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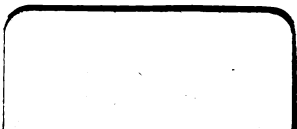
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A D D R E S S

OF

GEORGE BENTHAM, ESQ., F.R.S.,
PRESIDENT,

READ AT THE ANNIVERSARY MEETING

OF

THE LINNEAN SOCIETY

ON

FRIDAY, MAY 24, 1867.

Bentham.

Printed at the request of the Fellows.

LONDON:

PRINTED BY TAYLOR AND FRANCIS,

RED LION COURT, FLEET STREET.

1867.

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LINNEAN SOCIETY.

ADDRESS

OF

THE PRESIDENT,

Read at the Anniversary Meeting, May 24th, 1867.

GENTLEMEN,

THE proceedings of our Society during the past year have varied but little from those of the preceding one; our meetings have been very fairly attended, we have had a full average number of new elections, and our finances are in a satisfactory state. Although our publications have entailed an expenditure of about £700, and £87 have been applied to the purchase and binding of books, we have had a small surplus of receipts over expenditure, enabling us to invest £200 out of the compositions received; our total capital invested amounts, therefore, now to £1600. With regard to our future prospects, our chief anxiety has been in relation to the arrangements to be made for our accommodation consequent upon our present rooms being required for the Royal Academy. Nothing on this head has as yet, I believe, been finally determined on, but plans have been prepared by Messrs. Banks and Barry, and generally approved of by the six Societies concerned, according to which our new apartments will in many respects be superior to our present ones; our meeting-room especially will be much more suited to the occasions when we have a full attendance.

In our publications, besides the usual issue of quarto Transactions

and octavo Journals, the second part of our Library Catalogue has been published, containing the Transactions of Societies and Journals in progress, together with a supplement to the first part, thus completing the Catalogue of our Library up to the close of the Session of 1866. Our Transactions having attained 25 volumes, it has been thought a fit occasion for issuing a general Index. This had been long since prepared for the first 20 volumes by Mr. Bennett when Secretary to the Society, and it has now been completed for the remaining volumes, and is ready for issue to all Fellows of the Society who are entitled to the last part of the 25th volume.

In my address of 1865 I attempted a general sketch of the more important Transactions of Scientific Societies or Scientific Journals in which papers on Zoology or Botany are being published*, passing over, however, for want of time and space, those in the English language, beyond a mere mention of their titles. I have been since requested to resume the subject, in so far as the North American publications are concerned; and I the more readily avail myself of this opportunity of doing so, as there are some points in regard to their proceedings on which it may be useful to institute a comparison with those of European Institutions. In this review, however, I meet with one difficulty; I have never been in America, and have no personal experience of the working of their Institutions, as I had of so many of the European ones, and am obliged to collect the data from their published reports. I trust, therefore, my friends across the Atlantic will excuse any errors I may have committed through inadvertency, or any material points I may have passed over from ignorance.

Our American colonists before the outbreak of the war of Independence had already begun to turn their attention to the cultivation of Science, and especially to the investigation of the rich and varied fauna and flora of their territory, and several Societies or Academies for the promotion of these studies and the publication of Transactions on the model of European ones were founded either

* In the above-mentioned Address, in referring (p. 14) to the Bulletin de l'Académie Impériale de St. Pétersbourg, I find that I had inadvertently omitted a first series in 6 volumes, large 4to, from 1836 to 1840, in which all the sciences were mixed; and a second series, from 1841 to 1858, in which the 'Sciences mathématiques physiques et naturelles' were in separate volumes from the literary matter. In the present series the whole are again mixed, but more or less of the zoological and botanical matter is separately set up in octavo, forming volumes entitled 'Mélanges Biologiques.' I have seen no copy of this work, but, from the paging of several papers detached from it, the second volume must have been completed in 1866.

immediately before the great contest, or during the first years of the settlement of the States.

The American Philosophical Society, held at Philadelphia for promoting useful knowledge, was established in 1769, and soon commenced their 4to Transactions, the 1st volume having apparently been published in 1771, although, for some reason unknown to me, it bears the date of 1789. It contains nothing bearing upon Biology, except a few practical agricultural or horticultural papers; and the publication was interrupted during the years of trouble, until the Society was reorganized in 1780. A second volume is dated 1786, and four more complete the first series, which was closed, in 1804, with the sixth volume. It contains, amongst a great variety of subjects, a few, mostly short, zoological papers chiefly in Ichthyology, Erpetology, and Entomology by B. H. Latrobe, B. S. Barton, and Dr. Williamson, two small contributions to American Botany sent from Europe by Thunberg and Palisot de Beauvois, and an Index Floræ Lancastriensis by Muhlenberg. The labours of the Society appear then to have been suspended for nearly fourteen years; for it is only in 1818 that we find a new series commenced and continued more or less steadily to the present time, the last received being two parts of the 13th vol. dated 1865. All are in 4to, but with gradually improving typography, paper, and illustrations, and a somewhat enlarged size adopted with the 10th vol. dated 1853. The series comprises all sciences among the subjects treated of; but a large proportion of the papers are devoted to the investigation of the Natural History (including Biology, Geology, Ethnology, and Linguistics) of the United States. J. Lea's Malacological papers are perhaps the most extensive, going through nine out of the thirteen volumes. Entomology is next in order, in the earlier volumes by T. Say and N. M. Hentz, in the later ones by J. L. Leconte, with a paper on Coleoptera by S. S. Haldeman, and another on Myriapoda by H. C. Wood, jun. In other branches of Zoology, E. Hallowell on the Reptiles of Cuba and the United States, S. F. Baird's Zoology of the Upper Missouri, and J. Leidy's papers, chiefly physiological or palæontological, are the most important, the contributions to Mammology, Ornithology, and Ichthyology being few and short. In Botany there are several of Nuttall's descriptions of plants collected during his various expeditions, an enumeration of no less than 3098 North American Fungi by L. D. de Schweinitz in the 4th vol., G. Engelmann's Botany of the Upper Missouri, E. Durand's Botany of the Great Salt-Lake, and a few short contributions of minor importance. In 1838 the Society also commenced publishing their Proceedings in

