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ANNUAL REPORT

OF THE

TRUSTEES

OF THE

MUSEUM OF COMPARATIVE ZOOLOGY,

TOGETHER WITH

THE REPORT OF THE DIRECTOR,

1862.

BOSTON:
WRIGHT & POTTER, STATE PRINTERS,
No. 4 SPRING LANE.
1863.

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1862/80



Commonwealth of Massachusetts.

BOSTON, February 9th, 1863.

To the Honorable the Senate and the House of Representatives :

In compliance with the following vote, passed by the Trustees of the Museum of Comparative Zoölogy, the undersigned respectfully submits this Report :

“ *Voted*, That the Secretary communicate to the legislature the Annual Report of Professor Agassiz, with a statement of the proceedings of this Board, for the year past.”

On the thirtieth day of April last, a Resolve was passed by the legislature, under which the sum of thirty-five hundred dollars has been paid to this Board, out of the moiety of the income of the school fund, applicable to educational purposes, and has been applied to the care and arrangement of the collections of the Museum, in conformity with the terms of the grant. A small balance of the grant of the previous year has also been expended.

No payments have been made to the Trustees from proceeds of Back Bay lands, during the past year.

In a communication from the Faculty of this Board, the Secretary writes :—

“I may add, that all the funds thus far appropriated by the Trustees have been expended under the direction of the Faculty, in accordance with the intention of the Trustees, and that full and minute accounts of these expenditures have been rendered, and duly audited and passed upon by the Faculty. All these accounts, including the smallest items of expenditure, are on file in the Secretary's keeping.

“It may also be satisfactory to the Trustees to know that, according to a standing rule of the Faculty, no expenditures are ever directed to

be made for any purpose before the necessary funds have been placed at the disposal of the Faculty."

In their Annual Report to the Trustees, the Committee on the Museum make some statements of general interest, which I extract from that paper. They say:—

"To insure practical efficiency in its administration, an exact record is regularly made up of all its proceedings, whether within its own walls or in relation to its exchanges abroad, and an exact account is kept of all its expenditures, which with their proper vouchers are audited and passed from time to time by the Faculty, who are charged with the immediate oversight of all its affairs. * * * *

"Regarded as a part of the system of education for the Commonwealth, its condition is equally gratifying. The lectures, just closed, have been attended by from one hundred to one hundred and twenty persons, about half of whom were not connected with the University at Cambridge, but came from the people at large. Besides these lectures, much instruction has undoubtedly been gained by the large number of persons who daily, at all hours, and in all seasons, have visited the collections, which are always open and accessible, free of charge, to all comers.

"Among the circumstances which augur well for the future progress and usefulness of the institution, by showing the strong interest felt in its advancement, your committee have the pleasure to state that a few public spirited persons, capable of estimating its importance to the cause of education and science, and understanding how much its means were falling behind its wants in consequence of the untoward circumstances of the times, have lately subscribed eleven thousand two hundred dollars, which they have placed at the disposition of this Board for the purposes of the Museum, provided always that not more than one-half of the sum subscribed shall be appropriated during the year eighteen hundred and sixty-three. A wise generosity could not, as your committee would thankfully acknowledge, have been more happily timed to produce beneficial results for the institution to which it is devoted."

The fourth Annual Report of the Director, which is annexed, marked [A], gives a detailed statement of the operations at the Museum during the year.

The annexed paper marked [B], has a list of the names of trustees, officers and standing committees, for the year 1863.

On behalf and in the name of the Trustees,

WM. GRAY, *Secretary.*

[A.]

FOURTH ANNUAL REPORT

Of the Museum of Comparative Zoölogy, by LOUIS AGASSIZ, presented to the Board of Trustees at their meeting in October, 1862.

My chief aim in directing the affairs of the Museum during the past year has been to improve the condition of the collections, by carrying out, as far as circumstances would permit, the plan presented in my last Report for their arrangement. The patriotic sentiments now animating the nation have, however, called to other fields some of the most efficient assistants upon whose co-operation I had depended. Not less than ten of the young men who were last year uniting their efforts with mine to build up the Museum, are at present in the army, and I am proud to state that those who have remained behind have been deterred from the same course by special considerations fully justifying their decision, and not by any desire to avoid the hardships and privations of military life.

The plan I had hoped to carry out during this year for all the classes of the Animal Kingdom simultaneously, has on that account been only partially accomplished for certain classes. I have, however, divided the work in such a manner that the specimens requiring particular attention should be examined and arranged first. My desire to accumulate such specimens as are most important to the progress of our science, rather than those which make the finest show, has naturally resulted in large alcoholic collections of animals generally represented in public Museums by mounted skins only. The facilities thus secured for careful and comprehensive comparisons, daily strengthen my conviction that the plan adopted for the arrangement of the Museum is one that must lead to most satisfactory results.

I submit, as part of my Report, the accounts presented to me by the assistants who have had the special charge of certain departments of the collections, reserving to myself, however, as

Director of the Museum, a general statement of the progress we have made thus far. I need scarcely repeat that what was begun during the preceding year has been satisfactorily completed early in the present year, and that at this moment all the alcoholic specimens are not only safely stored, but so far arranged that the representatives of the different families in almost every class are placed together. This constitutes an important step toward their final arrangement and specific identification. The critical revision, naming and labelling of these specimens can now be proceeded with as time and opportunity permit.

I am now beginning a similar process with the dry specimens, and with the fossils especially. Thus far the latter have been greatly neglected, as they were, of all the materials on hand, those least liable to casualties. But this part of our collections is extensive and very important, especially with reference to an accurate classification of our rocks as well as their more critical comparison with those of Europe; and the frequent calls made upon me by geologists for identification of particular fossils, show the necessity of proceeding at once with their arrangement, if our Museum is to acquire the national importance and the practical usefulness which I hope to give it. Besides this practical object, there is another reason of more theoretical importance, it is true, which makes the revision of the fossils of great interest. The scientific world is divided upon the most vital question ever approached by science. No longer satisfied with a knowledge of the innumerable animals belonging to our own period and of the creations that have preceded ours in past geological ages, the question is pressing upon us from all sides,—how did all this come to be? It is no longer enough to know when the various races of animals made their appearance upon our globe,—the philosopher asks now, how did they originate? Many have been the theories brought forward in answer to these inquiries, but however satisfactory to some minds, they have only startled others. The vast collection of fossils accumulated at the Museum during the past few years may, if properly arranged and critically compared with their living representatives, contribute something towards the solution of this great problem. At all events they cannot fail to answer the practical purpose of furnishing the information

needed by our geologists for the identification of our rocks. Having devoted the best part of my life to the study of fossil remains, I feel that I cannot better employ the few years of activity that may yet remain to me, than in the accomplishment of this new task, leaving to the young friends I have prepared for the work, the great opportunity open for them in the Museum of illustrating its rich stores of living forms.

Though the special reports herewith submitted give a minute account of all donations made to the Museum during the past year, there are some which on account of their importance or magnitude require especial mention from me. In the first place, I would again express my thanks for the liberality of the Legislature which, in order to prevent the suspension of some of our active operations, was pleased in their last session to grant to the Museum a special appropriation of three thousand five hundred dollars. Our regular income from the Gray fund was chiefly applied to the payment of a part of Dr. de Koninck's collection, and to defraying the expenses incident to the reception and preservation of the numerous collections which have continued to arrive at the Museum, notwithstanding the disturbed condition of the country. It is a source of great gratification to me, and a sign of the continuation of our prosperity and of the unimpaired activity of our merchants in all parts of the world, that I can announce the arrival during the past year on board of merchant ships, and mainly through the liberality of gentlemen engaged in business, of no less than two hundred and thirty packages, barrels, cans, &c., filled with specimens from every quarter of the globe. The most valuable of these were received from Commodore Preble, from the Gallopago Islands; Hor. Hammond, from Bermuda; Mr. Ch. Demmick, of Boston; Mr. W. Webb, U. S. Consul, and E. D. Ropes, from Zanzibar; J. D. Sargent, from Nassau, N. Prov.; J. G. Shute, of Woburn; Miss C. M. Fitch, of New Bedford; J. M. Barnard, of Boston; Col. Jewett, D. S. Heffron and Dr. A. S. Copeman, of Utica; Capt. Crandall and Dr. R. H. Wheatland, of Salem; Mrs. F. Gardner, of Pike's Peak; Capt. J. Anderson, of Liverpool; J. D. Hague, from the Guano Islands of the Pacific; W. S. Putnam, from Lower Guinea; Mrs. Stearns, from Bombay; J. G. Anthony, of Cincinnati; George A. Boardman, of Calais, Me.; S. Tenney, of Auburndale; Mrs. Dr. Chaplin; the Marquis of

Lousada, H. B. M. Consul in Boston; Mr. J. Hunnewell, of Boston; Dr. Wm. Stimpson, of Cambridge; Mr. J. G. Rich, of Upton, Me.; Mrs. Munroe, of Boston; D. B. Parson, from Honduras; Capt. W. J. Chever, from China Seas; Mrs. Bridg- ham, of New York; Dr. E. Mayberry, of Edgartown; Mr. M. D. Parker, from Amoy, in China; Mr. E. C. Hammer, Danish Consul in Boston; Dr. Sternbergh and Ch. F. Davis, of Panama; Mr. Francis Brooks, of W. Medford; Dr. Holder and Capt. Pickering, from Florida; Capt. J. Dillingham, from the West Coast of South America; Mr. Walker, of Provincetown, from the West Coast of Africa; Mr. P. P. Ellis, from Siam; S. I. Smith, of Norway, Me.; Rev. Mr. Finotti, of Brookline; E. W. Rollins, of Boston, &c., &c.

I take especial pleasure in adding that Mr. William Robertson, of Hobart Town, and Dr. Ferdinand Müller, of Melbourne, in Southern Australia, have continued their contributions from that country. Mr. Cary, of San Francisco, and Captain Putnam have also kept up their collections with indefatigable zeal, and add new treasures yearly to the Museum. The contributions of Mr. Cary are particularly important, as including perfectly preserved heads of Chinese and Indians, in alcohol; and Captain Putnam has explored the coast of Peru, from which the Museum possessed nothing before it was enriched by the valuable collections received through him from that region. Mr. Garret has sent the balance of the large collections he has made in the Society Islands. From Mr. H. A. Pierce, of Boston, we have received a highly valuable collection made in Japan by his agent, Mr. A. A. Smith. At last the long expected collections made at Zanzibar by Mr. C. Cooke have arrived, and have proved very valuable, thanks not only to his personal exertions but also to the friendly assistance and co-operation he has received from Mr. Edw. D. Ropes and Mr. Webb, the U. S. Consul at that place. And last, but not least, I have to mention, among the special explorations, an excursion by Mr. Burkhardt, of the Museum, to the coast of the Mediterranean, the expenses of which were defrayed by Mr. Q. A. Shaw.

To Mr. Joshua Bates, whose liberality to the learned institutions of his native place is so well known among the citizens of Boston, we are further indebted for a magnificent set of casts of the gigantic *Megatherium* of the British Museum.

They are now nearly put together and mounted, in a manner that does great credit to the skill and ability of Mr. Glen, who has been for some months engaged upon this difficult task. It will shortly be ready for exhibition in the public rooms of the Museum. To the Rev. Dr. Schmidt, missionary in Japan, we are indebted also for a very remarkable animal known as the gigantic Salamander, which he has brought home with him, and two specimens of which are now to be seen alive at the Museum. Professor Poey has continued to send the original specimens of his descriptions of the fishes of Cuba, and Mr. Dabney, of Fayal, has presented us with the most elegant group of corals I have ever seen from that locality.

The intercourse with the other scientific institutions of this country has been kept up by the same system of friendly and active exchange as before. We are particularly indebted to the Smithsonian Institution for a large collection of tertiary fossils, and for type specimens of Insects. We have also to thank the University of Harvard for a very large collection of shells. Other specimens were received from the Academy of Natural Sciences at Philadelphia; from Professor J. Wyman, Director of the Anatomical Museum at Cambridge; from Professor Dawson, Principal of McGill College, Montreal; from Professor Hamlin, of the College of Waterville, Me.; from Professor Chadbourne, of Williams College; from the Essex Institute, of Salem; from Professor A. Crosby, of the Normal School of Salem, which possesses very valuable collections made by Capt. Ashby. Dr. J. H. Slack has also forwarded a considerable number of very interesting specimens. The Aquarial Garden has continued to send to the Museum the animals dying in the establishment; besides which we are indebted to Mr. P. T. Barnum for the facilities he has given to Mr. Bickmore of accompanying his expedition to Bermuda, during which Mr. B. has made an extensive collection of the marine animals of that island, showing that its fauna is identical with that of the coast of Florida. Our foreign exchanges have not been very numerous, owing to the difficulty of selecting and packing the necessary specimens with our reduced number of workers, and it becomes daily more desirable that something special be done to increase our activity in that direction. I have, however, to mention the reception of important invoices from Professor Martins, of Montpellier; from Professor A.

Ecker, of Freiburg; from Count de Kornis, of Prag; from Captain de Folin, of Paulliac; from the Free Museum of Liverpool, and the purchase of interesting fossils secured for me by the Earl of Enniskillen and by Dr. Imhoff. On our side specimens have been sent to the Jardin des Plantes, the British Museum, and the Museum at Liverpool; but we are now behind-hand with several others.

During the past summer Professor Marcou has resumed his exploration of the oldest fossiliferous rocks of Vermont and Canada, and secured a large number of highly interesting fossils, which have been forwarded to M. de Barrande for identification, in the hope of contributing something towards the solution of the question now pending among geologists respecting the age of those rocks. The appointment of Professor Marcou, as geologist to the Museum, was an important step towards securing precision in the identification of the geological age of the fossils, too often only vaguely determined in zoological museums. We owe his valuable services to the liberality of a number of friends of our institution. Mr. Theodore Lyman has improved the opportunity afforded him by his travels in Europe to add frequently to our collections whenever opportunities have been offered for collecting or making exchanges. The graduates and the students of the zoological department of the Lawrence Scientific School are also regularly contributing the results of their summer excursions to the increase of the Museum, and it is a pleasure for me to mention this evidence of their continued interest in the welfare of our institution. The most valuable contributions have been received from Messrs. S. H. Scudder, A. Agassiz, J. A. Allen, F. W. Putnam, A. E. Verrill, J. T. Rothrock, W. H. Niles, H. Mann, A. S. Bickmore, A. S. Packard, C. A. Shurtleff, J. H. Fowler, &c. Professor Clark has completed the systematic arrangement of the Acalephs, and is now engaged in revising the collection of Vertebrate Embryos. I lament my inability to secure regularly his valuable services for the Museum. For some months Dr. W. Stimpson has been engaged upon the arrangement of the Crustacea, which it is hoped he may be able to complete the coming winter. Mr. William G. Binney has revised some of our fresh water Gasteropods, and thus greatly added to the value of these specimens, owing to his familiarity with these shells. Mr. Glen continues to devote

most of his time to the preparation of sections to illustrate the microscopic structure of living and fossil animals, in which I believe he has no equal. Mr. Guggenheim has been during the whole year engaged in the ungrateful task of making skeletons and unpacking specimens, which he is faithfully discharging. Professor Marcou and A. Agassiz have lately put the library into perfect order, and made every book easily accessible for the work going on in the Museum. They are now engaged in preparing a systematic catalogue of the whole.

