SENATE..... .....No. 218.

ANNUAL REPORT

OF THE

TRUSTEES

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY,

AT HARVARD COLLEGE, IN CAMBRIDGE,

TOGETHER WITH THE

REPORT OF THE DIRECTOR,

1867.

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Commonwealth of Massachusetts.

Boston, April 29, 1868.

To the Honorable the Senate and House of Representatives.

The Trustees of the Museum of Comparative Zoölogy respectfully present the Annual Report of the Director for the past year, marked [A.]

The paper annexed, marked [B,] contains a list of the Trustees, their officers and committees, for 1868.

For the Trustees,

WM. GRAY, *Secretary.*

[A.]

REPORT OF THE DIRECTOR OF THE MUSEUM.

Owing to the insufficiency of our means, the working force of the Museum had been reduced to a minimum during the past two or three years, and the progress of the institution would have suffered greatly, had it not been for the liberality with which Mr. Nathaniel Thayer fitted out the Brazilian Expedition. For while the collections accumulated in former years were allowed to remain in the condition to which they had been brought before the close of 1864, new treasures were added by the exploration of extensive parts of Brazil, and especially of the Valley of the Amazons. These large collections, if properly exhibited, would unquestionably add much to the interest felt by the public at large in the progress of the Museum, and contribute to the increase of its possessions by a considerate exchange and distribution of its duplicates. But to undertake such an arrangement, it was indispensable to increase the number of the regular workers connected with the Museum. The liberal grant of $10,000 by the Legislature last spring, and the relief obtained from Congress by the remittance of excise duty on alcohol used for scientific purposes, have infused new life into our Institution. If these facilities could be continued until all the collections have been fully assorted and identified, it would require but a short time properly to exhibit the whole for purposes of general inspection and special study as soon as our building could be enlarged. There are really two very distinct objects to be kept in view in organizing a great Museum —the public exhibition and the scientific use of the specimens. While we have already made extraordinary progress in securing the necessary materials for this double end, it must be confessed that we are sadly behindhand in gratifying the just claims of the community to enjoy the benefit of these immense accumu-

lations, and the equally loud claims of scientific men to share in the advantages which should result from such extensive scientific possessions. Permit me, therefore, to submit to you briefly the present desiderata of the Museum.

In the first place, to enable me to carry on steadily the work of the internal arrangement of the collections without constant fluctuations and interruptions, the annual income of the Museum, now amounting to about $10,000, should at least be doubled. With our present resources I am frequently obliged to stop operations before they have reached a satisfactory result, and to leave some part of the collections in a complete state of stagnation. The department of Palæontology, for instance, has not made the slightest advance for the last two years, and hardly anything has been done, thus far, towards improving the condition of the class of Mammalia and Birds; while the class of Insects has been left for nearly a year without sufficient care.

In the second place, the necessity, owing to want of room of piling the collections in heaps, instead of laying them out systematically, makes it very laborious to get access to the specimens wanted for study. The natural consequence of this is the limited use made of the collections for scientific research, within the Museum itself, and the still greater limitation in affording facilities for study to naturalists not immediately connected with the Museum. Whenever investigators of particular branches of Zoölogy call upon me for information, or for the use of specimens, the present condition of the collections renders it absolutely necessary that I should either personally attend to the search for the specimens wanted, which unavoidably takes me away from more important labors, or allow persons not sufficiently familiar with the general arrangement of the Museum to overhaul our store-rooms, and perhaps bring great confusion among them in their haste to secure what they require. This should not be; and the only way to remedy the evil is to secure competent assistants for each department, so that with a greater division of labor a better system may be introduced throughout the whole, and an easy control maintained over every part of the collection. In this connection I would also allude to the importance of publishing as rapidly as possible the scientific results of the work done in the Museum. It is impossible to arrange such extensive collections as we already possess without

discovering much that is new to science; and the favorable reception with which the two parts of our Illustrated Catalogue have been welcomed by naturalists, competent to judge of their scientific value, shows plainly how desirable it is that it should be continued more rapidly, and our publications so enlarged as to include other investigations, daily making, which cannot appropriately be incorporated into the catalogues. But for this also means are wanting, since it is not possible to look to the sale of the catalogues for this purpose, when they are mainly so distributed as to secure similar publications from other scientific institutions. It is therefore indispensable that special means be provided for this object. The necessity appears to me more imperative since I have satisfied myself that we could easily publish one quarto volume every year.