8vo, after the model of European Societies. Of these we have 9 vols., from 1838 to 1864, including several papers of considerable length, occasionally illustrated by plates, but chiefly on Physical Sciences, Geology, or Palæontology. In Biology there is nothing beyond a few abstracts for the purpose of securing priority of names, or short communications of very little importance.

The diminished proportion of Natural History papers in the later volumes of the Philosophical Society's publications is fully accounted for by the activity of another Society in the same city devoted exclusively to Natural Science. This Academy of Natural Sciences of Philadelphia was established early in 1817, and immediately began the publication of the 'Journal of the Academy of Natural Sciences in Philadelphia,' in 8vo, issued in parts at irregular intervals, with a few plates. The first series of 8 vols., from 1817 to 1842, was chiefly a receptacle for short papers in almost all branches of Zoology, as well as in Geology and Mineralogy, with a very few botanical contributions by T. Nuttall, G. Elliott, L. D. de Schweinitz, and S. W. Conrad, all of little importance.

In 1841 the Academy commenced publishing their Proceedings in 8vo, at short intervals, forming 8 vols., for the years 1841 to 1856 inclusive, and since then one volume (not numbered) for each year, from 1857 to 1865, the last received. They contain short communications, abstracts of the longer papers intended for the Journal, and some entire papers of greater length, with a few illustrations, woodcuts, or lithographs; and in some of the earlier volumes, J. Cassin's Ornithological papers are accompanied by coloured plates. In these 17 vols. will be found a valuable record of observations and numerous descriptions of North American species in almost every department of Zoology.

In 1847 the Academy resumed the publication of the more extended papers in a work issued as a new series of the Journal, but in a large 4to form with plates executed in a superior manner, many of the zoological ones coloured; corresponding, in short, to the Transactions of other Societies. The five volumes issued up to 1863, besides a few papers on exotic animals or on general subjects, contain important and valuable contributions to the Zoology of the United States, amongst which may be particularly mentioned the papers in Ornithology by J. Cassin, Erpetology by E. Hallowell, Malacology and Conchyliology by J. Lea and T. A. Conrad, and Entomology by J. L. Leconte and R. Clemens, besides shorter communications in various branches of Zoology by naturalists of note. Botany is limited to Nuttall's account of Gambel's plants, a paper by

M. J. Berkeley and M. A. Curtis on Fungi, and E. Durand's accounts of Heermann's and of Pratten's collections.

In this Journal I observe that the date of issue of the author's copies of each separate paper is given in a note to the table of contents. This is no doubt with a view to fixing a date on which the priority of discovery or of names is to be established. It has been universally acknowledged that priority depends upon the date of publication; but it has been a much debated question what amounts to a publication so as to fix that date. Is it to be the time when a paper is read, or when it has gone through the press so as to prevent any further alterations on the part of the author, or when it is actually given out for sale, or simply the date it bears on the title-page? I believe that at the Royal Society the date of reading a paper is considered as a sufficient publication to establish rights of priority in a discovery or invention, and, in a legal point of view, with reference, for instance, to the law of patents, it seems reasonable that it should be so; for it is not fair that an inventor should obtain the sole right to his invention when the same or a similar one had been produced at the same time or before him, although not in a manner in which he could have cognizance of it; and for establishing such a fact the reading of a paper may be sufficient evidence. Both inventors can then enjoy the credit and benefit of their invention, but neither of them to the exclusion of the other. This also supposes that no alteration is allowed in a paper after it has once been read, unless it be clearly designated by brackets or otherwise, as I believe to be the practice of the Royal Society. In Biology, however, the case is different, the object is not only to establish that priority or rather independence of observation or discovery which can be enjoyed equally by two or more naturalists, but also the priority of name, which is a more complicated question, for an animal or plant cannot retain two names; when, therefore, it is found that it has been differently named by two or more naturalists it is necessary to decide which one should be exclusively adopted. In principle, it is the universal rule among botanists, and, I believe, a general one among zoologists, that, supposing there is no absolute objection to either name, that one is to be retained which was first fixed by actual publication—its insertion in a work on sale or in general distribution, accompanied by diagnostic characters or other indications intended to fix its identity. The reading a paper at a meeting of a Society is not a sufficient publication for this purpose, only because it does not give fixity; the author himself does not feel bound by it and (possibly from the discussion evoked or observations made at

the reading) may alter his names before or during the printing. A purely technical paper is, indeed, not even actually read, and often laid before the meeting in an unfinished state, the substance of it being verbally explained. The other objection as to the impossibility of a naturalist not actually present having cognizance of a paper read at a meeting until it is in print is only one of degree, and may even tell the other way, for he may see it in print long before he can possibly procure a rival one from the Antipodes although previously published.