The absence of those young men who were intrusted during the earlier part of this year with the arrangement of the Crustacea and Mollusks, prevents me from presenting a full account of the progress thus far made in these classes. I would say, however, that during the past year, more than fourteen thousand specimens of Mollusks, representing nearly two thousand species, one-half of which are preserved in alcohol, have been added to the collection. These additions are mainly due to the liberality of Harvard University, which has transferred their collection to our Museum. Besides these, large additions were obtained from Mr. C. Cooke, at Zanzibar, from Dr. Sternbergh, at Panama, from Mr. Hammond, at Bermuda, from Dr. Slack, Count de Kornis, Captain Anderson, and others.

The Crustacea have not yet been counted, but I would remark that the most valuable additions have been received through Capt. Putnam, from China and Peru, and from Mr. Cooke, at Zanzibar.

To the library I have added 823 volumes from my own private library, consisting chiefly of the transactions of learned societies. My son, Alexander Agassiz, has presented to the Museum his whole collection of insects, consisting of one hundred and ten cases.

During the past year, seventy-one can-boxes for making collections, have been sent to twenty-five persons, twenty of whom have already returned them filled with specimens. There are still thirty-five cans outstanding from the preceding years.

From the annexed special reports, it is apparent that some classes are far richer than others, and consequently that the different classes of animals are still very unequally represented in the Museum. I have thus far made no efforts to secure the larger Mammalia, which would occupy more room than we can

spare at present, and for the same reason I have allowed most of the birds to remain unmounted. But I may be permitted to say a few words of those classes which give an unquestionable eminence to our Museum.

Thus far the collection of fishes brought together in the Jardin des Plantes, by Cuvier and Valenciennes, has been considered the largest in existence, numbering about four thousand two hundred species, according to a recent report by Professor Duméril. From a recent article in the *Natural History Review*, of London, I see that the Curator of the British Museum claims now a superiority for their collection, over that of Paris, stating that the former contains 20,000 specimens. The number of species is not given, but judging from Dr. Günther's catalogue, as far as printed, the number of species can hardly exceed that of the Jardin des Plantes. Our own collection numbers now 100,000 specimens, representing 6,000 species, all preserved in alcohol. This numerous collection allows for the possibility of an extensive system of exchanges, as well as for the preparation of a large number of skeletons, of which we have already more than fifteen hundred.

I beg leave here to submit also the working plan adopted for the arrangement of this class, in consequence of the extraordinary size of the collection. It may give some idea of the amount of work required in the methodical arrangement of a museum, and as it has many novel features, may also be useful to other establishments.

From the rapid examination I have made myself of the Echinoderms and Corals in the British Museum and the Jardin des Plantes, I am also satisfied that our collections in these classes are inferior to none, even if they are any where equalled, and the arrangement of these two classes is nearly completed. But it will be a work of years to bring the collection of Mollusks, including the fossil types, that of the Articulates, especially the Insects and the class of Fishes among Vertebrates, into such a condition as will render them as useful as they may become to the progress of science. I hope, therefore, that in some way or other, means will be provided to enable me to go on with this work. I know that the regular resources at the command of this Board are insufficient for that purpose, but it cannot be doubted that establishments like this are the standards by which

the degree of culture of civilized nations is measured, and I trust that even in this hour of her trial, Massachusetts will sustain her scientific institutions in unimpaired activity. I feel distressed to be obliged to add that unless such means be secured, all the work alluded to in this Report must be stopped from this day forward, as I have already exhausted my resources in attempting to carry it out thus far. I believe, however, that no greater calamity could befall our institution than such a suspension, and that it would have a disastrous influence upon the estimation in which our scientific institutions are held by other nations. It may perhaps be said that I ought to have gone on more slowly, and saved something out of the appropriations thus far made, for the difficult times in which we live. To this I have only to answer, that the appropriations were at no time equal to the plans adopted for the Museum, which I always supposed would be carried out, since they received a partial execution; and that if I am mistaken in my estimation, all our transactions have misled me; for no man in his senses could have imagined that a Board like this, composed of the first officers of the State, and some of the most prominent citizens in every walk of life, would be organized by the legislature, merely to supervise a school or college museum.

Special Plan for the arrangement of the Fishes in the Museum of Comparative Zoölogy, in accordance with the views presented by Professor AGASSIZ in his last Report, prepared by F. W. PUTNAM.

The collection of fishes in the Museum, amounting to nearly 6,000 species represented by 100,000 specimens, is now in a comparatively safe condition, being stored in barrels, earthen jugs and glass jars, in the cellar of the Museum. The collection is divided as far as the families, and the species of several families have been critically identified, and are arranged in glass stoppered jars. All the fishes that have been separated as far as species, are entered in the four catalogues used for this class, reaching to about 3,000 numbers. The duplicates of several families, thus catalogued, have been separated and specially labelled.

It will thus be seen, that with the exception of the families now arranged, the specimens of this class, cannot be used for investigation or comparison, without much inconvenience and loss of time, and cannot be seen by persons visiting the Museum. It is, therefore, of the greatest importance, to adopt some plan by which this valuable collection may be made readily available for study, and exhibited in such a manner as to be at the same time instructive and attractive to visitors. It is therefore proposed, to divide all the fishes into three distinct collections, one to be arranged according to their zoölogical affinities, another according to their geographical distribution, and the third to embrace the duplicates.

Systematic Collection.—This collection could be placed, for the present, in the cases now occupied by the skeletons, which may be removed to the drawers, after those needed to illustrate the structure of the class and its orders have been taken out. It should contain ligamentary skeletons and preparations of the muscles, the nervous and vascular systems, and the organs of digestion and reproduction, to illustrate the structure in each order, and a ligamentary skeleton to show the form in each family. The special characteristics of each genus should be exhibited by parts of the skeleton, fins, teeth and scales, as well as other characteristic features. These parts should be shown in their natural relations, by sections and all necessary preparations. There should also be placed here a representative of every genus, from every fauna, both of the present and past times. As a general rule single specimens should be used for this purpose, but when there is a marked difference between male and female, adult and young, it will be necessary to have these differences illustrated. This collection should be so arranged that the systematic connection of every type throughout the class, could be seen at a glance.

Faunal Collections.—These collections might be arranged, for the present, as far as possible, in the north-eastern room of the second story of the Museum. Here the different faunæ should be kept separate and appropriately labelled. All the specimens illustrating the changes which the species undergo during their growth, and the difference between the sexes, should be placed here. The fossils of different geological periods should be arranged in the same manner as the recent species.

Collection of Duplicates.—This collection, which may be kept in the cellar, can be arranged in the old glass-stoppered jars, and in jugs and kegs; it should contain all the specimens separated as duplicates during the arrangement of the systematic and faunal collections. These duplicates should be so classified as to be accessible at any moment for the purpose of investigation or exchange.

Cataloguing.—In cataloguing the fishes they should be divided into four classes: the Myzontes, the Fishes proper, the Ganoids and the Selachians, and four catalogues should accordingly be kept. All the specimens of a species from one locality should be catalogued under a common number, unless it should be important to keep them distinct on account of the date at which they were collected, especially when the date throws some light upon the time of spawning.

In order to avoid the confusion arising from the repetition of any one numeral in the same class, great care should be taken to use the same number for identical specimens in the three collections. This number should be written on the label belonging to the specimen, and should also be repeated on parchment and placed within the jar, if the specimen be alcoholic, or attached to it if dry, or fossil. The catalogue should be prepared on sheets, ruled on one side only, with twenty-five lines on each sheet, and should have the following headings, reading from left to right. Catalogue number: Original number: Name: Sex or Age: Locality: Collected by: When collected: Received from: When received: Kind of Specimen: Number of Specimens: Remarks: Thus all specimens would be entered in the following manner. 1st. The catalogue number. 2d. The number under which it was received from any other Museum or collector. 3d. The systematic name in full, with its authority. 4th. The age or sex when known. 5th. The locality in full. 6th. The name of the collector. 7th. The date of collecting. 8th. The name of person or fund from whom it was received at the Museum. 9th. The date of its reception. 10th. The kind of specimen, whether alcoholic, dry, fossil, skeleton, &c. 11th. The number of specimens, the duplicates not being included. 12th. Remarks concerning its condition and history, and the collection in which it is placed.

At the top of each sheet the name of the class should be

written, and also the date of entry, and the name of the person by whom the specimens are catalogued.

Labelling.—In the Systematic and Faunal collections a label should be placed round the neck of the bottle, if the specimen be alcoholic; if dry, or fossil, it should be attached to the specimen, or to the box, or card containing it. This label should have upon the left upper corner the catalogue number, and just under this should be placed the name of the species, in full, with the authority for it. Under the name, on the left side, the locality of the specimen, and under the locality, on the left, the name of the collector; and on the right, from whom it was received. In the duplicate collection the specimens need only have their catalogue number, which should be on parchment, and placed within the jar, and on a card which should be tied to the neck of the jar. When the specimen is in a jug or barrel, it should have the parchment number attached to it, and when a bundle of specimens is in a jug or barrel, the parchment number should be outside of the bundle, so as to be readily seen, and a card number should be placed inside, to guard against the loss of the number, should the parchment one become illegible.

When specimens are thus placed in jugs and barrels, a card should be attached to the outside, having the numbers of the specimens within written upon it.

Duplicate Book.—A book under this name should be kept, in which all the duplicates should be entered under their respective names and important synonyms. On the left of the page the catalogue number should be written, and to the right of this the locality of the specimens and the number of duplicates, leaving a margin on the right of these figures, where specimens taken from the number can be stated, which will save searching for specimens in the duplicate collection that may have been used.

Exchange Book.—A book with this title should be kept, in which all specimens sent from the Museum in exchange, should be entered, stating to whom and when they were sent. Specimens should always be sent from the Museum under their respective catalogue numbers.

Receipt Book.—Under this title a book should be kept, in which all specimens received at the Museum should be entered

in the following manner : Date of reception : Name of person from whom received : Name of collector : Number of specimens and name of each species or genus, as far as it can be given : General remarks about the collection : Locality from whence the specimens came.

Species Books.—In these books a page should be given to each species in the collection. This page should be headed with the name of the species in full, with all its synonyms when they are ascertained, and all specimens of the species in the collection should be entered here, giving only their catalogue number and locality. Books thus kept will aid in determining the range of any species, and also in preparing the Museum catalogues. An index should be kept of all the names used in these books.

Locality Books.—In these books a page should be given to each locality from which there are specimens in the collection. The locality being written in full, at the head of the page, and with it the names of all persons who have collected the specimens. Under these different localities all specimens that are in the collection should be entered, giving only their catalogue number and name. These books will be of great use in determining the limits of the faunæ, and will show at a glance what is in the collection from any locality, as well as the localities from which we are deficient in specimens. There should be an index kept of the localities mentioned in these books.

Books for Species and Localities of Described Fishes.—Alphabetic lists of all fishes described, and the localities from which they were obtained, should be kept, and every endeavor should be made to procure either original specimens from the authors, or similar ones from the same localities.

Method to be pursued in executing this Plan.—To carry out properly the above arrangement of the Fishes, it is proposed to proceed in the following manner. As the fishes are now generally divided into families, each family may be worked up separately, identifying the species of each locality, cataloguing them and selecting the specimens for the Systematic and Faunal collections, and setting aside the duplicates after selecting those of each genus, to be used for dissections, skeletons, &c. Then all the preparations necessary for the Systematic Collection

may be made and put up in their proper places, before commencing upon another family.

At first it will not be possible to determine fully the limits of the different faunæ, since the knowledge necessary to define them can only be obtained by the proposed arrangement; therefore we should, at the outset, only take out one representative of each genus for the Systematic Collection, reserving the selection of representatives of each fauna, until the whole class is arranged. In order to ascertain the limits of the different faunæ, we propose to keep all specimens from one locality together, considering each locality as a distinct fauna until the whole is arranged, and then bringing those localities together which show by their specimens that they belong to one fauna. When this is done we can select the specimens that are needed to finish the Systematic Collection. When there is but one specimen of a genus it should be placed in the Systematic Collection, and a nominal reference entered in the Faunal Collection.

When the class is arranged in the above manner, Faunal and Systematic Catalogues of the collection could be published.

As the different families are worked up descriptive catalogues of the genera and species may be published, for the purpose of showing what species are in the collection, and of giving names to those that are undescribed, so that the duplicates of such species can be used for exchange.

An immense number of glass-stoppered jars, and a large quantity of alcohol, will be necessary in order to carry out this plan. It is estimated that it will take at least ten years to complete the arrangement of the Fishes only, and that the expense for this special purpose cannot be less than twenty thousand dollars.

This plan has already been carried out to as great an extent as time permitted, not only for the class of Fishes, but also for those of Reptiles, Insects, Crustacea, Annelids, Echinoderms, Acalephs, and Polyps. The Mollusks, Birds and Mammalia, are least advanced.

Report on Mammalia, by A. E. VERRILL.

The principal work accomplished in the collection of mammals, during the past year, has been simply to put them into a condition of safety. For this purpose a large part of the alcoholic specimens have been unpacked and rearranged in new kegs and barrels, which remain stored in the cellar. A portion of these, amounting to about 1,500 specimens, have been catalogued and arranged in families. Some of the mammalian skeletons have been rearranged by Mr. Fowler, while many additional ones have been prepared. The additions to the collection, although not numerous, have been very valuable. The whole number received, not including the fossils, is 233, in 42 lots, comprising 117 species, of which a considerable number were new to the collection.

The following is a list of the persons and institutions from which collections have been received:—

ALLEN, J. A., Student in the Zoölogical Department of the Scientific School, 29 specimens, 6 species, from Springfield, Mass.; 4 specimens, 2 species, from Saxonville, Mass.

ANTICOSTI EXPEDITION, by Messrs. Hyatt, Shaler, and Verrill, 9 small Mammals, 3 species; and 4 Seals, 1 species, in alcohol, from the Gulf of St. Lawrence.

AQUARIAL GARDENS, Boston. 5 specimens, 4 species, fresh, from N. A.; 1 Dolphin, fresh, from Cape Cod; 1 Peccari, fresh, from Central America; 1 Sable, fresh, from Maine; 2 Monkeys, fresh, from Brazil; 1 Cynocephalus Sphinx, fresh, from Africa; 1 Black Bear, fresh, from New Hampshire; 1 Egyptian Sheep, fresh.

BICKMORE, A. S., Student in the Zoölogical Department of the Scientific School. 1 skull from Bermuda.

