchanges.....	\$19,000
For North American Ethnology.....	45,000
For United States National Museum :	
Preservation of collections.....	153,225
Furniture and fixings.....	15,000
Heating and lighting.....	13,000
Postage.....	500
Repairs to buildings.....	4,000
Rent of Workshops.....	2,000
Galleries .....	8,000
For National Zoological Park.....	67,000
For Astrophysical Observatory.....	10,000

The executive committee has examined

all the vouchers for disbursements made during the fiscal year, and a detailed statement of the receipts and expenditures will be found reported to Congress, in accordance with the provisions of the Sundry Civil Acts of October, 2, 1888, and August 5, 1892, in a letter addressed to the Speaker of the House of Representatives.

The vouchers for all the expenditures from the Smithsonian fund proper have been likewise examined and their correctness certified to by the executive committee, whose statement will be published, together with the accounts of the funds appropriated by Congress, in that committee's report.

The estimates for the fiscal year ending June 30, 1898, for carrying on the Government interests under the charge of the Smithsonian Institution, and forwarded as usual to the Secretary of the Treasury, were as follows :

International Exchanges.....	\$23,000
American Ethnology.....	50,000
National Museum :	
Preservation of collections.....	180,000
Furniture and Fixtures.....	30,000
Heating and lighting.....	15,000
Postage .....	500
Galleries .....	8,000
Repairs to buildings.....	8,000
Removal of sheds.....	2,500
Rent of workshops.....	2,000
National Zoological Park .....	75,000
Astrophysical Observatory.....	10,000

#### AVERY FUND.

In regard to the bequest of Mr. Robert Stanton Avery, referred to in previous reports, a definite settlement has not been reached with the heirs at law, so that it is not possible to state the exact amount that this fund will reach.

#### BUILDINGS.

No important changes were made in the Smithsonian Building during the year. Two museum storage sheds adjacent to the

building have been removed, with a great improvement in the appearance of the south front, while at the same time a source of danger from fire is averted. It is still necessary to retain some workshops south of the western portion of the building, no rooms being elsewhere available, but it is hoped that these also will soon be removed.

I may call attention to the need of additional room for the proper storage of such publications of the Institution and its bureaus as must be retained in reserve. These are comparatively few in number for each particular work, but the accumulations of fifty years occupy in the aggregate so much space as to demand more storage room than is now available and create a positive danger in the excessive weight that is now placed upon the floors of upper stories, while the work of distribution of publications is now carried on in very inconvenient and inaccessible quarters. I have under consideration the feasibility of some changes in the interior arrangement of the main north and south towers of the building which would render suitable for storage purposes much space which can not now be utilized.

I may also mention the very decided improvement that would result from the remodeling of the steep and long iron stairways leading to the great hall of the building, which is now used for archæological collections.

The improvements in progress in the Museum by the erection of galleries in several of the halls are alluded to elsewhere.

#### RESEARCH.

Although the time of the Secretary must be almost wholly given to administrative affairs, yet, as in years past, in carrying out the wish of the Regents and in continuation of investigations begun prior to my connection with the Institution, I have de-

voted such time as I could spare to researches upon the solar spectrum and to experiments in connection with certain physical data of aerodynamics.

Both of these investigations have reached a stage at which it is possible to give to the world somewhat full statements of results. In my remarks on the operations of the Astrophysical Observatory I discuss more fully the researches upon the solar spectrum.

In my report for the previous year I brought to the attention of the Board the fact that my experiments in aerodynamics had finally resulted in a successful trial on May 6, 1896, of a mechanism, built chiefly of steel and driven by a steam engine, which made two flights, each of over half a mile, and I appended a brief statement of my own and of Mr. Alexander Graham Bell, originally communicated in French to the Academy of Sciences of the Institute of France, describing the actual flight. Since that time a third and a much longer flight was made on November 28, 1896, with another machine, built of steel like the first and driven like that by propellers actuated by a steam engine of between 1 and 2 horsepower, making a horizontal flight of over three-quarters of a mile and descending in safety.

I have thus brought to the test of actual successful experiment the demonstration of the practicability of mechanical flight, which has been so long debated and till lately so discredited. To satisfy a nearly universal interest, I am now engaged in the preparation of a full description of these experiments since 1891, when my first memoir on aerodynamics was published. This memoir, with those on 'Experiments in Aerodynamics' and 'Internal Work of the Wind,' will form volume 27 of the Smithsonian contributions to knowledge, which will thus contain a complete record of all experiments carried on thus far under my direction upon this subject.