It being admitted, then, that the date of a name is that of its actual publication, there still remains sometimes the practical difficulty of determining when that publication took place. *Prima facie* evidence is the date given on the titlepage of the work, but that is occasionally unfairly erroneous. The whole of Rees's Cyclopaedia, in which much Zoological and Botanical matter is original, bears on the titlepages the date of 1819, when some of the volumes were published nearly 20 years earlier. Presl's *Botanische Bemerkungen*, with innumerable new or altered names of plants, is dated the second year before it was on sale. The *Annales des Sciences Naturelles* are notoriously antedated by several months. Grisebach's *Monograph of Gentianeae* dated 1839, was received in this country the previous November. The first parts of Ecklon and Zeyher's *Enumeratio*, and of Ernst Meyer's *Commentationes on South African Plants*, each describing as new or renaming two or three hundred species of Leguminosae, many of them identical in the two works, appeared almost simultaneously; but Ecklon and Zeyher's was actually published, as dated on the cover, in January 1836, whilst E. Meyer's, which was not issued to the public till the 14th of February 1836, has the ostensible date of December 1835. In order to do justice to the authors under similar circumstances extrinsic evidence has been generally admitted to correct the dates apparent on the title. In the case of *Transactions of Scientific Societies* this extrinsic evidence, often difficult to establish, is particularly required. There are generally two dates given, that of the reading affixed to each paper, and that of the completion of the volume given on the titlepage; the former would be unfair to the rival observer, who might be superseded by alterations made after the reading of the paper, the latter equally unfair to the author whose *Memoir*, if in the first part of the volume, may have been in the hands of the public for years before the apparent date. In some *Transactions* this is remedied by printing the date of publication of each separate part; but even that is not always enough, for author's separate copies have sometimes been generally circu-

lated and even on sale a considerable time before the complete part to which they belong. It is for the purpose of fixing this date (which ought surely to be admitted as a sufficient publication) that in the Philadelphia Journal the date of issue of the author's copies is, as above mentioned, noted in the table of contents. We have been considering whether a similar plan might not be adopted for our own Transactions, but it has been thought unnecessary to make the alteration, for the cases are very few where the author's copies are ready for delivery much before the part in which they are contained; and since we have regularly issued a part every autumn, the whole of the papers read during a session are thus actually published within a few months of the close of that session, thus always bearing the date of the same year. Where, however, as in some foreign Transactions, the author's copies are sometimes circulated a year or more before the part they are contained in is actually published, the noting the date of the former appears to be essential.

We are this moment in receipt of the 4th, 5th, and part of the 6th volume of the Proceedings of the Entomological Society of Philadelphia in large 8vo, with a few plates; edited by Mr. Scudder.

Boston was not long in following the example of Philadelphia in the foundation of a central Scientific Body. The American Academy of Arts and Sciences was established at Boston in 1780, and a few years afterwards commenced the publication of 4to Transactions, entitled 'Memoirs of the American Academy of Arts and Sciences.' A first series of four volumes, dated from 1785 to 1821, contains, however, but little on Natural History, and from that date there appears to have been a long interruption. In 1833 a new series was commenced, with improved typography and illustrations. Of this we have seven volumes, from 1833 to 1860, and the first two parts of the 8th volume, dated respectively 1861 and 1863, when, as in the case of other scientific works, the publication appears to have been suspended by the effects of the civil war. Although the majority of the papers in these Transactions are on mathematical, physical, linguistical, and other miscellaneous sciences, yet, in Natural History, they contain D. H. Storer's extended synopsis of the Fishes of the United States, as well as several detached papers of his on the Fishes of Massachusetts, Nuttall's account of the Birds of Massachusetts, some smaller contributions to insect anatomy by Haldeman and J. Leidy, and several important Botanical papers, including Sullivant's Bryology and Hepaticology of the United States, A. Gray's *Plantæ Fendlerianæ*, Notes on the Botany of Japan, and several minor papers, Grisebach's *Plantæ Cubenses*

Wrightianæ, and Eaton's Filices Cubenses Wrightianæ et Panamenses Fendlerianæ.

In 1846 the Academy also commenced 8vo Proceedings, published at shorter intervals than the Memoirs, and forming six volumes, from 1846 to 1865. Besides the ordinary reports of Proceedings and abstracts of the longer Memoirs, they include some entire papers of considerable length, especially J. D. Dana's *Conspectus of the Crustacea of the Exploring Expedition under Wilkes, M. J. Berkeley and M. A. Curtis's Enumeration of the Fungi of the same Expedition, Tuckermann's Synopsis of N. American Lichens, G. Engelmann's of North American Cactaceæ, and Anderson's of West American Salices.*

The naturalists of Boston further followed the example of Philadelphia in the establishment of a Society specially devoted to their own Sciences. Their first efforts, however, were not successful. A Linnean Society of New England was formed in the winter of 1814-15, and during two or three years several meetings were held, papers read, and a few collections formed; but their only publication was a Report read at a meeting of the Society on the 18th of June 1817, on the part of a Committee appointed to inquire into the facts relating to the Sea-serpents supposed to have been seen on their shores. This Report, a curiosity in its way, consists chiefly of the examination on oath of a considerable number of witnesses, the result of which appears to have led the committee to conclude not only that Sea-serpents of sixty feet or more in length had really been seen, but that a *Scoliophis atlanticus* about three feet in length, actually captured and described and figured in the report, was the young of the same species. After this effort the Society languished, and was dissolved in 1822, and the remnants of the collections finally disposed of in 1830.