BOARDMAN, GEO. A., Milltown, Me. 1 Sable, fresh, from Maine.

BOARDMAN, WM., Beverly, Mass. 11 specimens, 2 species in alcohol, from Beverly.

BUCK, S. M., Student in Williams College. 12 specimens, 5 species, in alcohol, from Williamstown, Mass.

BURBANK, J. B. 1 specimen, in alcohol, from Mass.

CARY, T. G., San Francisco, Cal. 1 head of North American Indian, in alcohol.

CHEVER, Capt. W. J., Salem, Mass. 1 head of Musk Deer, in alcohol, from China.

COOKE, CALEB, Student in the Zoölogical Department of the Scientific School. 11 specimens, 9 species, in alcohol, from Zanzibar, Africa.

ECKER, Prof. ALEX., Freiburg. In exchange, 1 skin and skull of the *Bos Urus*, from Lithuania.

FIELD, T. G., Philadelphia. 1 skin of the Western Ermine, from "the plains," overland route to California.

FITCH, Miss C. M., Bedford, Mass. 8 specimens, 2 species, in alcohol, from Bedford.

GOODWIN'S MENAGERIE, Boston. 1 Baboon; 1 Jaguar from South America.

GRAY FUND. Collected by Andrew Garret, 2 skulls of the ancient inhabitants of the Hervey Islands; 1 young Dolphin from near St. Helena, purchased of a sailor.

MANN, HORACE, Student in the Zoölogical Department of the Scientific School. 5 specimens, 3 species, in alcohol, from Minnesota.

MÜLLER, Dr. F., Melbourne, Australia. 4 Marsupials, 3 species, in alcohol, from Australia, with drawings.

PIERCE, H. A., Boston. 4 specimens, 4 species, from Hakodadi, Japan, collected by A. A. Smith.

PUTNAM, F. W., Student in the Zoölogical Department of the Scientific School. 14 specimens, 8 species, in alcohol, from Warwick, Mass.

RICH, J. G., Upton, Me. (Gray Fund.) 8 specimens, 4 species, in alcohol, from Upton.

ROTHROCK, J. T., Student in the Lawrence Scientific School. 2 Mammals, skins, from Pennsylvania.

ROBERTSON, WM., Hobarton, Tasmania. 5 specimens of *Ornithorhynchus*, from Tasmania, in alcohol.

SHUTE, J. G., Woburn, Mass. 6 Mammals, 4 species, in alcohol, from Woburn.

SMITH, S. I., Norway, Me. 1 Bat, in alcohol, from Norway.

VERRILL, A. E., Graduate in the Zoölogical Department of the Scientific School. (Gray Fund.) 6 specimens, 4 species, in alcohol, and 1 Sable skin, from Maine; 52 skulls and skeletons, 23 species, from Maine.

VERRILL, B. D., Portland, Me. (Gray Fund.) 7 specimens, 3 species, in alcohol, from Norway, Me.

VERRILL, G. W., Norway, Me. (Gray Fund.) 6 specimens, 5 species, in alcohol, from Norway.

Report on Birds, by A. E. VERRILL.

During the past year nearly the whole alcoholic collection of birds has been unpacked, and rearranged in kegs, barrels, and jars, with new alcohol, so that they are now in a comparatively safe condition. A portion of them, amounting to upwards of 3,000 specimens, have been numbered and catalogued, and arranged according to their families. During the year there have been received 52 lots, comprising 2,274 specimens, representing 453 species, of which 223 are foreign and the rest, American. The sources from which these additions have been received, are as follows:—

AGASSIZ, Prof. L. 4 embryos, in alcohol, from Nahant, Mass.

ALLEN, J. A., Student in the Zoölogical Department of the Scientific School. 29 birds, 20 species, in alcohol, 2 skins, 2 species, from Malden, Mass.; 337 birds, 60 species, 107 eggs, 25 species, in alcohol, 4 skins, 3 species, from Springfield, Mass.; 4 birds, 1 species, fresh, from Cambridge, Mass.; 60 birds, 20 species, in alcohol, from Saxonville, Mass.

ANTICOSTI EXPEDITION. Messrs. Hyatt, Shaler, and Verrill, Graduates of the Zoölogical Department of the Scientific School. 347 birds, 70 species, in alcohol, from Anticosti and Labrador.

AQUARIAL GARDENS, Boston. J. A. Cutting. 3 birds, 3 species, fresh, from New England; 3 birds, 3 species, fresh, from Africa.

BICKMORE, A. S., Student of the Zoölogical Department of the Scientific School. 12 birds, 6 species, in alcohol, from Bermuda.

BOARDMAN, GEO. A., Milltown, Me. 2 specimens, 1 species, mounted, and 6 rare eggs, 3 species, dry, from Milltown; 19 birds, 7 species, in alcohol, from the Bay of Fundy.

BUCK, S. M., Student in Williams College. 1 Owl skin, from Brookline, Mass.; 43 birds, 15 species, in alcohol, Williamstown, Mass.; 20 birds, 10 species, in alcohol, from White Mountains, N. H.

CHEVER, Capt. W. J., Salem, Mass. 9 birds, 5 species, in alcohol, from the Indian Ocean.

COOKE, CALEB, Student in the Zoölogical Department of the Scientific School. 64 birds, 49 species, in alcohol, from Zanzibar, Africa, (Gray Fund).

FINOTTI, Rev. J. M., Brookline, Mass. 1 Macaw, mounted.

HAMLIN, Prof. CHAS. E., Waterville, Me. 350 birds, 80 species, in alcohol, and 50 eggs, 16 species, from Waterville.

LYMAN, THEODORE, Boston, Assistant of the Museum. 60 birds, 38 species, in alcohol, from Geneva; 131 birds, 58 species, in alcohol, from Italy.

MARQUIS OF LOUSADA, H. B. M. Consul in Boston. 1 Bald Eagle, fresh.

MACKINTOSH, H. S. 1 Bittern.

MANN, HORACE, Student in the Zoölogical Department of the Scientific School. 12 birds, 9 species, in alcohol, from Minnesota.

NILES, W. H., Student in the Zoölogical Department of the Scientific School. 29 birds, 17 species, in alcohol, from Worthington, Mass.

NORMAL SCHOOL, Salem, Mass. In exchange, 2 birds, 2 species, from Africa.

PIERCE, H. A., Boston. 37 birds, 34 species, in alcohol, from Hakodadi, Japan. Collected by A. A. Smith.

PUTNAM, Miss E. M., Salem, Mass. 10 birds' skins, 9 species, from Para, S. A.

PUTNAM, F. W., Student in the Zoölogical Department of the Scientific School. 7 birds, 5 species, in alcohol, from Warwick, Mass.

RICH, J. G., Upton, Me. (Gray Fund.) 26 birds, 18 species, in alcohol, from Upton.

SCUDDER, Rev. D. C. 3 birds' skins, 3 species, from the Indian Ocean.

SHED, WM. B., Malden, Mass. 1 Black Hawk, fresh, from Malden.

SHURTLEFF, C. A., Student in the Zoölogical Department of the Scientific School. 1 young Grouse, fresh, Brookline, Mass.

SHUTE, J. G., Woburn, Mass. 36 birds, 11 species, in alcohol, and 29 eggs, 9 species, from Woburn.

SMITH, S. I., Norway, Me. 64 birds, 42 species, in alcohol, and 46 eggs, 14 species, from Norway.

TENNEY, Prof. S., Cambridge, Mass. 32 birds, 15 species, in alcohol, from Massachusetts.

VERRILL, A. E., Graduate of the Zoölogical Department of the Scientific School. 97 birds, 66 species, in alcohol, and 9 skeletons, 8 species, from Norway, Me.

VERRILL, B. D., Norway, Me. (Gray Fund.) 60 birds, 28 species, in alcohol, from Norway.

VERRILL, G. W., Norway, Me. (Gray Fund.) 76 birds, 33 species, in alcohol, from Norway.

WARE, FRED., Cambridge, Mass. In exchange, 13 birds' eggs, 9 species, dry, from Massachusetts.

WYMAN, Prof. J., Cambridge, Mass. 19 birds, 13 species, in alcohol, from Uruguay River, S. A.

There have been sent from the Museum, during the year, the following collections, in exchange:—

BOARDMAN, GEO. A., Milltown, Me. 2 bird skins, 2 species.

SLACK, Dr. J. H., Philadelphia, Pa. 26 birds' eggs, 11 species.

SMITHSONIAN INSTITUTION. 5 birds, 3 species, in alcohol.

Report upon the Collection of Reptiles, by F. W. PUTNAM.

During the past year much has been done to further the increase and to perfect the arrangement of this department of the Museum. Thirty-six donations have been received, amounting to seven hundred and nine specimens, consisting of one hundred and seventy-four different species, ninety-four of which were not before in the collection.

The most important collections received are one from Professor Martins, Director of the Museum of Montpellier, comprising twenty-eight identified species, from France, Switzerland and Algeria, and another from Mr. C. Cooke, at Zanzibar, Africa, which is very rich in Batrachians, twenty-six species, out of forty-five received, belonging to the group of Frogs and Toads. Dr. E. Schmidt, of Japan, has kindly sent to the Museum two living specimens of the gigantic Salamander of Japan. All the Ophidians have been catalogued and temporarily arranged in large jars, according to their respective faunæ, a series having been set apart for the Systematic Collection; this is now ready to be exhibited in the galleries as soon as there is room in the Museum for that purpose, but until then, it will be necessary to leave them in the cellar.

The Saurians have also been catalogued, and those not lent to Professor Baird and Mr. Cope, have been arranged in one of the cases in the north-eastern exhibition room.

A series of all the Ophidians in the collection has been sent to Professor Jan, of Milan, for investigation. The specimens of West India Reptiles, and a group of the Saurians, from various localities, have also been lent to Mr. E. D. Cope, of Philadelphia.

Many of the North American Batrachians and Saurians, belonging to the Museum, are still in the hands of Professor Baird, of the Smithsonian Institution, who is engaged in writing a Catalogue of the North American Reptiles. To Professor Alex. Ecker, of the Museum of Freiburg, there have been transmitted one hundred and ninety-five specimens, consisting of twenty species, in exchange for other zoological specimens.

To the Free Public Museum, of Liverpool, there have been sent in exchange, twenty-five specimens, representing eighteen species.

List of the Additions to the Herpetological Collection.

ALLEN, J. A., Student of the Zoölogical Department of the Scientific School. 66 specimens, 16 species, from Springfield.

ANTICOSTI EXPEDITION, Messrs. Hyatt, Verrill, and Shaler, Graduates of the Zoölogical Department of the Scientific School. 15 specimens, 5 species, from Breton Island, N. S., and Mingan, Lab.

AVILES, J. M., Cienfuegos, Cuba. A living Crocodile, from Cuba.

CHAPLIN, Mrs. Dr., Cambridge. A nest of 22 young Tropidonotus Sipedon, and 2 specimens, 2 species, from Cambridge.

CUTTING, J. A., Boston Aquarial Gardens. 2 specimens, 2 species, from Florida.

EAMES, H. H., Cambridge. 24 specimens, 4 species, from Cambridge.

EDMANDS, Miss A. M., Cambridge. 8 specimens, 4 species, from Bethel, Me.

FITCH, Miss C. M., Bedford. 16 specimens, 9 species, from Bedford.

GARDNER, Mrs. FRANCIS, Boston. A specimen of Siredon, from Pike's Peak.

HEWINS, CHARLES A., Roxbury. A living Salamander, from West Roxbury.

HEGLER, ———, (through A. S. Bickmore.) A Lizard, from Turks Island.

LYMAN, T., Boston, Assistant of the Museum. 26 specimens, 5 species, from Paris, Florence and Switzerland.

MACKINTOSH, Miss S., Boston. 2 specimens, 2 species, from West Compton, N. H.

MÜLLER, Dr. F., Melbourne, Australia. 2 specimens, 2 species, from Australia.

NILES, W. H., Student in the Zoölogical Department of the Scientific School. 51 specimens, 7 species, from Leyden and Worthington.

PACKARD, A. S., Jr., Student in the Zoölogical Department of the Scientific School. A Diadophis from Braintree.

PIERCE, H. A. Collected by A. A. Smith, Japan. A snake from Hakodadi, Japan.

PUTNAM, Miss A. L., Salem. 3 specimens, 3 species, from North Conway, N. H.

PUTNAM, F. W., Student in the Zoölogical Department of the Scientific School. 70 specimens, 12 species, from Warwick.

PUTNAM, WM. S., U. S. N. 2 specimens, 2 species, from Lower Guinea, W. Coast of Africa.

SARGENT, J. D., Nassau, New Providence. 14 specimens, 4 species, from the Bahamas.

SCHMIDT, Dr. E. 2 living specimens of Sieboldia maxima, from Japan.

SCUDDER, S. H., Graduate of the Zoölogical Department of the Scientific School. 2 specimens, 2 species, from New Braunfels, Texas; a specimen of *Rana* sp? from Hermit Lake, White Mountains.

SHUTE, JAMES G., Woburn. 9 specimens, 4 species, from Woburn.

SMITH, S. I., Norway, Me. 4 specimens, 4 species, from Norway.

STERNBERGH, J. H., and C. F. DAVIS, Panama, N. G. 4 specimens, 4 species, from Panama.

TENNEY, Professor S., Cambridge. A specimen of *Tropidonotus sirtalis*, with 43 young, from Bolton.

UNKNOWN DONORS. A Salamander, from Wilmington, Del.; 3 specimens, 3 species, from the East Indies.

UPTON, D. P. A specimen of *Pelamis*, captured on the voyage from San Francisco to Calcutta.

VERRILL, A. E., Graduate of the Zoölogical Department of the Scientific School. 7 specimens, 5 species, from Norway, Me.

WYMAN, Professor J., Cambridge. 21 specimens, 11 species, from Surinam and Uruguay, S. A.

In Exchange.

ESSEX INSTITUTE, Salem. 4 Lizards, from Zanzibar, Africa, collected by E. D. Ropes; 1 Python, from the East Indies, collected by Capt. Wm. Crandall; 25 Ophidians, 15 species, from South America, Africa and the East Indies.

LYCEUM OF NATURAL HISTORY, Williams College. 34 specimens, 8 species, from Williamstown.

MARTINS, Professor, Zoölogical Museum of Montpellier. 69 specimens, 28 species, from France, Switzerland and Algeria.

NORMAL SCHOOL, Salem. 9 specimens, 7 species, from Zanzibar, Africa, collected by Capt. Ashby.

Gray Fund.

COOKE, C., Student in the Zoölogical Department of the Scientific School. 177 specimens, 45 species, from Zanzibar, Africa.

HOLDER, Dr. J. B., U. S. A., Fort Jefferson, Florida. 4 specimens, 3 species, from Tortugas, Fla.

Report upon the Class of Fishes, by F. W. PUTNAM.