In the third place, the general usefulness of the Museum is crippled by the limited room allotted to the public exhibition of the specimens. In order to heighten the scientific importance of the Museum I have, from the beginning, resisted the temptation of making it attractive to the many by putting up showy specimens, and devoted all the means of the institution to increasing its purely scientific resources. But while this has greatly heightened the intrinsic value of the collections, it may, in a measure, have perilled the popularity of the Museum; and it is probably high time that something be done to gratify the curiosity of the public, who have thus far generously approved the expenses incurred, and the appropriations made by the Legislature to help our establishment. This can, however, not be done without considerable additional expense, as our Building is totally inadequate to the proper exhibition of the collections stored in it at this moment. Until the northern wing is fully completed, with the addition of the corner room of the main structure it will be impossible to begin a general systematic arrangement of all our scientific possessions.

And here allow me to remark that the public at large is not alone a loser by this delay in the final execution of our plans. Whatever there is that may be original in the intended arrangement, approved by the Faculty of the Museum, to whom my schemes to this effect have been submitted, and whatever advance might thus be secured for science generally, remains in abeyance until our building is enlarged. In the last few

years, I have made special investigations with the view of testing different methods of exhibiting, in a public Museum, the modern results of zoölogical research in general; and I fear that all the work done in that direction may be lost, should I not have the opportunity of applying these results to the arrangement of our collections.

To sum up the present wants of the Museum in few words, I would say that we need an increased annual income, means for the publication of the scientific researches made in the Museum, and means for the extension of our building. To meet all these wants at once, would require a capital of $500,000; but as it is hopeless to expect so large a sum at once, I would leave it to your wisdom to devise the best mode of accomplishing that which may seem the most pressing in your judgment. In my estimation, the most urgent want is an increase of our annual income. Next, the means for publishing the work done in the Museum. Satisfied as I am that when the great scientific value of the institution is recognized in every part of the civilized world, the citizens of Massachusetts will not fail to secure an appropriate building for its purposes.

I cannot close these remarks without adding a few words upon our library. The collection of books, relating especially to natural history, now put up in one of the rooms of the Museum, has considerable value, owing chiefly to the large number of special papers, separately printed, contained in it. This class of scientific publications is not easily obtained, and the surest mode of securing the majority of them, as they are published, is by exchange. I am therefore satisfied that if a sufficient capital could be funded to insure the regular publication by the officers of the Museum, of richly illustrated transactions, this would suffice to build up a natural history library, such as we need. I want no better evidence of the possibility of securing this result than the fact that by a liberal distribution of its contributions to knowledge, the Smithsonian Institution has brought together the most important scientific library in the United States, consisting of 40,000 volumes, which have recently been added to the library of Congress. In like manner, could the Transactions of the Museum of Comparative Zoölogy, if published in the manner suggested above, be made

the chief support of the scientific library of the University of Cambridge.

Should these statements impress your minds as strongly as my own, with the conviction that we now possess collections of such great scientific value and extent that their final arrangement cannot fail to contribute largely to the advancement of natural history in all its branches, and that a protracted delay in their systematic arrangement can only be prejudicial to the best interests of our institutions of learning, I am convinced that you will promptly take the necessary means toward completing that part of our building indispensable to a systematic exhibition of our treasures, and so enlarging our income that the work incident to that arrangement may go on without interruption.