In that year a new Society was formed, which appears to have been yearly increasing in means and activity. The Boston Society of Natural History in 1834 commenced publishing papers communicated to them in the Boston Journal of Natural History, in 8vo, with a few plates; and the seven volumes issued up to 1863 are replete with valuable contributions to almost every branch of the Zoology of their country, with a few botanical papers, especially the *Plantæ Lindheimerianæ* by Engelmann and Gray. In exotic biology there also are papers by S. Cabot on the Birds of Yucatan, by J. Wyman on the Gorilla, by T. W. Harris on African Beetles, by A. A. Gould on African Shells, and by L. W. Bailey on Microscopical Organisms of Para. The Society also publish their Proceedings in 8vo, now in the 10th volume (1841 to 1866), which, besides abstracts,

include a considerable number of short systematic Enumerations, Diagnoses, &c., both in Zoology and Botany. Of late years, however, the Society appears to have devoted its chief energies to the formation of a Library and Museum. The printed reports give a very flattering account of the new building into which the Library and Museum were moved in 1864, and which had been erected at a cost, including the cases, of above 100,000 dollars; the Library is reported as consisting in 1865 of above 7000 volumes, besides 1800 parts of volumes and above 2000 pamphlets, and the Museum as being far richer in most branches of Natural History than one should have supposed that a private Society would have been able to maintain. It will be interesting to watch in future years how far the resources they can depend upon will enable them to provide for the proper care and arrangement of their collections, which, to be useful, must be constantly and largely on the increase. The Treasurer's accounts show that besides the Janitor (whom we should call Porter) and some occasional help, there is but one paid officer, an eminent Entomologist, who is at the same time Custodian, Librarian, Recording Secretary, and Entomological Curator. For the thirteen other Curators of as many branches of Natural History, on whom alone depends the arrangement of the specimens, no remuneration appears in the accounts, whereas if the anticipations of increase sketched out in the Custodian's reports be realized, there must be full claims to the whole time of more than one Curator in most of these branches. The Society is making an experiment upon a large scale, but evidently depends much upon gratuitous aid; time alone will show whether that is less precarious on the other side than on this side of the Atlantic.

It is announced that the Boston Society's Journal is to be discontinued in the present form, but that the papers read will be published in quarto, under the new title of *Memoirs of the Society*.

The Harvard College at Cambridge contains a Museum of Comparative Zoology, which appears to be of great importance, and we understand that the very rich and valuable Herbarium of the distinguished Professor of Botany is also secured to the Botanic Garden of the University, but we know of no regular Transactions or Journals published in connexion with the establishment.

The Lyceum of Natural History of New York was established in 1818, and commenced publishing the *Annals of the Lyceum* in 1823, in large 8vo, with a few plates. The seventh volume was completed in 1862, and the eighth is now in progress; they contain papers of considerable importance, chiefly in illustration of the

Natural History of the States, including C. L. Bonaparte's Synopsis of North American Birds, some other papers in Ornithology by J. N. Lawrence and others, in Ichthyology by T. Gill, in Entomology by J. L. Leconte, J. W. Greene, and others, and numerous monographs and catalogues of shells by various conchylologists. In Botany Torrey's account of Rocky Mountain plants and United States Cypreaceæ, and L. de Schweinitz on North American Carices, occupy a considerable portion of the early volumes, beyond which there are only a few short communications from A. Gray.

The Elliott Society of Natural History of Charleston, South Carolina, published a volume of Proceedings, extending from November 1853 to December 1858, in 8vo, with a few plates. The most important papers are those of J. Mac Crady on the Acalephæ of Charleston Harbour; among the smaller ones two are illustrated by plates, L. R. Gibbes on *Porcellana*, and a small list of rare plants by H. W. Ravenel.

The Academy of Science of St. Louis was established in 1856, and obtained an act of incorporation early in the following year. They publish Transactions and Proceedings in one continuous series under the former title, in 8vo, with a few plates; the first volume, a thick one, extends from 1856 to 1860, and two parts of the second are dated respectively 1863 and 1866. The papers relate chiefly to North American fossils, with a few on various physical subjects, and one on an Egyptian *Papyrus*. In Biology there is little beyond Engelmann's monograph of *Cuscuta*, and other communications by the same author, more or less connected with the North American flora.

The only scientific journal published in the United States which I have met with is that which has acquired a worldwide reputation under the title of the American Journal of Science and Arts. It was commenced under the editorship of Professor Silliman in 1818, and published in parts in 8vo. After some interruptions during the first year or two, owing to the difficulty of arranging with the publishers, it has regularly formed two volumes in each year. A first series, conducted by Professor Silliman, and after the first few years at his own risk as proprietor, was closed in 1846 with the forty-ninth volume, a fiftieth being soon after added, made up of a general Index. Professor B. Silliman was then associated with his father, who has since died, and now conducts it at Newhaven in conjunction with Prof. J. D. Dana, with the assistance of several other Professors of Cambridge and Newhaven. It is now in the forty-third volume of the second series, having undergone but little change beyond a re-

duction in bulk from 1864, necessitated by the difficulties resulting from the war. In this journal Biology occupies less space than other sciences; there are, however, a few valuable papers in both Zoology and Botany, and under the head of scientific intelligence, every number contains critical notices or abstracts of works and other doings in Biology, which are always of great interest on this side of the water as well as in the States.