The total number of specimens added to the department of Ichthyology, during the past year, amount to two thousand seven hundred and seventy-nine, consisting of three hundred and seventy-nine species, of which about two hundred are new

to the collection. The small addition of new species shows that our collection has reached a point of completeness when a further increase becomes very slow. Among the additions which are of special value, are those received, through exchange, from Prof. Martins, Director of the Zoölogical Museum of Montpellier, and from Mr. T. J. Moore, of the Free Public Museum of Liverpool, which, with the fine collection made at Nice, by Mr. J. Burkhardt, and that made by Mr. T. Lyman, in various parts of Italy and Switzerland, afford the means of comparison between many of the European species and their representatives in our own waters. The collection made by Mr. A. S. Bickmore, at the Bermudas, is important as showing the close relation existing between the fishes of those waters and the species found about the coast of Florida.

The invoices received from Mr. C. Cooke, of Zanzibar, contained a number of interesting forms and many species that were new to the collection.

We regret, deeply, that nearly all the fishes contained in the collection just received from Capt. W. H. A. Putnam, which was made at Mexillones, Peru, should have arrived in a decayed condition, owing to the oxydation of the cans sent to him, and the consequent loss of most of his alcohol. The few specimens that were saved and the skeletons that have been restored from the mass of decayed matter, are, however, of the greatest value, as they represent genera not before contained in the Museum.

The Museum is much indebted to Mr. E. W. Rollins, for a specimen of a most singular and hitherto unknown fish, taken off the Grand Banks, and given to him, while in Provincetown, by the fishermen by whom it was caught. We are also indebted to Mr. Newton Dexter, for the interest he has shown in the Museum, by procuring for it a living specimen of a very rare fish, caught by Mr. Charles Adams, in the Narraganset Bay.

The work of cataloguing and arranging the fishes, has been carried on with little interruption during the past year. A few families have been placed, temporarily, in some of the cases in the north-eastern exhibition room, but until the building is so enlarged as to allow space for the display of alcoholic specimens, the collections of this class, with a few exceptions, must remain stored in the cellar.

During the year a few of the duplicate specimens of the families that have been catalogued, have been sent, in exchange for other specimens, to the following institutions:—

Free Public Museum of Liverpool, . . .	38 species,	73 specimens.
British Museum,	12 “	12 “
Jardin des Plantes,	12 “	26 “
Smithsonian Institution,	12 “	18 “
Essex Institute, Salem,	22 “	34 “
Lyceum of Nat. History, Williams College,	47 “	99 “
Anatomical Museum, Cambridge,	14 “	66 “

A list of the donations to this department is herewith transmitted.

AGASSIZ, Professor L. 203 specimens, 26 species, from Nahant, Mass.; 50 preparations of the brains and internal organs of 20 species of marine fishes; 15 injected specimens of 3 species of marine fishes, showing the water system about the head.

ALLEN, J. A., Student of the Zoölogical Department of the Scientific School. 11 specimens, 4 species, from Springfield, Mass.

ANTICOSTI EXPEDITION, Messrs. Verrill, Hyatt, and Shaler, Graduates of the Zoölogical Department of the Scientific School. 258 specimens, 20 species, from about the Island of Anticosti.

BARNARD, JAMES M., Boston. 21 specimens, 5 species, from the Gulf Stream.

BARNUM, P. T., Aquarial Gardens, Boston. 65 specimens, 6 species, from Massachusetts Bay; 12 specimens, 10 species, from Bermuda.

BICKMORE, A. S., Student of the Zoölogical Department of the Scientific School. 3 specimens, 3 species, from off Cape Hatteras; 3 specimens, 1 species, from the Gulf Stream; 370 specimens, 32 species, from Bermuda.

BURKE, Capt. E., bark “Azore.” A specimen of *Trachypterus*, found on the shore at Fayal.

BURKHARDT, J., Cambridge. 185 specimens, 57 species, from Nice, South of France.

CARY, T. G., San Francisco, Cal. 1 *Salmo*, from Lake Bigler, East side of Rocky Mountains; 103 specimens, 27 species, from San Francisco.

CHEVER, Capt. W. J., Salem. 13 specimens, 7 species, from China Seas.

CHAPLIN, Mrs. Dr. 8 specimens, 2 species, from the Gulf Stream.

CUTTING, J. A., Boston Aquarial Gardens. A specimen of *Symnus* from Massachusetts Bay.

DAVIS, C. F., AND J. H. STERNBERGH, Panama, N. G. 5 specimens, 5 species, from Panama.

DEXTER, NEWTON, Providence, R. I. A living specimen of a very rare fish, *Priacanthus altus* Gill, from Narraganset Bay.

EMERSON, G. H., Student of the Scientific School. A fossil fish, from Turner's Falls.

HAMMER, E. C., Danish Consul, Boston. Beak of *Xiphias*.

JOHNSON, ANDREW J. 2 specimens, 2 species, from Aspinwall.

LINDSLEY, R., through Capt. J. ANDERSON, Steamer "Europa." 7 eggs of Sharks and Skates, from Galway Bay, Ireland.

LYMAN, T., of Boston, Assistant of the Museum. 78 specimens, 33 species, from Switzerland and Italy.

MÜLLER, Dr. F., Melbourne, Australia. 13 specimens, 6 species, from Australia.

PACKARD, A. S., Jr., Student of the Zoölogical Department of the Scientific School. A specimen of *Aspidophorus*, dredged at the mouth of the Bay of Fundy.

PIERCE, H. A., of Boston, collected by A. A. Smith, Japan. 18 specimens, 18 species, from Hakodadi, Japan.

PUTNAM, F. W., Student of the Zoölogical Department of the Scientific School. 150 specimens, 8 species, from Warwick, Mass.; 40 preparations of the brains and internal organs of 8 species of fresh water Fishes.

PUTNAM, Capt. W. H. A., Salem. 16 specimens, 8 species, and a number of skeletons of Selachians from Mexillones, Peru.

RICE, J. M., Boston. A specimen of *Chironectes*, from the Gulf Stream.

ROLLINS, E. W., Boston. A specimen of a new fish taken south of the Grand Bank.

ROLLINS, J. R., Lawrence. 5 Uranidea, from the Merrimac River.

SARGENT, J. D., Nassau, New Providence. 38 specimens, 28 species, from the Bahamas.

SCUDDER, S. H., Graduate of the Zoölogical Department of the Scientific School. 4 Uranidea, from Madison Brook, White Mountains.

UNKNOWN DONORS. 2 Domesticated Goldfish, from the East Indies; 1 *Prionotus*, from Massachusetts Bay.

Miss ———. A young *Holocentroid*, taken 200 miles off the coast of Chili.

VERRILL, A. E., Graduate of the Zoölogical Department of the Scientific School. 10 specimens of a species of *Osmerus*, from Pennessew-asse Pond, Norway, Me.

WYMAN, Professor J., Cambridge. 86 specimens, 23 species, from Surinam, and the Uruguay River, S. A.

In Exchange.

ESSEX INSTITUTE, Salem. 76 specimens, 29 species, from Zanzibar, Africa, collected by E. D. Ropes; 8 specimens, 6 species, from Buenos Ayres, S. A., collected by Dr. R. H. Wheatland; 2 specimens, 2 species, from Salem Harbor, collected by Dr. R. H. Wheatland; 3 specimens, 3 species, from Michigan, collected by Prof. Miles.

FREE PUBLIC MUSEUM OF LIVERPOOL, ENG. 24 specimens, 5 species, from the English Coast, collected by T. J. Moore.

LYCEUM OF NATURAL HISTORY, WILLIAMS COLLEGE, MASS. 246 specimens, 11 species, from Williamstown, Mass., collected by S. M. Buck.

MARTINS, Professor, Zoölogical Museum at Montpellier, France. 41 specimens, 26 species, from the Mediterranean.

NORMAL SCHOOL, Salem. 31 specimens, 9 species, from Zanzibar, Africa, and the South Atlantic, collected by Capt. Ashby.

Gray Fund.

COOKE, CALEB, Student of the Zoölogical Department of the Scientific School, 333 specimens, 85 species, from Zanzibar, Africa.

HOLDER, Dr. J. B., U. S. A., Fort Jefferson, Fla. 19 specimens, 10 species, from Tortugas, Fla.

JOHNSON, B., Nahant. 11 specimens, 3 species, from Nahant, (fresh specimens).

POEY, Professor F., Havana, Cuba. 57 specimens, 53 species of Types from Cuba.

RICH, J., Upton, Me. 120 specimens, 7 species, from Lake Umbagog, Me.

Report upon the Collection of Insects, by SAMUEL H. SCUDDER.

In presenting his Annual Report for the year ending October 31, 1862, the assistant in charge of the Entomological Department would congratulate the Director of the Museum upon the very extensive increase of the collections under his charge, the additions, in number of specimens, from the donations of its friends alone, exceeding that from all sources whatsoever,

during any one previous year, unless it be the year of its foundation, and the total amount equalling at least the additions which have been made since the foundation of the building was laid.

It will be seen by the Schedule accompanying this Report, wherein the additions received during the year have been recorded, that the additions received by donation amount to 2,053 species, represented by 6,792 specimens; that those received through the Gray Fund number 1,941 species and 6,036 specimens; and that those obtained by exchange reach the sum of 2,568 species and 11,354 specimens, making a total of 6,562 species and 24,182 specimens. These numbers should only be taken as approximate, because an actual enumeration of the specimens was scarcely possible, and a careful determination of the species would be the work of many years.

With regard to these collections, I should like to call attention:—

First.—To some of the collections important from their size. Among these may be enumerated—

a. The collection of C. F. Jung, obtained through exchange with Professor Chadbourne, consisting of about 11,000 specimens and nearly 2,500 species, from different localities in Sweden, all of which are arranged, and about half of them determined.

b. The labelled collections of European Insects, obtained through the Gray Fund, from Dr. Imhoff, amounting to 934 species and 3,045 specimens.

c. A large cabinet of Brazilian Insects, received from Mrs. L. I. Munroe, which number 800 species and 2,219 specimens.

d. The collections forwarded from Zanzibar, by C. Cooke, and received through the Gray Fund, a mixed collection of 733 species and 2,170 specimens.

e. A lot received through the Gray Fund, from S. I. Smith, collected in Maine, of 267 species and 780 specimens.

Second.—To some of the collections interesting from their nature, among which may be mentioned—

a. Type specimens of 28 species of Hymenoptera, described and presented by E. Norton.

b. Type specimens of 14 species of Orthoptera, described and presented by S. H. Scudder.

c. Some fine series of the different stages of a number of our native ants and bees, from Miss A. M. Edmands.

d. A small collection of insects, from the alpine and sub-alpine summits of the White Mountains, N. H., from S. H. Scudder.

The work upon the final arrangement of the collection has been commenced this year, and considerable progress may be reported. This task has been completed only so far as the arrangement of the families of Pieridæ and Bombycidæ among Lepidoptera are concerned, the former by Mr. S. H. Scudder, the latter by Mr. A. S. Packard, Jr., both of whom have spent much time upon the special study of these groups. The necessary room for the proper exhibition of these two families alone, has been found to consume already nearly one-fifth of the space at present allotted to the whole collection of Insects. Mr. Scudder has also completed an examination of the Orthoptera sufficient for its new arrangement, and the work thereon is so far advanced as to be nearly completed. Besides these labors, a temporary arrangement has been made of several of the local faunæ, particularly of many of the families of the European and Brazilian Lepidoptera. In addition, the already large and rapidly increasing collection of Insects preserved in alcohol, have all been removed from the cork-closed phials, in which most of them have hitherto been placed, and transferred to glass-stoppered bottles, in fresh alcohol, so as to be now in a condition of entire security from ordinary dangers. Finally, a number of preparations, exhibiting the general structure of Insects by disarticulation, have been made by Mr. C. A. Shurtleff, in part for illustration of his studies upon the structure of the wing in Hexapods; others to exhibit the details of structure among the Bombycidæ, by Mr. Packard; and drawings to show the generic distinctions in the neuration of the wings among Pieridæ, by Mr. Scudder.

This completes the account of the labor which has been bestowed upon the collection, so far as visible results will show, but it may be well to add that Messrs. Norton and Packard have many of the Hymenoptera at present under examination; and also that much attention has been paid to the large numbers of diurnal Lepidoptera, of the Essex Institute, in Salem, lent to the Museum by that institution for investigation, the

duplicates of which, when their arrangement is completed, will come into the possession of the Museum by exchange.

SCHEDULE, *exhibiting the additions made to the Department of Entomology, during the Year 1861-2, not including the 110 cases presented by A. Agassiz.*

AGASSIZ, A., Beverly, Mass., February, 1862; 28 species, 64 specimens Lepidoptera; 1 species, 2 specimens Neuroptera; 1 species, 1 specimen Coleoptera. Nahant, Mass., Sept., 1862; 6 species, 7 specimens Lepidoptera; 1 species, 1 specimen Hymenoptera; 13 species, 2 specimens Diptera; 1 species, 20 specimens (eggs) Neuroptera; 12 species, 15 specimens Arachnida. Total, 63 species, 112 specimens.

ALLEN, J. A., Springfield, Mass., September, 1862; 142 specimens Lepidoptera, 239 specimens Coleoptera, 85 specimens Neuroptera, 39 specimens Orthoptera, 28 specimens Hemiptera, 22 specimens Hymenoptera, 13 specimens Diptera, 13 specimens Arachnida, 1 specimen Myriapoda. Total, 584 specimens.

BARNARD, J. M., China, December, 1861; 15 species, 130 specimens Coleoptera; 31 species, 122 specimens Lepidoptera; 5 species, 55 specimens Hemiptera; 5 species, 28 specimens Hymenoptera; 5 species, 13 specimens Orthoptera; 2 species, 4 specimens Neuroptera; 1 species, 1 specimen Arachnida. Zanzibar, October, 1862; 1 species, 6 specimens Arachnida; 3 species, 3 specimens Myriapoda. Total, 68 species, 362 specimens.

BICKMORE, A. S., Bermudas, September, 1862; 61 specimens Orthoptera; 2 specimens Lepidoptera; 1 species, 1 specimen Hymenoptera; 2 specimens Arachnida. Total, 66 specimens.

BRIDGHAM, Mrs., Seekonk, Mass., October, 1862; 59 species, 94 specimens Lepidoptera.

CHEVER, Capt. W. J., Indian Ocean, October, 1862; 1 species, 1 specimen Myriapoda.

DAVIS, C. F., Panama, June, 1862; 3 species, 3 specimens Coleoptera; 2 species, 5 specimens Orthoptera; 2 species, 5 specimens Arachnida. Total, 7 species, 13 specimens.

EDMANDS, Miss A. M., Warwick, Mass., September, 1862; 3 species, 500 specimens Aphids; 8 species, 550 specimens Formica; 1 species, 30 specimens (eggs) Lepidoptera; 150 specimens Coleoptera, 150 specimens Lepidoptera, 200 specimens Orthoptera, 125 specimens Neuroptera, 75 specimens Hymenoptera, 50 specimens Hemiptera, 50 specimens Diptera, 50 specimens Myriapoda. Total, 1,930 specimens.