The work done in the Museum during the past year has been chiefly devoted to the arrangement and preservation of the collections obtained by the Thayer Expedition. On their arrival in Cambridge, in 1866, the alcoholic specimens were unpacked and transferred to more appropriate vessels. But they still remained crowded and undivided, and notwithstanding the untiring assiduity of Messrs. Lyman, Anthony, Shaler and Alexander Agassiz in repacking them, little more was done than to secure the whole collection against deterioration; only a small portion was brought into such order that the specimens of the same species were put up together in separate jars and arranged according to their localities. This latter work has been mainly continued by Messrs. C. Cooke, Bliss, Blake and Lockwood; while Dr. Stähli has been intrusted with the revision of the Mammalia and Birds. The plan and purpose of the work are explained in the instructions which I gave to Dr. Stähli respecting it, and which are appended to this Report. As, with some modifications adapted to the treatment of the different classes, these regulations apply to all the work of this kind in the various departments, I have suppressed the special details to avoid repetition, submitting besides only the report of Mr. Anthony, on Conchology, and that of Mr. Léo Lesquereux, on the Fossil Plants. I consider the co operation of Mr. Lesquereux in the work of the Museum, as an unexpected good fortune for our institution.

It gives me great pleasure, also, to state that I have been able to induce Dr. Hagen, of Königsberg, to come over to Cambridge and assume the arrangement of the department of Entomology. The loss of Mr. Uhler, who, to my great regret, was called away from us by his appointment as Superintendent of the library of the Peabody Institute, at Baltimore, left a great hiatus in our organization. This blank is now filled, and the high position which Dr. Hagen holds among Entomologists makes his presence among us not only of immense practical service to the Museum, but an honor also to the scientific character of the institution. Dr. Hagen has already presented a general plan for the arrangement of the collection intrusted to his care, which I shall submit to you as soon as its execution has been so far carried out as to give material evidence of its excellence.

Shortly after the departure of Mr. Uhler, the Museum sustained another great loss in the death of my old friend, Mr. Burkhardt, who, for more than thirty years, had worked by my side faithfully, drawing the specimens I was investigating. His place is now occupied by Mr. Paul Roetter, from whose service I expect valuable results in the illustration of the original researches carried on at the Museum.

There are also some other names absent from the annual record of scientific work accomplished at the Museum, which are usually associated with it. Private considerations have called away my son, Alexander Agassiz, but before the year is over he expects to resume his post. Mr. Shaler also has been travelling in Europe for his health, while at the same time continuing his studies with reference to the Museum, and I trust we shall soon have his valuable services again as a permanent associate of the institution. Mr. St.-John has been appointed assistant to the State geological survey of Iowa, a service in which he is likely to be engaged for a long time, and for which his mature studies here had well prepared him.

Mr. Allen, who had been compelled by ill-health to abandon his work at the Museum after his return from Brazil, has lately resumed his place, and is now engaged upon the arrangement of the Ornithological collection. I have also secured, recently, the services of the Rev. Mr. Perry, in the systematic arrangement of the Tertiary fossils.

I cannot close this enumeration of the work accomplished within the last year at the Museum, without alluding also to the efficient assistance I have received from Dr. Wilder, in my investigations on Selachians. The farther I advance in the work of organizing the Museum as a systematic representation of the present state of our knowledge of the animal kingdom, the more am I satisfied of the deficiencies in the present mode of arranging public collections; the more do I see how little we reproduce in our museums the most important results of modern science. The mere accumulation in systematic order of select specimens from given classes, families, genera, &c., has after all little intellectual value, and does not in any way represent the progress of our investigations. Zoölogy, comparative anatomy, embryology and paleontology are only parts of one great system, combining under different heads our knowledge of the affinities, the structure, the mode of growth and the order of succession of animals through all times and in their past and present distribution upon the surface of the globe. In order to represent these different aspects of the subject in their connection with one another, it is necessary to combine whole specimens of living animals, anatomical preparations, embryological series and fossil remains in the same case, or on the same shelf, in such intelligent relation that they shall illustrate each other, instead of isolating them in separate museums, as is usually done. In order to test such a synthetic arrangement as I have described, and as I wish to see carried out for all classes of the animal kingdom, I selected the Selachians as one which, from its limited number, taken in connection with its existence through all geological periods, would give us the materials for testing such a comprehensive arrangement with greater ease than any other more numerous and diversified class of animals. For the past two years Dr. Wilder has been assisting me in making such preparations of the Selachians of our coast as would enable me to determine what are the anatomical characteristics of that class, and by inference those of the other classes of Vertebrates. If I mistake not, this attempt will result in a complete remodelling of Museums. The largenumber of specimens of sharks and skates necessary for this investigation have been freely supplied by Capt. Atwood, of Providence, Mr. Edward Johnson, of Nahant, and Mr. Everett, of Swampscott.