## HODGKINS FUND.

The Hodgkins medals of award were received at the Institution on the 13th of July, 1896, and were transmitted on the same day to those competitors for the Hodgkins fund prizes who were recommended by the committee to receive medals. A replica of the medal was sent to each of the members of the Hodgkins advisory committee and to certain specialists who, without compensation, had rendered valuable aid in connection with the competition. A replica was also sent to the firm of Evarts, Choate & Beaman, the legal counsel of Mr. Hodgkins, and to Dr. Chambers, his medical adviser and long-time friend, as a memento of valued services rendered in connection with the Hodgkins bequest to the Institution.

In July, 1896, Mr. E. C. C. Baly, of University College, London, a Hodgkins competitor, whose memoir received honorable mention, was awarded a grant of \$750 to enable him to prosecute further his investigations on the decomposition of the atmosphere by means of the passage of the electric spark. A report of the research, so far as it has progressed, has been received from Mr. Baly.

Under an additional grant to Dr. S. Weir Mitchell and Dr. John S. Billings investigations have been conducted in the Laboratory of Hygiene of the University of Pennsylvania, upon the effect which a prolonged exposure to vitiated air has upon the power of individuals to resist infectious diseases. Dr. D. H. Bergey, who conducted the experiments, reports that he subjected certain animals to an impure atmosphere, and found that while it apparently lowered their vitality he was unable to attenuate the fluids used for inoculating the diseases so that they would kill such a weakened animal while not affecting a vigorous one. Still, animals inoculated for tuberculosis died much earlier when ex-

posed to impure air. As these results may doubtless be applied to all warm-blooded animals, including man, it would appear that we have here an important confirmation of the clinical observation that tuberculosis thrives most in vitiated air.

January 15, 1897, a grant of \$500 was made to Mr. A. Lawrence Rotch, Director of the Blue Hill Meteorological Observatory at Readville, Mass., to be used in securing automatic kite records of meteorological conditions at an altitude of 10,000 feet or more. An additional grant of \$400 was later made to Mr. Rotch for continuing his experiments in connection with the explorations of the upper air.

With a view to being prepared to apply most advantageously the accruing interest from that portion of the fund devoted to investigations connected with the atmosphere, the Secretary has conferred, during the year, with specialists in this country and Europe, upon the subject of researches suitable to be aided from the Hodgkins fund.

The six Hodgkins memoirs which have been published by the Institution were issued in February and March, 1897, and a copy of each was sent to all persons who had submitted papers in connection with the competition.

## NAPLES TABLE.

As stated in my last report, the Institution has renewed the lease of the Smithsonian table at the Zoological Station of Naples for a second term of three years, this action being in accordance with the urgent solicitation of the faculties of several colleges and universities and of many of the leading biologists of the country.

At my earnest request Dr. Billings has continued as Chairman of the Advisory Committee, which has rendered most efficient aid in examining testimonials and in recommending action with regard to appli-

cations for the occupancy of the table. The following applications have been favorably acted upon :

Dr. F. H. Herrick, professor of biology at Adelbert College, Cleveland, occupied the table in November, 1896, and Dr. S. E. Meek, formerly of the Arkansas Industrial University, but more recently connected with the United States Fish Commission, received the appointment for two months in the spring of 1897. The application of Dr. H. S. Jennings, of the University of Michigan and later of Harvard, was approved for the three months during the spring and summer of 1897. Through the continued courtesy of Dr. Dohrn, in permitting two persons nominated by the Institution to occupy tables at the same time, the residence of Dr. Jennings began before the termination of Dr. Meek's appointment. Applications for the coming year are now under consideration.

#### EXPLORATIONS.

Ethnological and natural history explorations have been continued under the direction or with the assistance of the Institution in various parts of the world by the Bureau of Ethnology and the National Museum. This work is more fully described elsewhere, but I may mention here that a large number of objects of interest from various parts of the world have been added to the Museum collections, and much valuable information has been acquired regarding the history and the language of the American Indians. Among the explorations of the year were those by Dr. William L. Abbott in Siam, Professor O. F. Cook in Africa, Dr. E. A. Mearns in Minnesota and elsewhere, Mr. Frank H. Cushing in Maine, Mr. J. W. Fewkes in Arizona, Mr. E. T. Perkins in Idaho, Mr. W. J. McGee in Iowa, Mr. J. B. Hatcher in Patagonia and Tierra del Fuego, and Dr. Willis E. Everette in Oregon, British Columbia and Mexico.

#### PUBLICATIONS.

The publications of the Institution and its bureaus during the year comprised two works in quarto form, four in royal octavo, and fourteen in octavo, aggregating 9,630 pages, covering to a greater or less degree nearly all branches of human knowledge.

The Smithsonian Institution proper issues three series of works: The Contributions to Knowledge, the Miscellaneous Collections, and the Annual Report. By the bureaus of the Institution there are issued the Annual Report and the Bulletin of the Bureau of American Ethnology and the Proceedings and Bulletin of the National Museum, and the Secretary transmits to Congress the Annual Report of the American Historical Association. The Smithsonian Contributions and Miscellaneous Collections are printed at the expense of the Institution and the other publications from Congressional appropriations.