EDWARDS, W. H., Bahia, Brazil and Honduras, February, 1862; 19 species, 30 specimens Lepidoptera.

FIELD, Capt. T. T., October, 1862; 1 species, 1 specimen Orthoptera.

LYMAN, T., Alps, Switzerland, November, 1861; 2 species, 3 specimens Lepidoptera; 1 species, 1 specimen Orthoptera. Florence, October, 1862; 1 species, 6 specimens Coleoptera; 1 species, 1 specimen Myriapoda. Total, 5 species, 11 specimens.

MÜLLER, Dr. F., Melbourne, Australia, February, 1862; 2 species, 25 specimens Lepidoptera; 3 species, 3 specimens Orthoptera; 1 species, 7 specimens (nests) Hymenoptera; 1 species, 1 specimen Neuroptera; 4 species, 16 specimens Arachnida; 1 species, 1 specimen Myriapoda. Total, 12 species, 52 specimens.

MUNROE, Mrs. L. I., Rio Janeiro, Brazil, September, 1862; 1,211 specimens Coleoptera, 43 specimens Neuroptera, 48 specimens Hymenoptera, 171 specimens Hemiptera, 25 specimens Diptera, 624 specimens Lepidoptera, 88 specimens Orthoptera, 9 specimens Arachnida. Total, 2,219 specimens.

NILES, W. H., Worthington, Mass., September, 1862; 69 specimens Lepidoptera, 13 specimens Orthoptera, 12 specimens Coleoptera, 5 specimens Hemiptera, 4 specimens Neuroptera, 7 specimens Arachnida. Total, 110 specimens.

NORTON, E., Various localities, November, 1861; 19 species, 47 specimens Hymenoptera. June, 1862; 9 species, 15 specimens Hymenoptera. Total, 28 species, 62 specimens.

ORDWAY, Lieut. ALBERT, Newbern, N. C., October, 1862; 3 species, 10 specimens Coleoptera.

PACKARD, A. S., Jr., Brunswick, Me., October, 1862; 138 specimens Lepidoptera, 13 specimens Orthoptera, 129 specimens Coleoptera, 20 specimens Hemiptera, 34 specimens Diptera, 14 specimens Neuroptera, 20 specimens Hymenoptera, 7 specimens Arachnida. Total, 375 specimens.

SCUDDER, Rev. D. C., Madura, India, February, 1862; 6 species, 9 specimens Lepidoptera. Periaculum and Pulney Hills, October, 1862; 8 species, 8 specimens Lepidoptera. Total, 14 species, 17 specimens.

SCUDDER, S. H., China, November, 1861; 11 species, 17 specimens Lepidoptera. January, 1862; 3 species, 4 specimens Lepidoptera; 2 species, 2 specimens Orthoptera; 6 species, 12 specimens Hemiptera. Various localities, January, 1862; 1 species, 2 specimens Orthoptera; 2 species, 2 specimens Hemiptera. Various localities in N. A., September, 1862; 14 species, 65 specimens Orthoptera. White Mountains, N. H., October, 1862; 18 species, 36 specimens Lepidoptera; 10 species, 22 specimens Coleoptera; 6 species, 10 specimens Hymenoptera; 11 species, 30 specimens Neuroptera; 9 species, 13 specimens Hemiptera; 3 species, 15 specimens Orthoptera; 11 species, 13 specimens Diptera. Total, 107 species, 243 specimens.

SHURTLEFF, C. A., Cambridge, Mass., November, 1861; 3 species, 18 specimens Coleoptera; 2 species, 6 specimens Diptera; 2 species, 15 specimens Lepidoptera; 1 species, 2 specimens Orthoptera; 1 species, 25 specimens Hemiptera; 1 species, 12 specimens Hymenoptera. Brookline, Mass., December, 1862; 46 species, 70 specimens Lepidoptera; 17 species, 23 specimens Coleoptera; 2 species, 2 specimens Neuroptera; 1 species, 1 specimen Hemiptera. Total, 76 species, 174 specimens.

SHUTE, J. G., Woburn, Mass., September, 1862; 8 species, 8 specimens Lepidoptera; 2 species, 2 specimens Coleoptera; 1 species, 1 specimen Hymenoptera; 1 species, 1 specimen Diptera. October, 1862; 36 species, 43 specimens Coleoptera; 4 species, 4 specimens Lepidoptera; 4 species, 4 specimens Hemiptera; 5 species, 5 specimens Neuroptera; 1 species, 2 specimens Hymenoptera; 1 species, 1 specimen Orthoptera; 1 species, 1 specimen Arachnida. Total, 64 species, 72 specimens.

SMITHSONIAN INSTITUTION, N. America, June, 1862; 92 species, 138 specimens Coleoptera.

STEARNS, Mrs., Bombay, India, September, 1862; 24 species, 38 specimens Lepidoptera; 1 species, 1 specimen Diptera. Total, 25 species, 39 specimens.

STERNBERGH, J. H., Panama, June, 1862; 3 species, 8 specimens Hymenoptera; 3 species, 3 specimens Coleoptera; 2 species, 2 specimens Orthoptera; 1 species, 1 specimen Lepidoptera; 2 species, 2 specimens Arachnida; 2 species, 7 specimens Myriapoda. Total, 13 species, 23 specimens.

WAUSEY, GEORGE, Syracuse, N. Y., October, 1862; 1 species, 50 specimens Hymenoptera.

WYMAN, Prof. J., Uruguay River, S. A., November, 1861; 1 species, 2 specimens Coleoptera; 1 species, 1 specimen Orthoptera; 1 species, 1 specimen Arachnida. Total, 3 species, 4 specimens.

Total by Donation, 2,053 species, 6,792 specimens.

By Exchange.

CHADBOURNE, Prof. P. A. The collection of C. F. Jung, Sweden, April, 1862; 1,695 species Hymenoptera, 485 species Hemiptera, 150 species Orthoptera, 116 species Diptera. Total, 2,446 species, 11,000 specimens.

ESSEX INSTITUTE. Duplicates of the collection of E. D. Ropes, Zanzibar, November, 1861; 15 species, 33 specimens Orthoptera; 12 species, 14 specimens Coleoptera; 7 species, 8 specimens Lepidoptera; 1 species, 1 specimen Hemiptera; 10 species, 60 specimens Hymenoptera; 6 species, 7 specimens Neuroptera; 3 species, 3 specimens Diptera; 14

species, 35 specimens Arachnida; 1 species, 2 specimens Myriapoda. Total, 69 species, 163 specimens.

NORMAL SCHOOL, Salem. Duplicates of the collection of Capt. Ashby, Zanzibar, December, 1861; 9 species, 12 specimens Coleoptera; 15 species, 30 specimens Orthoptera; 5 species, 100 specimens Hemiptera; 4 species, 5 specimens Neuroptera; 8 species, 20 specimens Hymenoptera; 4 species, 5 specimens Lepidoptera; 3 species, 5 specimens Diptera; 1 species, 13 specimens Arachnida; 2 species, 3 specimens Myriapoda. Total, 53 species, 91 specimens.

Total by Exchange, 2,568 species, 11,354 specimens.

Secured with the Gray Fund.

From JOHN AKHURST, Brooklyn, N. Y., May, 1862; 7 species, 41 specimens Lepidoptera.

From CALEB COOKE, Zanzibar, March, 1862; 10 species, 200 specimens Hemiptera; 10 species, 26 specimens Orthoptera; 12 species, 25 specimens Coleoptera; 5 species, 10 specimens Hymenoptera; 4 species, 4 specimens Diptera; 3 species, 4 specimens Neuroptera; 1 species, 1 specimen Lepidoptera; 12 species, 20 specimens Arachnida; 2 species, 10 specimens Myriapoda. May, 1862; 400 specimens Coleoptera, 350 specimens Orthoptera, 400 specimens Hymenoptera, 150 specimens Hemiptera, 100 specimens Diptera, 50 specimens Neuroptera, 30 specimens Lepidoptera, 350 specimens Arachnida, 40 specimens Myriapoda. Total, 733 species, 2,170 specimens.

From Dr. IMHOFF, Basle, Switzerland, December, 1862; 45 species, 203 specimens Coleoptera; 13 species, 28 specimens Lepidoptera; 73 species, 365 specimens Hemiptera; 45 species, 186 specimens Diptera; 1 species, 8 specimens Orthoptera; 15 species, 100 specimens Neuroptera; 42 species, 109 specimens Hymenoptera. April, 1862; 118 species, 429 specimens Hymenoptera; 60 species, 254 specimens Diptera; 45 species, 124 specimens Lepidoptera; 27 species, 102 specimens Coleoptera; 26 species, 96 specimens Hemiptera. May, 1862; 424 species, 907 specimens Coleoptera; 47 species, 134 specimens Lepidoptera. Total, 934 species, 3,045 specimens.

From S. I. SMITH, Norway, Me., March, 1862; 112 species, 432 specimens Coleoptera; 88 species, 159 specimens Lepidoptera; 27 species, 98 specimens Hymenoptera; 12 species, 34 specimens Hemiptera; 9 species, 21 specimens Orthoptera; 7 species, 20 specimens Neuroptera; 12 species, 16 specimens Diptera. Total, 267 species, 780 specimens.

Total by Gray Fund, 1,941 species, 6,036 specimens. Grand total, 6,562 species, and 24,182 specimens.

Annulata, by A. AGASSIZ.

In Annelids, the additions since the collection has been catalogued, have not been numerous, containing only 49 species, represented by about 400 specimens. The collection of Mr. C. Cooke, made at Zanzibar, added, however, several species to those already on hand. Mr. F. W. Putnam collected a few worms in the Western part of the State. Mr. Burkhardt and Prof. Martins, of Montpellier, and Mr. T. Lyman, have sent, also, a few Annelids from Italy. Mr. Bickmore collected at the Bermudas five or six species of Annelids; this, with the exception of a small collection of our common sea-worms made at Nahant, by A. Agassiz, and a dozen species of intestinal worms found in fishes presented by Prof. Agassiz, completes the additions to the collection of Worms.

A small collection of Annelids, containing 14 species, and numbering about 70 specimens, has been sent from the Museum to Prof. Chadbourne, to assist him in giving his instruction.

A collection of Annelids is expected from Prof. Schmarda, of Vienna, containing original specimens of all the species described by him.

Annelids Received.

C. COOKE, Zanzibar, 10 species.

F. W. PUTNAM, Warwick, 2 species.

J. BURKHARDT, Nice, 1 species.

T. LYMAN, 1 species.

Prof. MARTINS, 1 species.

T. G. CARY, 1 species.

A. S. BICKMORE, Cape Cod, 2 species; Bermudas, 3 species.

A. AGASSIZ, Nahant, 7 species.

L. AGASSIZ, Nahant, 11 species.

LIVERPOOL FREE MUSEUM, 10 species.

Total number of species, 49.

Report on the Echinoderms, by A. AGASSIZ.

During the past year the fossil Echini have been entirely arranged and catalogued. Owing to want of room to display the collection, it has been placed in drawers, which have been heaped up in the cases of the gallery of the lecture room. The

number of entries made for the fossil Echini is over 2,500. The recent Echini have also been well advanced, the Echinoids, which are by far the greater portion of the collection, being nearly arranged. About 1,000 entries have been made in this portion of the Catalogue. Mr. A. S. Bickmore has arranged the true Starfishes, and has made a great number of preparations; he has made about 1,500 entries in the Catalogue of the Starfishes. Mr. N. Bowditch continued the Catalogue of Holothurians, commenced by A. Agassiz; after his departure it was completed by Mr. Agassiz. About 600 entries have been made in the catalogue. Mr. Agassiz has also made a number of preparations of Echini, to illustrate their generic differences. The additions to the collection of Echinoderms, have been numerous and valuable, especially with reference to their geographical distribution, quite extensive faunal collections having been received from Zanzibar, collected by Messrs. Ropes, Webb, Capt. Ashby and C. Cooke; and from the Bermudas, collected by Mr. Hammond and Mr. A. S. Bickmore; from the West Coast of North America, collected by Col. Jewett, Mr. J. H. Wilson, and Mr. T. G. Cary; from the English Coast, through the Liverpool Free Museum and Capt. Anderson; from Mexilones, on the coast of Peru, through Capt. Putnam.

Many very valuable accessions have been obtained by exchange with the Essex Institute, the Normal School of Salem, and the Academy of Natural Sciences of Philadelphia, as also from Key West, through Dr. Holder, and from Nice, through Mr. Burkhardt and Prof. Martins; and from Nahant, the larvæ of our common Starfishes and Sea Urchins, collected by A. Agassiz. By far the greater proportion of the additions were species which were new to the collection.

Collections of Echinoderms have been sent, in exchange, to the Liverpool Free Museum, 26 species; to the British Museum, 4 species; to the Jardin des Plantes, 45 species; to the Essex Institute, 66 species; to Prof. Chadbourne, 67 species; and to the Academy of Natural Sciences in Philadelphia, 114 species.

Echinoderms received from October 30, 1861, to October 30, 1862.

E. D. ROPES and WILLIAM WEBB, Zanzibar, 18 species.

C. COOKE, Zanzibar, 35 species.

Capt. ASHBY, Zanzibar, 1 species.

J. H. WILSON, California, 1 species.

Col. JEWETT, North West Coast, 10 species.

LIVERPOOL FREE MUSEUM, English Coast, 7 species.

Dr. J. B. HOLDER, Florida, 4 species.

A. A. SMITH, Japan, 1 species.

ESSEX INSTITUTE, Salem, in exchange, 29 species.

ACADEMY OF NATURAL SCIENCES, Philadelphia, in exchange, 17 species.

J. BURKHARDT, Nice, 6 species.

MARTINS, Nice, 1 species.

A. S. BICKMORE, Bermudas, 5 species.

H. HAMMOND, Bermudas, 3 species.

A. AGASSIZ, Nahant, 5 species.

Capt. W. H. A. PUTNAM, Mexillones, 7 species.

Making, in all, 155 species and more than 600 specimens. The portion of the collection of Echinoderms which is in bottles, has been placed in the N. E. Room, for exhibition.

Report on the Acalephs, by A. AGASSIZ.

In the class of Acalephs, Prof. Clark has catalogued the alcoholic collection, and it has been placed temporarily in the cases of the N. E. Room. The additions to the Acalephs have not been numerous. With the exception of the collections made at Nahant, by A. Agassiz and Prof. Clark, and a small collection from the Bermudas by Mr. Bickmore, there have only been a few species presented by the Normal School, and some others by Mr. Cary, of San Francisco. The Liverpool Free Museum sent a number of Hydroids alive, and from the Gray Fund were obtained the specimens collected at Zanzibar by Mr. C. Cooke. A small collection was sent to Prof. Chadbourne, to illustrate his lectures upon the Class of Acalephs.