The classes of animals now completely identified and ready for exhibition in the Museum are the Echinoderms, the Acalephs and the Corals. Next to them, the Mollusks and Reptiles are the most advanced. The identification of the Reptiles has been the work of the late Professor Jan of Milan, of Professor Baird of the Smithsonian Institution, of Professor Cope of Philadelphia, and myself. The Shells have been identified by Mr. Anthony, his identification being based to a considerable extent, so far as the American species are concerned, upon a direct comparison with original specimens from the collections of the authors by whom the species were first described. The Corals have been chiefly identified by Professor Verrill, of Yale College, while assistant in the Museum, and frequently compared with the original specimens described by Dana. Of late the arrangement has been continued by Mr. Lyman. The Echinoderms and Acalephs have been identified by myself and my son, Alexander Agassiz. Our collection of Radiates is probably the largest in the world.

The occasion justifies some additional remarks. When an administration asks for a large appropriation, the director is bound to submit an account of its proceedings. Now, I believe we can come before the public with confidence, and present the results thus far reached as evidence that the means placed at our command from the beginning to this day, have been judiciously applied.

When the Museum of Comparative Zoölogy was started, there existed no scientific collections in the United States having a world-wide reputation, and to which naturalists of all nations could resort for information. I mean to be just to all the local institutions, akin to ours, which existed before; I am therefore bound to say that they were all local in their character, or limited to particular objects. Now, we have collections that may contribute to the advancement of all departments of Zoölogy and Palæontology, and some of them have already been made the basis of extensive investigations, nay, have furnished materials for important monographic works published in Europe, by Messrs. Jan, Keferstein, Ehlers, Selenka, Gegenbaur, and others. I may also be permitted to add that our institution has had its full share in raising the standard of scientific

research among us, and in educating the present generation of naturalists.

It is not asking too much that these collections should now be exhibited to the public, and I can truly say that were all our treasures fairly laid out, so that the whole could be seen at a glance by intelligent visitors, our citizens when visiting similar institutions abroad, could with pride point out what Massachusetts has done for science, and confidently affirm that their Museum fears no comparisons. Indeed, the Museum of Comparative Zoölogy should no longer be looked upon as a State institution; so far as its intrinsic value is concerned it has acquired a national importance.

Report on the Fossil Plants, by Léo Lesquereux.

No report has as yet been made on the Fossil Plants of the Museum. It is therefore advisable to examine in some detail the different collections, or parts of collections, now in this department, in order to establish a reliable point of comparison for further communications on their increase and improvement.

The Museum possesses,—

1st. A splendid collection of tertiary fossil plants of Europe, the specimens of which, in a perfect state of preservation, have been furnished and named by Professor Heer, of Zurich. It includes representative and characteristic species of three stages of the Tertiary—Oeningen, Schrotzburg and Upper Rhone, and contains eight hundred specimens, representing more than one hundred and fifty species. This is by far the most valuable part of the collections of fossil plants, and has not its equivalent in any museum of America.

2d. A collection of tertiary plants from the basin of Paris, part of the cabinet of Mr. Duval, bought in 1859, contains splendid Fucoids, large dicotyledonous leaves on tufa, and a lot of less valuable specimens from various parts of Europe—in all one hundred and sixty-eight specimens.

3d. In Bronn's collection, besides sixty specimens of tertiary plants from various localities of Europe, there are seven specimens of Cretaceous species and fifteen of the Jurassic and Lias formations. It is but a poor representation of the two last

formations, which, as far at least as regards their vegetable remains, are as yet very imperfectly known.