Washington is the seat of an Institution which, although not coming precisely within the definition of a Scientific Society, contributes largely to the promotion of our own, amongst other sciences, by publications after the model of Transactions of Academies, as well as by other means. It is, moreover, of a nature so different from any we have in this country, that it may not be out of place to enter into some detail as to its history, as gathered from the official reports, as well as from what we have experienced of its action. The founder was an Englishman, James Smithson, described as a graduate of the University of Oxford, who, having devoted a long life to the pursuit and encouragement of science, bequeathed his large property to the United States, in trust, to found, at Washington, an Institution which should bear his name, and have for its objects the increase and diffusion of knowledge amongst men. The greater part of the property was realized in 1838, but considerable delay occurred in its application, owing chiefly to the great difference of opinion that prevailed as to the character to be given to the Institution, the objects of which were so vaguely indicated by the testator under these two heads, the increase and the diffusion of knowledge. At length, on the 10th of August, 1846, an Act of organization was passed by Congress, and the 'Smithsonian Institution for the Increase and Diffusion of Knowledge' was established at Washington, under the management of a Board of Regents fifteen in number, consisting of the Vice-President of the United States, the Chief Justice of the Supreme Court, and the Mayor of Washington, as *ex officio* Members, three appointed by the Senate from its own body, three by the House of Representatives from its Members, and six citizens appointed by a joint resolution of both houses; several of the principal executive officers of the States to be *ex officio* Members, with occasional Honorary Members to be elected by the Regents. The total amount of the bequest received into the United States Treasury on the 1st of September, 1838, was 515,169 dollars, or above £125,000, deposited in the United States Treasury, and producing an annual income of 30,910 dollars, payment of which they have succeeded in obtaining in coin, making nearly £7000. There was

also at the time of the establishment of the Institution an accumulation of interest amounting to 242,129 dollars, or nearly £55,000. For the application of these sums two different schemes were strongly advocated by opposing parties. One, which found most favour with the national and popular party, was the formation of a general Library, Museum, and Gallery of Art in a building which, by its dimensions and architectural design, should be an ornament to the city, and a splendid memorial of the liberality of the founder; whilst others, entering more into the spirit of the bequest, urged that Smithson's object could never have been the glorification of Washington, or the localization of knowledge, but the promotion of science wherever or by whomever it was or might be pursued, and that the fund ought therefore to be employed in the encouragement of scientific and literary researches, and to the publication and transmission of their results to every quarter of the globe where civilization could reach, with such buildings, collections, and local appliances only as should be immediately subservient to these objects. At length a temporary compromise was effected between the advocates of local appliances and of active operations. It was determined that, besides the deposited capital which, by the Act, was to be left untouched, a portion of the income was at first, at least, to be annually invested, till the plans should be matured by experience, and that, of the remainder, one portion was to be expended in the formation of the library, museum, and gallery required by the Act, and the other in the more active operations recommended by men of science, whilst the accumulations already in hand were to be applied to the erection of the building, the relative proportions being left to the discretion of the Regents. During the first year the popular party found favour with the majority of them, and large sums were squandered on the building and local objects; but in time sounder views prevailed, the active operations have been extended with a success we all can appreciate, and the Institution has now attained a position of practical eminence and usefulness to science in strict conformity with the evident intention of the founder. This happy result (as far as I can judge from this distance, and without any personal communication) must be attributed mainly, if not entirely, to the well-devised plans of the Secretary, Prof. Henry, and to the zeal, activity, and perseverance with which he has devoted himself to their practical carrying out during the twenty years that have elapsed since the foundation of the Institution.

The edifice was originally to have been "a suitable one, constructed in plain and durable materials;" but the Building Com-

mitee, giving way to local influences, adopted a plan described in the Secretary's reports as being in the Lombard style, with useless buttresses, turrets, and towers, the convenience of the interior entirely sacrificed to architectural display—a judgment which an inspection of the plans and elevations given in R. D. Owen's 'Hints on Public Architecture' fully confirms. The money thus lavished on the freestone façade absorbed so much of the sum at command that the interior had to be run up in wood, lath, and plaster. The two wings were thus completed and the main building presenting a frontage of 200 feet was far advanced when the woodwork gave way, and had to be replaced with fireproof materials at very large extra cost, the roof alone of this main building remaining in wood. In that roof, where little danger was foreseen, a fire broke out through the carelessness of some workmen in June 1864, destroying much private property, official papers, &c., although the most valuable stores, library, and collections of the Institution were preserved. After these disasters the ruling powers appear at length to be convinced that in the work of restoration and completion they must look more to substantial durability than to architectural effect; but they are sadly hampered by the size of the building, so much beyond their real wants, and its costly style, which cannot now be altered.

In this building were to be deposited—

(1) A general National Library, with provisions by which the Institution would be encumbered by all the trashy productions of the day without means of procuring those really valuable to science; this they have succeeded in warding off, and are endeavouring to limit their library to works bearing on science. They have bestowed especial pains, and appear to be already rich in Proceedings and Transactions of learned Societies and other serials connected with science; and it is hoped that they will be gradually relieved from their general and useless literature by the transformation of the Congress Library into the great National United States Library, instead of attempting to impose the burthen on a private Institution incapable of sustaining it.

(2) A general Museum, as comprehensive and multifarious in its objects as our own British Museum, with a similar aim at popular display. But the impracticability of such a Museum, which would soon absorb an annual income equal to their whole capital, is now felt, and the collections are to be henceforth restricted—1st, to those made by the United States Exploring Expedition, the care of which has been imposed on the Institution by Congress; 2nd, a limited Museum of type specimens, principally of the products of

the American Continent, or such as are thought of especial interest as illustrating the Smithsonian publications; and 3rd, collections for distribution, to which I shall presently revert.

(3) A Gallery of Art; but the absurdity of imposing on such an Institution the care and maintenance of a National Gallery is so evident, that the collections in this respect have been limited to some plaster casts of distinguished individuals, and a very few pictures they could not refuse the charge of.