The total number of species received is 33, of which many were new to the collection. The number of species sent in exchange was 10.

A large number of new species of Medusæ, no less than 22, has been added to the Catalogue of the Acalephs of our coast, by A. Agassiz.

Acalephs Received.

NORMAL SCHOOL, Salem, 2 species.

T. G. CARY, San Francisco, 1 species.

A. S. BICKMORE, Bermudas, 6 species; Cape Cod, 2 species.

Prof. CLARK, Nahant, 10 species.

C. COOKE, Zanzibar, 1 species.

LIVERPOOL FREE MUSEUM, 3 species.

A. AGASSIZ, Nahant, 16 species.

Total number of species, 41.

Report on Polyps, by A. E. VERRILL.

The identification and arrangement of the Corals have been continued, during the past year, while considerable time has been devoted to revising their classification and synonymy. The number of specimens that have been identified, labelled and catalogued, is 3,123, or about one-fourth of the entire collection. The additions to this department have been numerous and important. The whole number received, including both alcoholic and dry specimens, is 788, representing 150 species, many of which were new to the collection. These have come in 22 lots, from the following sources:—

ANDERSON, Capt. J., Steamer "Europa," 5 corals, 1 species, from Bermuda; 26 corals, 9 species, from Singapore.

ANTICOSTI EXPEDITION, Messrs. Hyatt, Shaler, and Verrill, Graduates of the Zoölogical Department of the Scientific School. 9 polyps, 3 species, in alcohol, from the Gulf of St. Lawrence.

BICKMORE, A. S., Student in the Zoölogical Department of the Scientific School. 90 corals, 17 species, partly in alcohol, from Bermuda.

BURKHARDT, J., of the Museum of Comparative Zoölogy. 4 corals, 1 species, from Nice.

CARY, T. G., San Francisco, Cal. 1 coral, from the Sandwich Islands.

COOKE, CALEB, Student of the Zoölogical Department of the Scientific School. 41 polyps, 6 species, in alcohol, from Zanzibar, Africa.

ESSEX INSTITUTE, Salem, Mass. In exchange, 44 corals, 9 species, mostly from Zanzibar; 12 specimens, 3 species, from the West Indies.

FREE PUBLIC MUSEUM, Liverpool, England. T. J. Moore, Curator. In exchange, 43 polyps, 2 species, in alcohol, from England.

GARRET, ANDREW, (Gray Fund). 93 corals, 36 species, from the Society Islands.

HAGUE, J. D., New York. 32 corals, 25 species, from the Pacific Ocean.

HAMMOND, H., Brookline, Mass. 7 corals, 7 species, from Bermuda.

HARVARD UNIVERSITY, 37 corals, 19 species, from various localities.

HOLDER, Dr. J. B., 6 specimens, 6 species, from Florida.

LYCEUM OF NATURAL HISTORY, Williamstown, Mass. 249 corals 16 species, mostly from Florida.

MÜLLER, Dr. F., 2 corals, 1 species, from Madagascar.

NORMAL SCHOOL, Salem, Mass. 20 corals, 6 species, from Zanzibar, Africa, collected by Capt. Ashby; 2 specimens, 2 species, from the Indian Ocean.

PICKERING, Capt., and Dr. J. B. HOLDER, 53 corals, 7 species, from Florida.

PUTNAM, Capt. W. H. A., Salem, Mass. 7 polyps, 3 species, in alcohol, from China.

STIMPSON, Dr. WM., Cambridge. 5 polyps, 1 species, in alcohol, from Eastport, Me.

The following collections have been sent away, during the past year, in exchange:—

To Prof. CHARLES E. HAMLIN, Waterville, Me. 27 specimens, 23 species.

LYCEUM OF NATURAL HISTORY, Williamstown, Mass., 138 specimens, 49 species.

In addition to these, several collections have been made up, and are nearly ready to be sent to the following places, viz.:—

STATE NORMAL SCHOOL, Salem, Mass.; ESSEX INSTITUTE, Salem, Mass.; MCGILL COLLEGE, Montreal, Canada; Prof. KRAUSS, Stuttgart, Germany.

OCTOBER 14, 1862.

[B.]

TRUSTEES OF THE MUSEUM OF COMPARATIVE ZOOLOGY.

1863.

- THE GOVERNOR OF THE COMMONWEALTH,
JOHN A. ANDREW.
- THE LIEUTENANT-GOVERNOR,
JOEL HAYDEN.
- THE PRESIDENT OF THE SENATE,
JONATHAN E. FIELD.
- THE SPEAKER OF THE HOUSE OF REPRESENTATIVES,
A. H. BULLOCK.
- THE SECRETARY OF THE BOARD OF EDUCATION,
JOSEPH WHITE.
- THE CHIEF JUSTICE OF THE SUPREME JUDICIAL COURT,
GEORGE T. BIGELOW.

LOUIS AGASSIZ,

WILLIAM GRAY.

JACOB BIGELOW,	NATHANIEL THAYER,
JAMES WALKER,	SAMUEL HOOPER,
GEORGE TICKNOR,	SAMUEL G. WARD,
JAMES LAWRENCE.	

OFFICERS OF THE MUSEUM OF COMPARATIVE ZOOLOGY FOR

1863.

His Excellency JOHN A. ANDREW, Governor of the Commonwealth,
President.

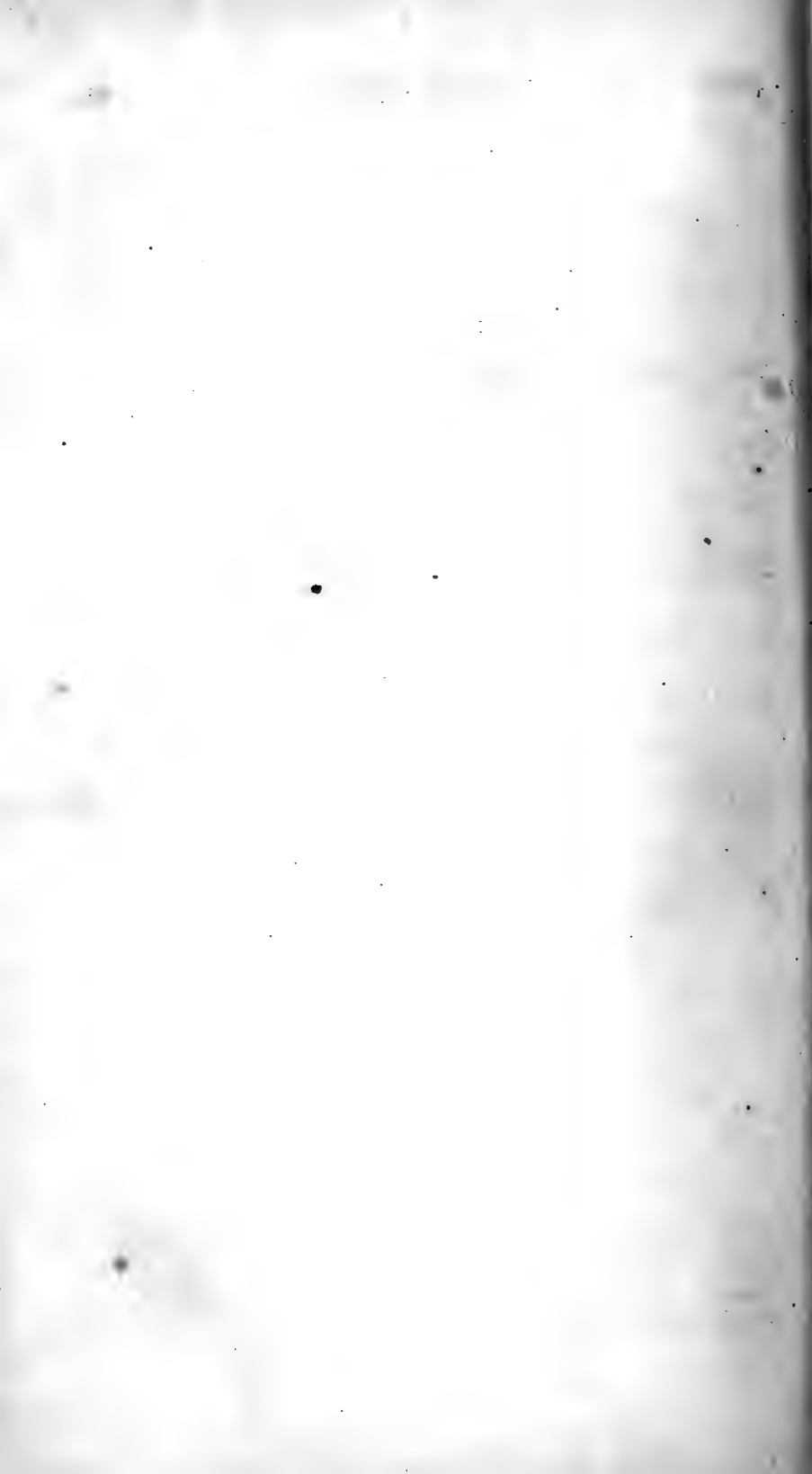
WILLIAM GRAY, *Secretary.*

SAMUEL G. WARD, *Treasurer.*

LOUIS AGASSIZ, *Director of the Museum.*

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

GEORGE TICKNOR, LOUIS AGASSIZ, JACOB BIGELOW, GEORGE T. BIGELOW, *Committee on the Museum.*



ANNUAL REPORT

OF THE

TRUSTEES

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY,

TOGETHER WITH

THE REPORT OF THE DIRECTOR,

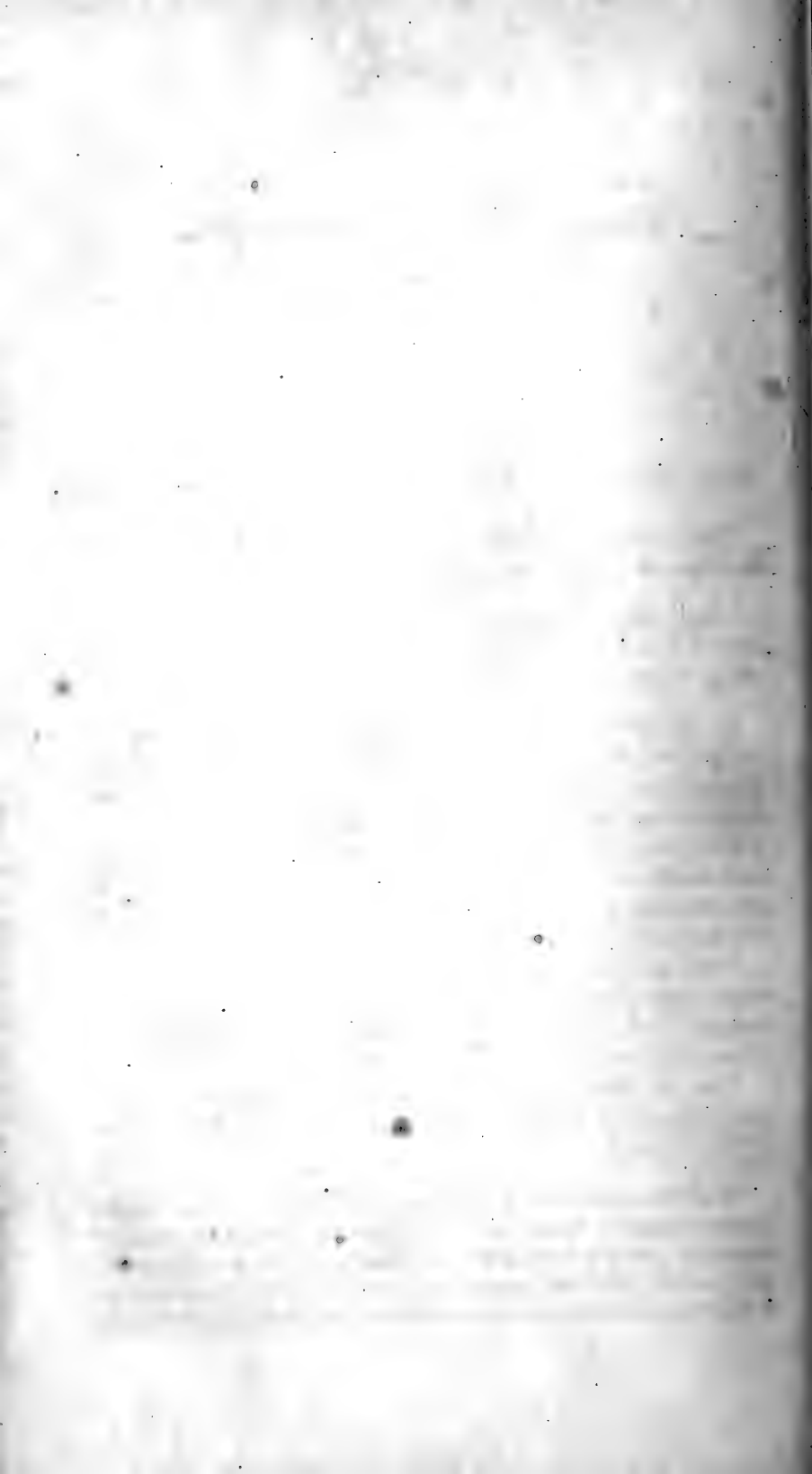
1863.

BOSTON:

WRIGHT & POTTER, STATE PRINTERS,

No. 4 SPRING LANE.

1864.



Commonwealth of Massachusetts.

BOSTON, January 27th, 1864.

To the Honorable the Senate and the House of Representatives :

The Trustees of the Museum of Comparative Zoölogy, on the 28th day of October last, passed this vote :

“ *Voted,* That the Secretary communicate to the legislature the Annual Report of Professor Agassiz, with a statement of the proceedings of this Board, for the year past.”

On the 18th day of April, 1863, a Resolve was passed by the legislature, giving to the Trustees of the Museum the sum of ten thousand dollars, to be applied to the preparation and publication of catalogues, under their direction.

This Board has appropriated one-fourth part of this grant in accordance with its terms, and the balance has been placed on interest, and will be applied in like manner as the work is advanced.

There has been received from the sales of the Back Bay lands, since the last Annual Report, the sum of sixty-seven thousand one hundred and thirty-five and thirty-three one hundredths dollars.

From the report of the Committee on the Museum, I make some extracts in regard to the progress and present condition of the Museum.

“ The collections in the Museum have, since the last Annual Report, greatly increased, chiefly by a well-organized, economical system of exchanges, which is going into more thorough operation every month. Any one who went with care through the institution a year ago, and compares its condition then with its condition now, will not fail to observe

how much it has grown in the interval, not only by the crowded state of the shelves and cases in the halls open to the public, but by the encumbered state of the laboratories, where many hundred boxes full of specimens, already examined, arranged and labelled, are waiting for space in which properly to display them as means of instruction, while as many more specimens preserved in alcohol are packed away in barrels, carefully arranged and labelled, put in the cellar instead of being exhibited in transparent jars as they would be, if there were room in which to do it. The Committee, however, are happy to believe that all these important collections are at least safe both from loss by fire, to which they were long exposed, and from any injury by decay against which skill and forecast can protect them.