4th. Of the Trias, Keuper and New Red Sandstone, there are in Bronn's collection fifty species, represented by one hundred specimens. These, from various parts of Europe, are generally good; their stations are carefully marked on the labels, but they are not yet satisfactorily identified.

5th. The vegetation of the Carboniferous epoch is already pretty well represented in the Museum. From Bronn's collection there are one hundred and fifty-two specimens, some of them very interesting, and gathered from different parts of Europe. From the Coal measures of England we have about the same number.

But it is from our own continent that the largest number of species and specimens have been procured. There are from Ohio one hundred and fifty specimens; from Pennsylvania, fifty; from mixed localities in Pennsylvania and Ohio, thirty; from the anthracite basin of Massachusetts, fifteen; from Maryland, nine; and from Illinois, twenty-two. As these specimens are generally fine and valuable, though they do not represent any very rare species, it is to be regretted that their number is not larger, especially as they are from regions of our coal basins, which have been rarely explored, and from which palæontologists have as yet received few materials. This last observation does not, however, apply to the coal fields of Illinois, especially not to that famous locality, Mazon Creek, from which the Illinois specimens of the Museum were obtained. It is, on the contrary, one of the most thoroughly investigated, and generally known for the beauty of the specimens which it has furnished to Palæontology. The remains are small, indeed, and generally occupy the centre of a pebble of carbonate of iron; but in this formation plants and animals appear to have escaped the effects of maceration, which has generally destroyed the soft parts of the plants; and even all the soft species whose remains were imbedded in the bituminous shales of the coal. And therefore, in these pebbles, not only have the vegetable remains with their tissue been fully preserved, with their outline and nervation well defined, but many species have been found there which have never been seen anywhere else in the coal basins of America. A proof that we know as yet only a

part of the vegetation of the Carboniferous age, and perhaps only a small part. In the same deposit, and in the same kind of pebbles, many small animals—Crustacea, Anelides, winged Insects, and even Saurians—have been found of late, all species unknown before in the Coal measure. The Museum has recently made arrangements for obtaining a larger number of specimens from that locality.

6th. Among the Coal plants of the Museum, a collection worth mentioning for the beauty and large size of its specimens, especially in the genera Sigillaria and Lepidodendron, is that of Mr. J. G. Anthony. It was obtained from Cuyahoga Falls, Ohio, and contains eighty-four specimens. It is the more valuable from the reason that the geological horizon of the bed of coal where the collection was made is fully ascertained, being the lowest bed of the coal measures above the conglomerate.

7th. Lately another collection of fossil plants of the Coal, presenting the same advantage as the former has been made in Pennsylvania for the Museum, from three different beds of anthracite, whose horizontal position is equally well marked. It contains one hundred and forty-six specimens, all carefully determined and labelled. The species are recorded in the catalogue, in a table, according to their geological horizon. In comparing their distribution in that way, it is seen that two species only belong to two different stations and none to the three. Such tables established with care would help to solve the problem of distribution of species at the different levels or horizons, where our coal beds are formed, and furnish at the same time reliable leading species for the identification of the coal strata.

8th. From the Coal measures of Nova Scotia, the Museum has a series of about one hundred broken, small, poor specimens, coming especially from the Joggins. This collection is not of great value.

9th. The formations older than the Carboniferous, are scantily represented in the Museum, by thirty-nine specimens of the Devonian of New Brunswick and Maine. Though these specimens are named by Professor Dawson, they are so badly broken, small and obscure, that little advantage can be derived from them for comparison and identification of species.

10th. The only representatives of the Silurian are six large, beautiful specimens, from the State of New York.

11th. The specimens mentioned above, mostly determined and labelled, are placed in cases and exposed to view for examination and comparison. But there is still in the magazine of the Museum a number of boxes, containing about four hundred specimens, which cannot be disposed in cases from want of place. They are mostly from the recent formations of Europe, and from the coal measures of America. Most of the specimens are good and valuable.