In the active operations of the Institution the knowledge they are called upon to promote has been divided, as in the great Academies of the Continent of Europe, into the three great branches of Physical Science, Moral and Political Science, and Literature; the Fine Arts being nominally included in the latter class, but really somewhat extrinsic in character, and practically passed over. What has been effected by the Institution in the second and third classes, it is beyond my province to inquire; and even in the Physical class I do not venture to express any opinion on their efforts in the promotion of Meteorological, Astronomical, and other Physical observations. In Biology their exertions have been directed to the publications of Memoirs, Reports, and other papers, to the promotion of Exploring Expeditions, as well as of local investigations, to the distribution of specimens, and to the facilitating the interchange of publications and other vehicles of knowledge.

The principal publications of the Institution are in two series, the one in 4to, the other in 8vo, corresponding generally to the Transactions and Journals of Scientific Societies. The 4to series, entitled 'Smithsonian Contributions to Knowledge,' copiously illustrated by well-executed plates, has now attained its 15th volume (although 14 only have as yet reached us), the first having been published in 1847, less than a twelvemonth after the foundation of the Institution; the 8vo series was only commenced in 1862 without plates, and now forms six large volumes. In these two series Physical Sciences and Natural History (Biology, Palæontology, and Geology) occupy nearly equal proportions; there are also extended ethnological and philological Memoirs, and a few smaller ones on miscellaneous subjects. The Biological papers, whether systematic or physiological, are almost entirely illustrative of the fauna and flora of North America, the most important of which are (including two or three now in the press) Monographs or Catalogues of North American Bats by H. Allen; Mammals and Birds by S. F. Baird; Oology by T. M. Brewer; Reptiles by S. F. Baird and C. Girard; Cottoid Fish by C. Girard; Marine Invertebrata and

Crustacea by W. Stimpson ; Shells by W. G. Binney, P. P. Carpenter, T. Prime, W. Stimpson, and G. W. Tryon ; Insects by J. L. Leconte, H. Hagen, H. Loew, F. E. Melsheimer, J. G. Morris, R. Osten Sacken, H. de Saussure, S. H. Scudder, and P. R. Uhler ; in Animal Physiology by J. Dean, J. Jones, S. W. Mitchell, G. R. Morehouse, and J. Wyman ; in Insect Embryology by L. Agassiz, and in Microscopic Biology by J. W. Bailey and J. Leidy. In Botany we have W. H. Harvey's *Nereis Boreali-Americana*, illustrated by 50 plates, A. Gray's *Plântæ Wrightianæ Texano-Neomexicanæ*, and three papers by J. Torrey on Californian plants. Each one of these papers is separately paged in order to facilitate their separate distribution.

The Smithsonian reports form a volume in 8vo for each year ; they contain, besides the official reports of the proceedings of the Institution for the preceding year, extracts from correspondence, reports of Explorations, &c., several important scientific papers translated from foreign languages, and some original ones on various scientific subjects. These reports to Congress are printed at the expense of Government, with the exception of a few occasional woodcuts supplied by the Institution.

In the way of promoting Explorations and collection of observations, the efforts of the Institution have hitherto been judiciously confined as strictly as possible to America, Northern and Arctic, Central and Southern ; but in this field they have done much, and the exertions of the Institution, with considerable means at its command, cannot but remind one of the equally strenuous and successful exertions, as to one branch at least of science, of a single individual in our own country, the late Sir William Hooker, or of the more general ones of our Royal Geographical Society. On this subject I cannot do better than quote a passage from the Secretary's Report of March 1865, when speaking of the aid afforded in the organization of government explorations by land and by sea :—
 “ Whether by official representations to the heads of departments or personal influence with officers and employés, it has secured the engagement of individuals competent to collect facts and specimens ; it has instructed persons thus engaged and others in the details of observation, it has superintended the preparation and in some cases borne the expense of the necessary outfits, has furnished fresh supplies from time to time to the collectors while in the field ; received the collections made and preserved them for future study, or at once consigned them to proper persons, both at home and abroad, for investigation, directing the execution of the necessary

drawings and engravings for the reports, and finally superintending the printing and even the distribution of any available copies of the completed works to Institutions of science. Prior to the establishment of the Institution but little had been done by the Government in the way of scientific explorations, with the exception of that under Captain Wilkes. But since then, nearly every United States expedition, whether a survey for a Pacific Railroad route, a boundary line, or a wagon route across the Rocky Mountains, or an ordinary topographical expedition, has been influenced or aided more or less as above stated. Besides these, similar explorations have been carried on without any reference to Government, and either entirely or in a great measure at the expense of the Institution and always at its suggestion." An enumeration follows of above twenty of the more important of these Expeditions directly organized by the Institution in the northern and western portions of North America, in Mexico, Central America, Cuba, Jamaica, and Bolivia.

In making collections by means of these expeditions or otherwise, the object has not been so much to supply a large museum with permanent specimens or duplicates for regular exchanges as to distribute the specimens where it is thought they might best advance the cause of science, by being most accessible to the largest number of students engaged in original investigations. Much has been done in this way in the encouragement of local societies in rural districts for the collection of specimens and the recording of natural phenomena; and, as far as botany at least is concerned, the collections that come to Europe show that the official statements on this head are not extravagant boasts.

I have said that in its Library the Institution is endeavouring to obtain a complete collection of Transactions and other works of a serial character issued by learned bodies. This they expect to obtain chiefly by a liberal system of exchange, and for that purpose it is now in correspondence with upwards of 1200 of the Societies, Public Libraries, and principal Universities of the Old World.