“ Equally obvious with the increase of the specimens in the Museum is the proof that a great amount of work has been done during the past year, so as to bring them into exact order, and render them instructive to all who are interested in natural science, or wish to make a study of it. For this purpose, the greater part of the duplicates have been separated from the specimens reserved for teaching;—those that are to be permanently retained have all been identified as to their character and origin, and are marked accordingly;—each specimen of the whole vast number has been so far cared for that it can immediately be found, whether wanted for the purposes of study or for exchange,—and in every division active work is going on for the final catalogue, some portions of which, by means of the liberal appropriations of the Commonwealth, are in course of publication;—many hundred wood-cuts having been finished with their explanations, and many hundreds more being now in the hands of artists. It may reasonably be hoped, therefore, that without any delay, except such as may arise from the nature of the work itself, the contents of the Museum may soon be made interesting and useful to many persons in the State who cannot visit it; while at the same time such a catalogue will do honor to the institution among scientific men everywhere, and gain accessions to its collections, both by the contributions of the friends of progress in knowledge, and by more and more valuable exchanges from the museums of other countries.

“ But besides the great increase of the collections of the Museum, and the important progress made in the catalogue, which are to render these collections accessible and instructive, the institution itself has during the past year been more active than it ever was before as a place of direct, effective teaching. For not only have the usual courses of lectures to undergraduates, to graduates and to school teachers, been continued with their accustomed good results; but courses of lectures open to all, whether connected with the university or not, and delivered by persons not always among its regular officers or instructors, have been

established under academic authority, and begun with excellent promise of success;—three of these courses having been appropriately delivered in the Museum, namely, one by Professor Agassiz, on the natural history of the Cretaceous Period; one by Mr. Samuel Hubbard Scudder, on Entomology; and one by Mr. Alexander Agassiz, upon the Embryology of the Echinoderms,—all depending for their illustrations and success upon the resources to be found in the collections of the Museum. It is believed that this institution could not have effected more during the past year for the progress of sound, exact knowledge in the Commonwealth, than by thus entering earnestly as it has done into this liberal system for teaching all who wish to learn, without injuring what has been their previous training, or what is their present position in society from their intellectual culture.”

The Fifth Annual Report of the Director, which is annexed, marked [A.], gives a statement in detail of the operations at the Museum during the year.

The annexed paper marked [B.], has a list of the names of trustees, officers and standing committees, for the year 1864.

On behalf and in the name of the Trustees,

WM. GRAY, *Secretary.*

[A.]

FIFTH ANNUAL REPORT

Of the Director of the Museum of Comparative Zoölogy, by
LOUIS AGASSIZ.

Before I proceed to give a special account of the operations of the Museum during the past year, permit me to submit to you the plan I adopted for the instruction regularly given in the establishment to the special students of the Lawrence Scientific School in the department of Zoölogy, and to other persons admitted to the lectures delivered in the regular course of our University programme. With reference to the latter, I have nothing particular to add beyond what has already been noticed in former Reports. As usual these lectures have been attended by a large number of public teachers, besides the regular students of the College and of the Scientific School. But during the past year, with the introduction of the system of University courses of lectures, the Museum has received a new accession to its means of usefulness. Mr. Scudder has delivered a special course upon Entomology in the lecture room of the Museum, Mr. A. Agassiz one upon the Embryology of Echinoderms, and I one upon the Natural History of the Cretaceous epoch. I may also mention that on two occasions large delegations of the public teachers from Rhode Island and New Hampshire, numbering upwards of four hundred individuals, have visited the Museum, spending the day in its examination under my guidance and that of the assistants of the establishment. Thus the importance of this kind of instruction is gradually better appreciated in a wider circle; and a knowledge of what is practicable in this direction will, I hope, contribute to disseminating a love for the study of nature, and lead to the introduction of that branch of instruction in those schools and colleges where it is still neglected.

The instruction which is given at the Museum to the special students of the Zoölogical department of the Lawrence Scientific

School, forms such an important part in the active operations of our institution, that I think it proper to devote this year a part of my Report to the consideration of this subject. You know that it is one of the most praiseworthy features of our organization that while the Museum, as a great exhibition of the products of nature in the animal kingdom is entirely disconnected from the University, the educational interests of the establishment are entirely left to the wise direction of the President and Fellows of the College. Thus the University is relieved of a trust involving great responsibility, without losing any of the educational advantages of the institution, and the public enjoys the unlimited access to it, secured by the powers of this board.

The object of the special instruction given at the Museum is mainly to educate professional naturalists. This being the case, the primary consideration in their education should be to teach them how to observe. The progress of our science is too rapid to allow the use of text-books to any advantage. Most of them, even the best, are already antiquated by the time they leave the press. A student of nature should, therefore, be at once trained in the difficult art of reading for himself in the great book of nature. To this end specimens are from the beginning placed in the hands of the students instead of books, and during the first weeks I watch their ways of dealing with these objects, without assisting them, until I have ascertained, in a measure, what are their ability of seeing for themselves, and their aptitude for this kind of studies. To prevent imitation among the new comers, I give each different objects. If they have already paid some attention to the study of natural history, I make them work up some description, or prepare some specimen. If I notice a special aptitude in them or indications of sufficient devotion to their studies to enable them to overcome the difficulties inherent to the work of the naturalist, I at once set them to work out a special problem in connection with specimens. I have satisfied myself long ago, that the general and most elementary principles of our science are better understood when illustrated from nature, than when explained in a mere abstract manner. In this way, each student is, as it were, led to go for himself over the road through which science itself has passed in its onward progress, and far from protracting his

course, he soon finds that he is brought without preamble into the very sanctuary of science, and he may from time to time be astonished to find that he has been prosecuting an investigation the solution of which may not yet have been reached by professional naturalists themselves. This is particularly the case with the examination of American animals of the lower classes, a large number of which have not yet even received names. While the young naturalists are thus tracing facts for themselves, and trying to understand them, I watch carefully their course, bringing them back to the right path if they are imperceptibly led from it, warning them from the many mistakes they may make, pointing out the objects they should steadily keep in view, and in this way I generally succeed in making tolerable observers of them in the course of one or two years. From this time forward they are advised to select a special branch of natural history, to make it their speciality, the field being too wide for any man to attempt to master the whole. This course leads to a rapid advance in one direction; but I contrive to remedy what might easily become one-sidedness by advising them to pursue as collateral study some other investigation in a different class, and faithfully to attend the lectures in which general instruction is given upon natural history as a whole, and its separate branches in particular.

I take special care to have them attend courses of lectures upon other branches of science delivered in the University, and to cultivate at the same time some literary, historical and philosophical studies. I am more constantly made to feel the importance of pressing these collateral studies, owing to the very circumstance that with the method thus described the students make generally such rapid progress as to mislead them to the belief that they know much more than they really do know. After a few years' study they are generally as far advanced in one special department of Zoölogy as the most eminent naturalists, and they easily forget how much they do not know, and still more do they overlook to what circumstance they owe their rapid advancement. In the beginning they are never made to feel the constant guidance under which they have been kept, in order not to discourage them. Their familiarity with the special objects of their study naturally leads them to comparisons with the knowledge recorded in the special published works

which they are now advised to read, in order to study the history of their science. They frequently may find the masters of our science at fault, and think themselves more learned than men who have stood at the head of their respective departments. The conceit of the most successful ones is often exalted by the admiration paid to them by their fellow-students. There is thus an unavoidable disposition to over-confidence and presumption fostered among them by their very success. And now begins for me the most difficult part of my task, which is also the most difficult stage of the final scientific emancipation of the students, when they are to be made to understand to what extent they have been working with borrowed means, which honesty requires they should pay back. The difficulty is the greater on account of the fact that the intellectual capital to be restituted belongs to him whose duty it is now to claim it back himself, and at the same time make the student understand that it is for his own good that he must settle his intellectual accounts. The subtlety of all intellectual property is no doubt a source of great perplexity in any attempt at the most impartial appreciation. I may add, however, that I have made my students participants of all my investigations to an extent which I have never found any other teacher to allow them. I know that this course has its dangers, and I have already experienced it on several occasions. Some of my colleagues have perceived it and warned me. One of them, many years ago, told me that he thought me imprudent in thus laying before my pupils every thing I was doing, and speaking freely before them of my scientific plans and aims. But I have only one object in life, which is the advancement of science, and I shall not change my course for the sake of self-protection merely. Through all I have done in science, since I first began to publish my investigations, there runs a connecting train of thought, which nobody can appropriate to himself.

During the past years a large amount of contributions have been received from every quarter of the globe, thanks to the liberality of our merchants and the continued interest shown to the Museum by the people at large. These contributions consist, as in former years, of every kind of object attracting the attention or exciting the curiosity of the donors. Unfortunately a great deal of what is thus indiscriminately gathered at

random has less value than collections made systematically. I have therefore drawn up short instructions for collectors, which I have caused to be printed and circulated very extensively; and I have no doubt the result will be felt in the course of the present year in the improved condition of the specimens received. The Superintendent of the U. S. Coast Survey, Dr. A. D. Bache, is conferring a permanent benefit upon the Museum, by directing the light-house keepers, stationed in favorable localities, to devote their leisure to the picking up of specimens in conformity with the instructions sent to them. Among these directions is a request to pay particular attention to young animals, as the study of the young has been thus far too much, if not altogether neglected. During the present year the collection of young animals has been very largely increased, chiefly through the exertions of the gentlemen directly connected with the Museum; but in proportion as the importance of such collections begins to be more extensively understood, we may look for additions of this kind from other parts of the world. The scientific returns for these efforts are near at hand, as improvements in the classification of adult animals are daily suggested in consequence of comparisons with young of other families. I have myself been richly rewarded for my attention to this subject, by the discovery, at once verified in the principal families of the class, that fishes undergo as varied and as extensive metamorphoses, after hatching from the egg, as the Batrachians do. The types in which these facts have been ascertained are the Lophioids, the Labroids, the Cyprinodonts, the Atherinoids, the Cottoids, the Blennioids, the Percoids, the Cyprinoids, the Siluroids, the Esocids, &c.

Another interesting result incidentally arrived at, during these investigations, was the possibility of determining at once, under certain circumstances, the age of slow-growing animals which could not otherwise be ascertained.

Every-body is forcibly impressed with the longevity of the trees of our forest, when he sees how little the oak, or the maple, or the elm in his father's garden has been enlarged since his childhood. But when we see chickens growing to their full size in a few months and our largest animals attain their imposing dimensions in a few years, the impression must naturally be general, that animals rapidly complete their growth, to

continue stationary afterwards for an indefinite period of time. But this is not the case with a very large number of them, the growth of which is slow and long continued, and I have succeeded in devising a very simple method of ascertaining their age at once, provided it be known that they breed at a fixed period in the year. This being known, all that is necessary to determine the age of any individual of the species, is to gather a very large number of specimens of every size, from the smallest to the largest, and to arrange them in sets, according to their size. As all were born at the same season, the difference of size between the smallest and those of the next set is of course one year, and so on for every set. So the ordinal number of every set gives the age of all the specimens belonging to it. The large collections of specimens of our common species of marine animals, amounting frequently to many thousand specimens of the same species, have been gathered for this purpose. I have thus ascertained that the medium size of an adult *Natica Heros* is reached in about thirty years; that of most of our *Unio* and *Anodontas* reach their full size in from twelve to fifteen years; that our common *Pinna* is full grown in six or seven years, &c. Once upon this track, it will be easy to ascertain the rate of growth of most animals. I may already mention that specimens of our common Starfish of ordinary size are at least ten or eleven years old; while our largest Jellyfish, measuring over six feet in diameter, attain their full size in a few months.

These collections of numerous specimens of the same species have led to another unexpected result, which may be expressed in these words: The differences noticed among animals of the same species do not constitute varieties, but are individual differences, similar to those which may be noticed among the different individuals of the same family among ourselves. Any attempt to group them under a few heads as varieties fails, as soon as large numbers of specimens are considered. What have been generally described as varieties by naturalists are extreme individual differences occurring more frequently in certain species than in others, but like all others presenting the same indefinite peculiarities which forbid considering them as in any way typical. This shows that individuality consti-

tutes the most prominent feature of the organic kingdom, and is by no means confined to the human family.

Among the most valuable additions to the collections, I may mention the new series of microscopic sections made by Mr. Glen during the past year; as those prepared by him in former years they are unsurpassed for minuteness and exquisite finish. Of late he has been chiefly engaged in making sections of the shells of Gasteropods, no longer mainly with a view to ascertaining the mode of growth of shells in general, but rather to trace the generic differences which characterize the more recent subdivisions introduced in the classification of shells by the latest writers upon the subject. I may already state that unexpected generic characters have thus been found even among the seemingly most similar genera of terrestrial Gasteropods.

The collection of ethnographical illustrations, begun by the efforts of Mr. Theodore Lyman, a few years ago, has been largely increased by his own liberality during the past year. He has lately presented a large series of casts, one hundred in number, representing the face of the principal tribes of men inhabiting the East Indies, obtained from the originals secured by the brothers Schlagintweit, during their memorable exploration of that region. To these were added, also by Mr. Lyman, several hundred photograph portraits of men of all the different races of the human family, individuals of which could be found in the various embassies to the European Courts and elsewhere. I had expected great help from him on his return; but his devotion to the country has outweighed his love for science. I can hardly grudge the services of any man to his country in a time like this, and yet I feel that the Museum has lost its most active friend. Mr. T. G. Cary has also contributed his share to this collection in the shape of photographs of the miscellaneous population of California.

Notwithstanding the large amount of duplicates for years accumulated in the Museum, it has been very difficult for me to bring about the system of exchanges which is now carried on. In some quarters, whence original specimens would have been particularly desirable, I found an inability to relinquish any thing from want of duplicates; in other quarters pretensions were raised to which I would not agree. But these were not the most forbidding difficulties I had to meet. Our own stock

of duplicates, large as it is, consists chiefly of undigested materials, frequently even of undescribed species; and it was desirable that whatever was sent forth from our establishment should have a special scientific value, and be particularly acceptable to other establishments; nay, if possible, so desirable for them that they should be induced to make continued effort to keep up the intercourse. To attain this end I directed all the assistants in charge of special departments to pay particular attention to the identification of the specimens to be exchanged, and to label them in such a way that no mistake could occur. In cases where it appeared especially important, I had even the labels signed, in testimony of the trustworthiness of the identification. And to add to the authenticity of all these precautions, I caused a bulletin to be printed, in which the species so identified should be enumerated, and the new ones so far characterized as to prevent confusion for the future. I submit the first parts of this bulletin, which embrace the Fishes, Echinoderms and Corals, selected from the duplicates for distribution by Mr. F. W. Putnam, A. Agassiz, and A. E. Verrill. Without expressing an opinion upon the merits of this scheme, I may be permitted to add, that I would gladly accept a large reduction in the amount of returns made to us, if I could induce the owners of original specimens to send to our Museum specimens identified with the same care as ours are. From the *Jardin des Plantes* in Paris I met with the most friendly response to my proposition for exchanges of original specimens, and I have already received several invoices from Professors Milne-Edwards and Valenciennes. The same good-will and readiness have also been shown by the directors of the museums in Montpellier, Stuttgart, Darmstadt, Copenhagen, and Vienna. Other arrangements are now pending, or in progress of execution with the museums of Leyden, Strasburg, and others.