12th. Besides the fossil species, the department of botanical Palæontology received important additions and an element of success of great value in the collection of palms, fern trees and other equatorial species, immense trunks of which have been brought from Brazil, by Professor Agassiz. These will offer an invaluable advantage for the comparison of the fossil plants, especially in studying their internal structure. I do not think that any other Museum in the world contains such admirable materials for a scientific comparison of fossil plants with those now in existence.

In summing up this examination, it is found that the Museum has already about two thousand five hundred specimens of fossil plants, and that they represent more than five hundred species. It is by far the greatest number of vegetable remains found in any of the Museums of America. And it is easy to see that in its composition this collection contains the essential elements for the building of a great and solid scientific monument, where the vegetation of every formation may find its place, and be satisfactorily represented.

Much, however, remains to be done in order to reach this end. It is especially to the gathering and study of the fossil plants of our American formations that the first efforts should be directed; for of all our formations, except that of the Coal, there are no representatives whatever in the Museum. Nevertheless, questions of great importance, occupying now the scientific world can be definitively solved only by good collections of fossil plants, even of our most recent formations. The few vegetable remains, for example, obtained from the Tertiary of Tennessee and of Mississippi and from the Cretacean of

Nebraska and California, have demonstrated facts, which science was scarcely prepared to admit:

First. That the floras of our ancient formations already had peculiar types, which separated them from each other in the different continents. This is even evident in the vegetation of the Coal measure. Therefore, the supposition of a continental union of Europe with America by Atlantides or other intermediate lands, is proved to be untenable.

Second. That the essential types of the old floras, of the cretaceous and tertiary formations have passed into our present vegetation, or are preserved to our time. The Cretacean of America, for example, has already the Magnolias, which we find still more abundant in our Tertiary. This last formation has furnished a number of species of the genus Magnolia, nearly identical with that now existing in the United States, while the genus is totally absent in the corresponding floras of Europe. More than this: we find in our Tertiary the same predominating types marked on both sides of the Rocky Mountains. On the Atlantic slope, leaves of magnolias, of oaks, of elms, of maples and poplars, and not a trace of coniferous trees; while in California and Vancouver Island, the red woods or Sequoia, abound in the Cretacean and Tertiary, as now they still form the predominant vegetation of the country. These few facts are mentioned only to show the importance of collections of fossil plants from every formation of our American continent, the only part of the world where questions of general significance concerning palæontological distribution can be studied with some chances of satisfactory conclusions.

From our Coal measures, also, other problems of general interest are still awaiting a solution. The vexed question of the distribution of the vegetation at the various horizons where beds of coal have been formed is one of the most important. Some geologists assert that the differences in the vegetation of the coal are merely due to geographical or climateric influences; while others, on the contrary, find different and essential characters in the flora of each bed of coal. Nothing can solve problems of this kind but collections of fossil plants carefully made, not only in view of the determination of species and an acquaintance with the vegetation of a certain epoch, but especially in view of ascertaining local and general distribution

For this reason the plan proposed by the Director of the Museum, for the arrangement of specimens of animal Palæontology, should be followed with the same care for the fossil plants. It demands a collection for the study of species and another for the exemplification of geological stations by a number of characteristic species.

We have an abundance of fossil plants in the whole thickness of the Silurian. We can follow the development of vegetation in our Devonian, which also abounds in terrestrial and marine vegetable remains. Ascending through the Coal epoch to our recent formations, we may gather from all a number of fossil plants, and by and by have in the Museum the links of that admirable manifestation of life, under atmospheric influence, which animal Palæontology fails to show us, and which constitute an essential chapter in the history of our globe.

Report on the Collection of Mollusks, by J. G. ANTHONY.

The year just closed has been one of considerable activity in the Department of Conchology. During the earlier portion of the year my attention was mainly devoted to exchanges, by which our collection has received large accessions of valuable species; while during the later portion of four or five months I have been almost exclusively occupied in preparing and mounting the specimens on the glass tablets, preliminary to their due exhibition to the public, and also as one very important step in the direction of making out a general catalogue of our Conchological collection.