*Contributions to Knowledge.*—Two memoirs to this series were issued during the year, both having been submitted in competition for the Hodgkins fund prizes.

The memoir by Lord Rayleigh and Professor Ramsay describes the discovery of argon, for which achievement the authors were awarded the first Hodgkins fund prize of \$10,000. It gives an account of the reasons which led the investigators to suspect the existence of a new element in the atmosphere and a detailed description of the apparatus and methods by which the presence of this hitherto unknown gas was definitely established. The importance of the discovery was recognized independently by the Institute of France, which awarded a prize of 50,000 francs, and by the National Academy of Sciences, which granted to the discoverers the Barnard medal.

The memoir by Professor E. Duclaux, of Paris, entitled *Atmospheric Actinometry* and the Actinic Constitution of the Atmosphere, describes the methods and results of

numerous experiments on the chemical rays of the sun by the exposure of oxalic acid to their action. Professor Duclaux found that the chemical action of the rays when the sky was overcast was much less than on a fine day and that with light cumulus clouds the combustion might be more active than with a clear blue sky or slight cirrus, so that it appeared evident that the chemical activity and hygienic power of the sun's rays are not related to the apparent fineness of the day.

*Miscellaneous Collections.*—Nine papers of the 'Miscellaneous' series were issued and others are in progress. The completed works were Smithsonian Physical Tables, by Professor Thomas Gray; Equipment and Work of an Aerophysical Observatory, by Alexander McAdie; Air in Relation to Human Life and Health, by Professor F. A. R. Russell; Air of Towns, by Dr. J. B. Cohen; Air and Life, by Dr. Henri de Varigny; Mountain Observatories, by Professor E. S. Holden; Methods of Determining Organic Matter in the Air, by Dr. D. H. Bergey; Recalculation of Atomic Weights, by Professor F. W. Clarke, and Virginia Cartography, by P. Lee Phillips.

The Catalogue of Scientific and Technical Periodicals, by Dr. H. Carrington Bolton, mentioned in my last report, is in type and will soon be published. It comprises the titles of more than 8,500 scientific and technical periodicals in all languages, adding 3,500 titles to the first edition, published in 1885.

There is also completed, ready for the printer, a voluminous supplement to Dr. Bolton's Select Bibliography of Chemistry.

As a special work, there has been printed the International Exchange List of the Smithsonian Institution, being a list of the foreign correspondents, aggregating 9,414 learned societies, museums, universities, etc., with which American publications are exchanged.

*Annual Reports.*—The Smithsonian Annual Report is in two volumes, one of which is devoted to the work of the National Museum. In the general appendix of Part I. are included memoirs on all branches of knowledge, selected chiefly from publications of learned societies of the world that are not readily accessible to the public, the basis of selection being that the papers are written by a competent person, give an account of some important or at least interesting scientific discovery, are untechnical in language and suitable to nonprofessional readers.

The History of the First Half Century of the Smithsonian Institution, outlined with some detail in my last report, is now printed and will soon be issued. The Institution was founded August 10, 1846, by Act of Congress approved by President Polk, and it seemed an appropriate memorial of the completion of its first fifty years to publish a volume which should give an account of its origin and history, its achievements and its present condition.

The editorial supervision of the volume was undertaken by the late Dr. G. Brown Goode, and to his thorough acquaintance with the history of the Institution, and his skill and critical knowledge, the comprehensive plan of the work is entirely due. At the time of his death, in September, 1896, the manuscript was sufficiently advanced to permit of its completion on his general plan.

The volume is royal octavo of 866 pages, with a preface by William McKinley, President of the United States, ex-officio the head of the establishment. It is illustrated by full-page portraits of James Smithson, the Chancellors, several of the Regents, the three Secretaries, and of Assistant Secretary Goode, besides illustrations of the Smithsonian Building and of the infra-red spectrum investigations by the present Secretary. The main divisions of the work

are fifteen chapters, descriptive of the history of the Institution, and a like number of chapters giving appreciation of its work in the several branches of knowledge, mainly by persons not connected with the Institution, followed by an appendix of 8 pages narrating the principal events in its history.

Since it is impossible in a single volume to exhaust the subject it became necessary to mention but briefly many topics which it was hoped might be elaborately treated. The book is printed from type in an edition of 2,000, with 250 additional copies on handmade paper. It is now classed in either of the regular series of Smithsonian publications, and will receive a special rather than a general distribution. This course is found necessary by reason of the cost of the work.