The last head I shall refer to is that of International Exchanges. From the first, one of the special objects of the Secretary's plans was to facilitate the direct correspondence between the learned institutions and scientific men of the two worlds, and the free exchange of their publications. Year by year the plans for this purpose have been modified and improved until they have attained an extent which seems only to require control to guard against its being abused by private interests under the name of science, or, perhaps still more, of benevolence. At the present time the Institution

receives, at periods made known through its circulars, any books or pamphlets of scientific, literary, or benevolent character which any institutions or individuals in America may wish to present to a correspondent elsewhere, subject only to the condition of being delivered in Washington free of cost, and being accompanied by a separate list of the parcels sent. Where any party has any special works to distribute, the Institution is prepared to furnish lists of societies or persons to whom they might be usefully sent. The articles and volumes, when received, are assorted, packed, and dispatched to the agents of the Institution in London, Leipzig, Paris, and Amsterdam. The boxes are there unpacked, and the contents distributed through the proper channels. The returns for these transmissions are received by the same agents, packed and forwarded to Washington, from which point the parcels for other parties are sent to their proper destination. All the expenses of packing, agents, freights, &c. between those four towns and Washington are borne by the Institution, the parties concerned only paying the local carriage from or to these great centres. In this interchange the Institution has obtained special facilities on the part of custom-houses, railroad and steamboat companies; and the scientific and literary world have largely availed themselves of this useful system. The number of packages reported as dispatched to foreign countries from Washington in 1864 was 1011, contained in 63 boxes, weighing 20,500 lb., whilst the packages received in return was 2482, exclusive of those for the Smithsonian library.

We have nothing of the kind in this country, and the difficulties of interchange of books and specimens with the Continent are much felt; the comparative cheapness of freights is more than made up by the complicated agencies and other extra charges, which can scarcely be avoided even by the few who are initiated into the secrets of the business. A box of specimens for Hamburg, which the carrier took to the wrong continental steamboat agent in the city, cost me 22s., when for 25s. I might have gone myself to Hamburg and taken the box with me as luggage. The sending one or two volumes, or a small packet of specimens into Germany, is often prevented by the difficulties and expense attending it. It is not to be expected that any Association in this country should be endowed with funds especially devoted to the diffusion of knowledge, enabling them to undertake the transmission gratis of scientific works and specimens; but it appears to me that if, for instance, the six Scientific Societies which are in future to be assembled in this locality were to join in salarizing agents in London and in three or four of the principal

centres of science on the Continent, who should receive for transmission, pack, and periodically despatch scientific parcels and distribute return packages, charging to individuals their proportions only of actual disbursements, the gain to science would be considerable and the charge to each Society but small.

In glancing over the general tendency of the biological papers contained in the works I have enumerated, it will be seen that, although it is scarcely half a century since our American brethren applied themselves in earnest to the investigation of the natural productions and physical condition of their vast continent, their progress, especially during the latter half of that period, had been very rapid until the outbreak of the recent war, so deplorable in its effects in the interests of science as well as on the material prosperity of their country. That is, however, now fortunately over; and although the means of every scientific institution are still sadly crippled by the high prices and heavy duties resulting from that war, yet many of them appear to be resuming their former activity; and it is to be hoped that they will now again receive every encouragement, public and private, in the vigorous prosecution of their researches. The peculiar condition of the North American Continent requires imperatively that its physical and biological statistics should be accurately collected and authentically recorded, and that this should be speedily done. It is more than any country, except our Australian colonies, in a state of transition. Vast tracts of land are still in what may be called almost a primitive state, unmodified by the effects of civilization, uninhabited, or tenanted only by the remnants of ancient tribes, whose unsettled life never exercised much influence over the natural productions of the country. But this state of things is rapidly passing away; the invasion and steady progress of a civilized population, whilst changing generally the face of nature, is obliterating many of the evidences of a former state of things. It may be true that the call for recording the traces of previous conditions may be particularly strong in Ethnology and Archæology; but in our own branches of the science, the observations and consequent theories of Darwin having called special attention to the history of species, it becomes particularly important that accurate biological statistics should be obtained for future comparison in those countries where the circumstances influencing those conditions are the most rapidly changing. The larger races of wild animals are dwindling down, like the aboriginal inhabitants, under the deadly influence of civilized man. Myriads of the lower orders of animal life, as well as of plants, disappear with the destruction of

forests, the drainage of swamps, and the gradual spread of cultivation, and their places are occupied by foreign invaders. Other races, no doubt, without actually disappearing, undergo a gradual change under the new order of things, which, if perceptible only in the course of successive generations, require so much the more for future proof an accurate record of their state in the still unsettled condition of the country. In the Old World almost every attempt to compare the present state of vegetation or animal life with that which existed in uncivilized times is in a great measure frustrated by the absolute want of evidence as to that former state; but in North America the change is going forward as it were close under the eye of the observer. This consideration may one day give great value to the reports of the naturalists sent by the Government, as we have seen, at the instigation of the Smithsonian Institution and other promoters of science, to accompany the surveys of new territories. For present purposes we want very much a digest of the new observations. Synopsis of some classes of insects and other animals appear indeed in a complete, or nearly complete, form in the Smithsonian and other publications above mentioned; but we have as yet no complete flora of North America. The admirable one began so many years since by Torrey and Gray has been so long interrupted that it requires rewriting from the beginning; and there is no greater service to the science that the distinguished Cambridge Professor could now render than the resumption of that work, in any, however much abridged, form.