By the exchanges above referred to, we have received during the year just closed, from twenty-five persons, thirty packages, containing 2,305 species and 39,319 specimens, being by far the largest number of species received from this source during any one year since the foundation of the Museum. The character of the species has also been gradually improving, and few are now received which are not directly available in adding novelties to our already large collection.

While the exchanges have thus largely increased, there has been a considerable falling off in the number received by donation, 156 species and 3,558 specimens being all that has been added from that source, as follows:—

H. Edwards, mostly from New Zealand, 59 species, 496 specimens.
Joseph Heco, mostly from Japan, 7 species, 12 specimens.
Prof. J. Wyman, from Florida, 5 species, 22 specimens.
Charles Wright, from Cuba, 85 species, 3,028 specimens.

All very interesting species, and for which we feel greatly indebted to the liberal donors.

To the Gray Fund we are indebted this year for only 105 species and 3,552 specimens, an unusually small accession from this source, and mainly due to collections made directly for us by paid collectors working in our Southern States.

It will thus be perceived that while our exchanges have been steadily and rapidly increasing, our numbers derived from donations and purchases have gradually diminished; and although gladly received from our friends, we cannot consider them as a very certain and reliable source of increase. To our exchanges we must mainly look for additions to our collections in this department, especially while the Gray Fund, usually devoted in part to the purchase of shells or the payment of hired collectors, is so much needed in other departments.

The preparation of a catalogue of our shells, which was in progress at the date of our last report, has not been lost sight of during the past year, but the advance in this direction has not been so manifest, owing to the fact that it has been thought advisable before attempting to catalogue any genus, to place on tablets every species we have belonging to it. This necessarily retards the work, but it is steadily going on, and during the past year over 3,600 tablets have thus been mounted, with over 10,000 specimens.

The marine bivalves are included in the above, but these, together with many genera of Gasteropods, must remain for the present in the work-rooms, for want of space to display them in the exhibition rooms.

The identification which was going on at the date of our last report, has since been continued, and all the species identified as far as possible with our present means; but the same hindrances still remain in the want of the books necessary to a satisfactory completion of the work.

During the past year we have sent abroad twenty-eight packages of shells, containing 3,980 species, and 11,660 specimens. These have been sent to twenty-two individuals and foreign

museums, mostly in payment for previous boxes received; and although less in number than during the previous year, which was a very unusual one by reason of our large accession of desirable objects of exchange from Brazil, is yet quite respectable, and has occupied much time and attention, besides nearly or quite extinguishing all our indebtedness to our exchange contributors.

During the coming year, the collection purchased of Mr. Anthony will receive special attention, and when that is placed on tablets a full and complete catalogue may be expected.

Report on the Mammals and Birds, by FRANCIS R. STÆHLI, M. D.

Upon assuming the duties of an assistant in the Museum of Comparative Zoölogy, I received the following instructions from Professor Agassiz:—

"In the present condition of the collections gathered together in the Museum, it should be your first and constant aim to place the specimens of Mammalia and Birds in as perfect a state of security as our means and room will allow. Before you undertake any other work, make it your duty to overhaul the whole collection of alcoholic specimens of Mammalia and Birds, in order to ascertain, first, whether the labels which indicate their origin are legible or not, and if not well preserved, replace them by the addition of new ones, without, however, destroying the old ones; and in the second place, whether the alcohol in which they are preserved, is of sufficient strength to insure the permanent safety of the specimens. As this is a kind of labor which cannot be carried on for weeks in succession, you should alternate with the making of such anatomical preparations as will increase the value of the specimens preserved, and also lead to the most accurate identification of the species under examination. This more scientific work should be conducted in the following manner:—

"First. Bring together all the specimens of the same species, and collected at the same place and at the same time, and from these select a series for preservation in the zoölogical collection. These specimens are then to be thoroughly cleaned, washed in alcohol, and put up separately. The number of specimens to

be thus retained is to depend upon the number on hand, and the rarity or value of the specimens themselves. In making this selection it is to be remembered, that a sufficient number of specimens be set aside to complete the faunal collections as well as the embryonic collections and the general systematic collections. After this selection is made, the remaining specimens may be considered as duplicates, and from these the materials for anatomical studies may be taken.