The Annual Report of the Museum for 1894, which includes several special papers by Museum officers or collaborators, has been issued, and the Museum has published a volume of Proceedings, and separate papers of other volumes, besides two octavo and two quarto bulletins, the contents of all of which are given elsewhere.

The Bureau of Ethnology has published three reports, the fourteenth, fifteenth and sixteenth, bringing the work down to the close of the fiscal year 1894-95.

The Annual Report of the American Historical Association for 1895 has been published, and the report for 1896 has been sent to the printer. These reports are transmitted by the Secretary of the Association to the Secretary of the Institution, who submits the whole or portions of the reports to Congress, in accordance with the act of incorporation of the Association. Prior to the report for 1894 the Institution had no share in the distribution of these volumes, but, beginning with the report for 1894, a limited number is available for purposes of exchange by the Institution

with historical and other learned societies of the world. The reports contain papers relating to American history or to the study of history in America. A most important contribution in the report for 1895 is a bibliography of the historical societies of the United States and British America, covering 561 printed pages, which is a very useful reference work for writers and students of American history.

#### LIBRARY.

The library continues to grow steadily, the accessions in volumes, parts of volumes, pamphlets and charts reaching 35,912 during the past year. Special mention should be made of the gift of Mr. S. Patcanof, of St. Petersburg, of over 300 volumes, consisting mostly of oriental works and including some Arabic manuscripts and many rare Armenian publications.

As stated in my last report, the Secretary of State had named, in accordance with my suggestion, Dr. John S. Billings, United States Army, retired, Director of the New York Public Library, and Professor Simon Newcomb, United States Navy, Superintendent of the Nautical Almanac, as the delegates of the United States to a conference to be held at the instance of the British government at London in July, 1896, to consider the preparation of an international catalogue of scientific literature. This conference met July 14 to 17, 1896, twenty-two countries being represented. The conference drew up a plan which the respective delegates submitted to the countries they represented. The report of Professor Newcomb and Dr. Billings, submitted to the Secretary of State, October 15, 1896, recommended that the United States government should take part in this work and that the Smithsonian Institution be made the agent of the Government in this important scientific enterprise.

In accordance with this suggestion the

Secretary of State invited my opinion as to the propriety and feasibility of the United States taking part in this work through the Smithsonian Institution, and requested an estimate of the probable expense attendant thereto. To this I replied that I fully concurred in the view of the delegates as to the great importance of a successful execution of the conclusions of the conference and as to the propriety of this government taking its share of the proposed work by providing for the cataloguing of the scientific publications of the United States. This opinion is strengthened by the fact that the recommendations made are due to results emanating from an international conference, at which the United States was officially represented, and by the further considerations that the benefits to be derived from this undertaking are not only great and far-reaching for the scientific progress of America, but also of universal value, and that all the great and many of the smaller nations will take part in the work. I recognized also the propriety of the suggestion that the government should employ the Smithsonian Institution as an agent in this matter, particularly since the Institution first suggested this subject in 1855, and since it has been from its earliest organization interested in scientific bibliography.

I was, however, reluctant to commit the Institution to the appearance of soliciting Congress in this matter in any case, or to the undertaking of the enterprise, however worthy, unless provision could be made for the necessary expenses of the work. After considering the subject, it seemed to me that the work, if assigned to the Smithsonian Institution, would require a person of special qualifications to immediately assist the Secretary, together with a number of trained clerical assistants, and that the salaries for these persons and the expenses incident to the work would require an appropriation of not less than \$10,000 per annum.

In accordance with this recommendation, Secretary Olney transmitted this correspondence to Congress. Although the Catalogue will not begin until 1900, much preliminary work will be necessary. I have accordingly brought the matter to the attention of Secretary Sherman, and the Department of State has agreed to submit an item for this purpose in its regular estimates for the year 1898-99.

Although the new building for the Library of Congress was completed in February, 1897, its occupancy had not begun at the close of the fiscal year. The east stack was provisionally assigned for the Smithsonian collection of transactions. In the past only this portion of the Smithsonian Library has been kept together, the remainder of the collection being distributed throughout the Library of Congress. I trust that in the new building, with its ample space and largely increased force, it will be found possible, in accordance with the resolution of the Regents in 1889, to assemble the entire collection in one place.

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HARRISON ALLEN.\*

IN Harrison Allen this Association has lost one of its founders and most active members and its second president; science has lost a devotee; medicine has lost a specialist of high rank; the community has lost a man of lofty character and broad culture; there are doubtless others beside myself upon whom the announcement of his death on the 14th of November fell with the shock of personal bereavement, great and irreparable. During the present week Dr. Allen and his family were to have been my guests. What contrast could be greater than between the joys anticipated and the sad reality of the tribute which, at the re-

\* Read before the Association of American Anatomists at its Tenth Meeting, December 28, 1897.