The American Museum reports suggest some topics worthy of consideration with regard to the general question of Natural History Collections. The first thing that strikes one is the want of a National Central Museum for the reception of as complete a representation as can be obtained of the North American Fauna and Flora, with so much at least of foreign specimens as may be required for comparison and generalization. For this they seem to have depended on the efforts of private scientific bodies; but the progress of these, so far as they have gone, seems to corroborate the experience of the Old World, that the useful maintenance of such an establishment is absolutely hopeless unless it be supported at the public expense, or by the annual proceeds of a sufficiently large inalienable capital. In America, as in Europe, almost every Natural History Society, small or large, begins by contemplating the formation of a Museum, undefined as to limits; contributions are invited and donations thankfully received from every quarter, without reference to value or practical utility. At first, whilst the Librarian, Secre-

tary, or other manager takes a personal interest in the arrangement and exhibition of the objects received, when donors can bring their friends to see their contributions displayed on shelves or in glass cases with their own names paraded on the cards, when most of the members of the Society have the new feeling of a personal share in the ownership of the collections, when the number of specimens received is blazoned forth in annual reports as a matter of pride and gratification, these incipient Museums may have considerable influence in stimulating collectors and observers of nature. But after a time these collections outgrow the Society's means, the specimens which may be required for study or comparison are encumbered by a mass of trash presented by persons who do not know what else to do with it, or who have attached a false value to the fruits of their own labours, the permanent officer can no longer have time to select for exhibition what is worthy of it, nor to arrange those which might be available for reference, and the Society cannot afford to maintain the necessary staff of keepers, even if they have a building large enough for the purpose. Packages and specimens are, however, still received, exhibited at meetings to elicit formal thanks, and then consigned to oblivion and decay in cupboards and garrets, the members generally taking no further interest in what they can make no use of. If afterwards attention is called to this state of things, it may be felt that something must be done; the gratuitous aid of patriotic members is called in, and the museum may be more or less purged of trash and partially arranged. But gratuitous aid, like voluntary subscriptions, is generally given on the spur of the moment, and can never be depended on for long-continued and ever-increasing demands; the collections relapse into a condition worse than the previous one, till at last the Society is obliged to dispose of them as a clog on, instead of an aid to, their operations. Such is the history of many a museum I could name on the Continent and at home, including our own, and such seems destined to be the career, on a large scale, of the Boston Society, notwithstanding its large invested funds, if something is not done to give it a permanent independence of individual disinterested efforts. It is now in the gratuitous aid period; but when its present stores are doubled or quadrupled, when the thirteen or fourteen unpaid curators must not only give their whole time to it, but require each of them one or more assistants to do the work usefully, it will not be done at all; and unless the Society receives that extensive support which can only be expected from the State stowage, neglect and destruction must ensue. It is no doubt considerations such as these that have

induced the Smithsonian Institution to repudiate the burthen attempted to be imposed on them of a National Museum, which even the whole of their income would be insufficient to maintain.

There is another class of Museums which the Smithsonian Institution appears to be promoting and assisting, with what results I have not sufficient means of judging; these are local Museums on a smaller scale in the smaller cities and provincial towns. We have many such in Europe, both on the Continent and in our own country, and if judiciously formed and adequately maintained, ought to be very useful in encouraging the taste for observation at home, and giving the scientific visitor from a distance authentic information on the natural history of the district. But too many of them depend on the fluctuating support of voluntary contributions, and follow the fate of Museums of Societies. I have had occasion to go over many of these local Museums in various parts of the Continent and some of our own, and it had been my intention to have collected information, and in one of my addresses to have prefaced some general observations on the subject, with a detailed review of all our provincial Natural History Museums and Associations; but so many of them are unfortunately more or less in a state of collapse or uselessness, that I feared that special notes might be invidious. I may perhaps be allowed, however, generally to remark, that it appears to me that local provincial societies cannot better apply their funds and influence than in the establishment, on a permanent and independent footing, of a public Museum confining their publications to matters of purely local interest, which the general naturalist is not to be called upon to notice; that this Museum should aim at completeness in representing the local district, that exotic specimens should be restricted to such a limited number of representative types or specimens for comparison as their means will afford, selected solely in proportion to their utility in the Museum, without reference to the individuality of the donor, or, if a certain number of complementary specimens must be retained for a time in order to keep up the public interest in the establishment, such specimens be unhesitatingly expelled as soon as the cause for retaining them is gone.

In conclusion, I may perhaps be excused in alluding to some general principles in the management of large Museums, which are inculcated by the Smithsonian Institution, more or less followed on the Continent, formerly almost ignored with us, but now more generally recognized. These are liberality of exchanges, facilities for study, and rejection of trash, principles which it may be hoped are even gaining upon that most essentially conservative establishment, our gigantic and, I

might almost add, all-grasping British Museum. The large sums annually voted for its support by the Nation justify, indeed, not only the exhibition on a most extensive scale of attractive specimens for the occasional instruction or excitement to observation they may give to the general public, but also the concession to the popular party of a raree show for the thousands of gazers who would otherwise congregate for less harmless amusements; but a large proportion of the support or contributions to the Museum is granted or given in the name of Science, and Science has a right to its full share in the consequent benefit. Whether Natural History be or not under the same roof as Art, Literature, and Archæology, Science has a claim upon Parliament to provide buildings and maintain a staff adequate to the scientific arrangement of the collections; and she has, I think, also a right to call on the management, be they a composite Board of Trustees or individual responsible Heads, to reserve days, accommodation, and specimens for examination and study, to allow of the requisite appliances of light and heat in the process, to cause the stores that have accumulated for more than half a century to be turned out of their hidden repositories, to have what is useful to scientific researches rendered accessible for the purpose, the surplus duplicates employed in a liberal system of exchanges, with an eye quite as much directed to the distributing them usefully as to the pecuniary value of any expected return, and to authorize the consigning to the dust-cart all absolute rubbish occupying valuable space.



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