"Second. The anatomical preparations ought always to bear upon the principles of classification. In a zoölogical museum, such investigations are not designed to elucidate questions of physiology, but to facilitate the study of zoölogical affinities, and to establish on a more permanent basis the relative standing of the different kinds of natural groups among animals. The anatomical preparations, made in the Museum, ought therefore to elucidate as much as possible the characters of the classes for themselves; next those of the orders, that we may learn to discriminate between class and order; next those of the families, the genera, etc. You will soon perceive, in consulting zoölogical works, with reference to your labors in the Museum, that there is not, to this day, a systematic classification of animals in which this distinction of characters is carried out. It will tend to remove much that has been arbitrary in Zoölogy thus far, if on studying the structure of animals, we keep in mind the unequal value of structural features.

"As a special point of study, in the class of Mammals, I would particularly urge the making of serial preparations of the teeth, in every stage of growth of all the species sufficiently common to afford the necessary materials. In like manner should entire specimens of all the common species be set aside, representing all their stages of growth from the earliest embryonic condition to their adult state and to old age. To complete the series on hand, you should frequently visit the slaughter-houses, where large numbers of our domesticated animals are killed, and also keep in the shed of the Zoölogical Hall such small species as breed rapidly, to have constantly on hand fresh materials for examination. I would also recommend that you make as many skeletons of embryos as possible, to be preserved in alcohol, that the unossified parts may be studied as well as

the hardest. Whenever the opportunity presents itself, I would recommend a careful comparison of the most closely allied species of the same genus, with a view of ascertaining the limits within which fossil species may be determined from the imperfect materials usually at our command.

"Finally, I wish you would set aside all such duplicates as are not needed for the use of the Museum, that they may be divided among our correspondents without much loss of time."

In consequence of these instructions, the whole collection of alcoholic specimens of Mammals and Birds has been overhauled; the alcohol has been changed where the slightest trace of alteration was perceptible. About twelve hundred glass jars have been carefully revised; also the specimens contained in fifty kegs, containing Mammals, and one hundred and six kegs containing Birds; but the additions to this department have been small since the great accessions derived from the Brazilian Expedition.

At the same time with this revision of the bulk of specimens, a special investigation of the Insectivora has been commenced, and will be continued during the coming winter. The next work will be a careful overhauling of the collection of skeletons of Mammals and Birds, every part of which is to be marked, so that they may be brought into the lecture room and handled without fear of confusion.

The whole programme contained in the preceding instructions is to be carried out, as far as the present state of the collection and the scarcity of room will allow.

[B.]

TRUSTEES OF THE MUSEUM OF COMPARATIVE ZOÖLOGY.

1868.

THE GOVERNOR OF THE COMMONWEALTH,
ALEXANDER H. BULLOCK.

THE LIEUTENANT-GOVERNOR,
WILLIAM CLAFLIN.

THE PRESIDENT OF THE SENATE,
GEORGE O. BRASTOW.

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES,
HARVEY JEWELL.

THE SECRETARY OF THE BOARD OF EDUCATION,
JOSEPH WHITE.

THE CHIEF JUSTICE OF THE SUPREME JUDICIAL COURT,
REUBEN A. CHAPMAN.

LOUIS AGASSIZ. WILLIAM GRAY.

JACOB BIGELOW. NATHANIEL THAYER.
JAMES WALKER. SAMUEL HOOPER.
GEORGE TICKNOR. JAMES LAWRENCE.
THEODORE LYMAN.

OFFICERS OF THE MUSEUM OF COMPARATIVE ZOÖLOGY FOR 1868.

His Excellency ALEXANDER H. BULLOCK, Governor of the Commonwealth, *President.*

WILLIAM GRAY, *Secretary.*

THEODORE LYMAN, *Treasurer.*

LOUIS AGASSIZ, *Director of the Museum.*

SAMUEL HOOPER, JOSEPH WHITE, NATHANIEL THAYER, JAMES LAWRENCE, *Committee on Finance.*

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