Exchanges with private individuals are also carried on very extensively, as the special Reports concerning the different departments of the Museum will show.

Among the collections received and acknowledged in the special Reports herewith submitted, there are some which deserve a special mention; such are the invoices of Rev. J. C. Fletcher, Mr. Bourget, Dr. Brunet, Dr. Wucherer, Mr. A. de

Lacerda, from Brazil, the collections made at San Francisco by Mr. T. G. Cary, those of Mr. D. B. Van Brunt, of Acapulco, of Mr. C. F. Davis and Dr. Sternberg, of Panama, of Capt. W. H. A. Putnam, in Chili, of Mr. Gulich, in Japan. Dr. W. Stimpson, Mr. J. G. Rich, the Aquarial Gardens, Mr. G. A. Boardman, A. E. Verrill, Mr. J. A. Allen, and Capt. N. E. Atwood have contributed valuable collections. Mr. H. A. Pierce has presented to the Museum the collections made in Russian Asia by Mr. A. A. Smith. Major J. G. Shute and A. S. Bickmore have presented their collections made in North Carolina. Capt. Anderson, of the Cunard service, has continued to assist in facilitating the exchanges between the Free Public Museum of Liverpool and our Museum.

The Smithsonian Institution has forwarded to the Museum extensive collections. In the way of exchanges, valuable invoices have been received from the Jardin des Plantes, from Professors Milne-Edwards and Valenciennes, Professor Kaup, Professor Krauss, Professor Jan, from the Marquis de Folin, Professor Poey, Señor de Elizalde, Mr. Parreys, and Mr. R. Howell, of Nichols, N. Y. Special thanks are due to many gentlemen who have forwarded many of these packages free of charges for the Museum, more particularly to Mr. James M. Barnard, to the agents of the Panama Railroad Company, of the Pacific Mail Steamship Company, and of Messrs. Wells, Fargo & Co.

There have been received in all during the past year two hundred and fifty boxes and packages from one hundred and sixty different persons.

It is my pleasant duty to remember, in this connection, the grant of \$10,000 by the legislature for the publication of an illustrative catalogue, and to state also that the Gray Fund has been partially applied to paying an instalment of the collection of Dr. Konnink, and partly to defraying the expenses incident to the reception and preservation of the specimens received during the year.

For many years past I have caused diagrams to be drawn to illustrate more fully those specimens in the Museum, the characteristics of which are not easily preserved in the usual mode of exhibiting objects of natural history. Many animals are so very small, that unless they are magnified, their peculiar-

ities are not readily perceived ; others contract so much when preserved in alcohol, or lose their natural form and color to such an extent, that they appear like shapeless masses in the jars in which they are put up ; still others are so delicate in their structure that they can hardly be preserved at all. It appeared nevertheless desirable that all these objects should be exhibited to the eye of the student as fully as the largest animals which from their very nature may easily be preserved either whole or in parts. The simplest way to attain this end was to have enlarged drawings made of all these objects, either from living specimens or copied from works not readily accessible to the students of natural history, in which satisfactory illustrations may have been published. Many hundreds of these diagrams have already been made by my friend Mr. Bourkhardt, some of which are now on exhibition in the Museum, and in a few weeks every available space in our public rooms will be occupied by those which thus far have remained in portfolios. This will greatly add to the interest of our collections and form a novel feature in the Museum, which I have no doubt will soon be imitated by others.

Thus far I have limited myself, in the preparation of these illustrations, to the least known species of animals and to the representation of their intimate microscopic structure and their mode of growth ; but of late, I have turned my attention also to such illustrations as may contribute to give correct ideas of the character of the local fauna of the present period as well as of past geological ages. To this end I have collected the best views of the characteristic vegetation of different regions, either published in works of travel, or which I could obtain in photographs from friends residing in distant lands.

The amount of work done in the Museum, during the past year, has been very great. It consisted chiefly in the separation of the duplicates from the specimens to be retained for the collection, and in identifying and systematically arranging those retained. The special Reports here annexed, prepared by those who have been intrusted with the care of distinct portions of the collection, will give a more complete idea of what has been done, and of what remains to be done, than is necessary to notice in this General Report. I may, however, be permitted to say that the arrangement of the Radiates is almost complete,

and that it will be possible hereafter to devote a larger part of our working force to other departments, which thus far have received an inadequate share of attention. The Mammalia and Birds need especially to be cared for, and great additions to these classes will be required before they are brought to the same footing as the lower classes. The Insects also demand greater attention, not so much to increase the number of specimens, as to identify and systematically arrange the materials already stored up in our magazines. The Mollusks are now rapidly arranging. It has been my good fortune to secure the co-operation of Mr. J. G. Anthony, who has been for nearly forty years one of the leading conchologists of America, and his zeal and activity, as well as exquisite neatness in putting up specimens, will soon change the whole aspect of that department of the Museum. I take this opportunity to bear also witness to the devotion of the other gentlemen engaged upon the work of the Museum. Prof. Marcou has been chiefly engaged with the library and the arrangement of the fossils. Mr. Scudder, after a protracted absence, is about resuming his work upon Insects, in which Mr. Packard is now taking a regular part. Dr. Stimpson has arranged a part of the Crustacea. Mr. Verrill has completed the arrangement and identification of the living Polyps, and is now proceeding to the fossils. Mr. A. Agassiz has also completed the arrangement of the Echinoids and will now proceed to the Asterioids and other Echinoderms. The task assigned to Mr. Putnam is almost hopeless. Our collection of fishes is now so extensive that it would require the attention of several assistants to be completed in a reasonable time. What Mr. Putnam has done thus far, to put it in order, is all that I could have expected. It gives me special pleasure to state that both Mr. Hyatt and Mr. Bickmore, after serving for nine months in the army, have now returned to their study in the Museum, where Mr. Hyatt has resumed his monographic investigation of the Cephalopods, and Mr. Bickmore is arranging the very fine collections he had an opportunity of making upon the coast of North Carolina while detached upon special hospital duty near the sea shore. We owe special thanks to Colonel Francis Lee, for the facilities afforded on that occasion to Mr. Bickmore. It is my painful duty to add that Mr. Craigin, who had also entered the service,

has lately died of fever in one of our military hospitals. He was a young man of excellent moral character and good abilities, promising to do full justice to the liberality to which he had been indebted for a situation at the Museum. Mr. Hartt has been successfully working at the fossil Brachiopods, and is about to resume his studies of those remaining, after a protracted absence. I regret that Mr. Shaler, who also left the Museum for the army, has not yet returned; but I hope to see him back next spring. Ill health has also taken away Mr. Allen from his field of labors. I regret it the more since he had made excellent progress in Ornithology and promised to become a valuable assistant in the arrangement of the specimens of birds. He has left unfinished a very interesting investigation upon the structure and arrangement of the feathers of birds. Mr. Niles is now progressing rapidly with the systematic and faunal arrangement of the Crinoids, and Mr. Horace Mann with that of the tertiary shells. Mr. Guggenheim continues to be occupied with the preparation of the skeletons, a large number of which have been added in this way to the collection during the past year.

The scientific value of all this work consists not only in the accuracy of the identification of the specimens, and the careful labelling of those selected for exhibition, but more particularly in the separation of the systematic and faunal collections. As I have already noticed on another occasion, I propose to make the work now going on in the Museum subservient to a thorough revision of the faunal distribution of the whole animal kingdom. As far as the Echinoids are concerned, this survey is already complete, and much has been done, besides, to determine the faunal limits of the Corals, the Fishes, and some families of Insects, Crustacea and Mollusks.

The liberality of the legislature in granting \$10,000 for the publication of an Illustrated Catalogue of the Museum, will enable us to lay the results of these investigations before the scientific world in an appropriate form, and thus extend the usefulness of our institution beyond the limits of those who have immediate access to its overcrowded rooms. It gives me particular pleasure to state that the first part of this Catalogue is already in the press, and I now submit to you proofs of some of the plates and woodcuts already finished. I hope to have

the first volume ready for distribution in the course of the coming winter.

Notwithstanding the activity infused in every department of the Museum, and the satisfactory condition of the institution as a whole, I trust I shall be permitted to add that the regular resources at our command are now utterly inadequate to carry on its regular operations. Had my task from the beginning been restricted to the putting up of a Museum that should answer the wants of the University within the limits of our present means, I might be blamed for extending its sphere of action; but I understood the object of this organization to be the founding of a great Museum, and I am happy to be able to say that the general frame of such a Museum is not only fairly laid out, but already so far advanced in some of its most important features as to challenge competition. And all that is now wanting to bring every department to the same degree of perfection, is an addition to our regular income, and a well-digested system of regulations, concerning the work to be done in the Museum and the use of its treasures for scientific purposes.

Report on the Collection of Mammalia, by A. E. VERRILL.

During the present year the work necessary for putting the collection into a condition of perfect safety, and arranging the specimens so that they may be always available for scientific study, has been continued until it is now so far completed as the limited space, allotted to this department in the cellar, will allow. The alcoholic specimens have all been numbered and a careful catalogue made of the species, with their localities and origin. The specimens remain stored in barrels and kegs, but are arranged according to their families and genera, so that they are readily accessible for examination. The embryos have been catalogued and arranged in jars by Professor H. J. Clark. Most of the Bats (309 specimens) have been sent to Dr. H. Allen, who is preparing a monograph of those found in North America, for the Smithsonian Institution. The Shrews (*Soricidæ*, 54 specimens,) and *Spermophili* (8 specimens) have been sent to Prof. S. F. Baird, who is engaged in the study of these

groups, and the *Weasels* (*Putorius*, 20 specimens,) have been forwarded to Mr. R. Kennicott, for monographic work.

To the collection of mounted specimens, now arranged in the exhibition rooms of the Museum, valuable additions have been made. Among these may be mentioned a series of the wild animals of Maine, collected by Mr. J. G. Rich, and mounted from the fresh specimens by Mr. S. R. Jillson. Fine specimens of the Beaver, Otter, Fisher, and Caribou, are included among these. Another collection, embracing some of the most interesting animals of Europe, has been received from Dr. Kaup.

To the collection of skeletons, considerable additions have been made, chiefly those prepared at the Museum, by Mr. Gugenheim, from fresh specimens. A very valuable skull of a young Sperm Whale has been presented by G. HOWLAND, Jr., H. TABER, and TABER & Co., of New Bedford.

The whole number of additions to the collection, during the year is 53 lots, including 206 specimens, and 117 species. One of the most interesting and valuable collections received, consists of a number of embryos of the Moose, Caribou, and Red Deer, collected in northern Maine by Mr. Rich, and an embryo of the Balænoptera, presented by Mr. Lyman.

The following is a list of the additions received from all sources:—

Donations.

AGASSIZ, Prof. L. 2 Arvicolæ in alcohol, from Yarmouth, Mass.

ALLEN, J. A., Student in the Zoölogical Department of the Scientific School, 4 Mammals, 3 species, in alcohol, from Springfield, Mass.

AQUARIAL GARDENS, Boston, Mass. 5 Mammals, 5 species, in alcohol, from various localities.

BICKMORE, A. S., Student in the Zoölogical Department of the Scientific School, 3 Mammals, 3 species, in alcohol, from Beaufort, N. C.

BOARDMAN, GEO. A., Milltown, Me. 2 skins, 1 species, from Calais, Maine.

BOURGET, D., Rio Janeiro, Brazil. 8 Mammals, 6 species, in alcohol, including an embryo of Armadillo, and a skin of Ant-Eater, from Brazil.

DALL, W. H., Medford, Mass. 1 Bat in alcohol, from Japan.

DECKEN, Baron von der. 1 skin from Madagascar.

ELA, G. W., Concord, N. H. 1 Condylura, fresh.

FITCH, Miss CAROLINE M., Bedford, Mass. 1 Bat, in alcohol, from Westchester Co., N. Y.; 1 young *Arctomys*, in alcohol, from Bedford.

FLETCHER, Rev. J. C. 3 Mammals, 3 species, in alcohol, from MONAOS, Brazil.

GREEN, S. A., M. D., U. S. A. 2 Mammals, 2 species in alcohol, Seabrook Island, S. C.

HARTT, C. F., Student in the Zoölogical Department of the Scientific School, 2 young of *Fiber zibethicus*, in alcohol, from Cambridge.

MESSRS. HOWLAND, G. J., H. TABER and TABER & Co., New Bedford, Mass. Skull of Whale, taken off the coast of New Jersey.

HITCH, H. F., of the firm, Swift & Co., New York. 1 living *Armadillo*, from South America; 1 *Armadillo* in alcohol, from Brazil.

LACERDA, DON ANTONIO DE. 1 Monkey, in alcohol, from Bahia, Brazil.

LYMAN, THEODORE, Assistant at the Museum. 1 embryo of *Balaenoptera*, from Bergen, Norway, collected by Mr. Hoeg.

NILES, W. H., Student in the Zoölogical Department of the Lawrence Scientific School. 1 Shrew, in alcohol, from Worthington, Mass.; 14 embryos, in alcohol, from Cambridge.

PUTNAM, Capt. W. H. A., Salem, Mass. 1 living Fox, from Caldera, Chili.

PUTNAM, F. W., Student in the Zoölogical Department of the Lawrence Scientific School. 27 Mammals, 4 species, in alcohol, Bridport, Vt.

ROCKWOOD, D. T., Bridport, Vt. 1 skull of Calf, five weeks old.

ROCKWOOD, Capt. E., Bridport, Vt. 2 skulls of Sheep.

SCUDDER, Mrs. D. C. 2 skins from Magera, East Indies.

SCUDDER, S. H., Graduate of the Zoölogical Department of the Lawrence Scientific School. 1 *Leucopus*, from Mt. Washington, N. H.

SWASEY, CHAS. E., Sandwich, Mass. 1 *Opossum*, fresh, from Sandwich.

UNKNOWN DONORS. 1 *Cynocephalus*, fresh, from Africa; 1 *Condylura*, from Cambridge.

VERRILL, A. E., Graduate of the Scientific School. 2 Mammals, 2 species, in alcohol, from Eastport, Me.

WHEELER, S., Berlin, Mass. 1 *Hesperomys*, fresh, from Berlin.

By Exchange.

HAMLIN, Prof. CHAS. E., Waterville, Me. 8 Mammals, 3 species, in alcohol, from Waterville.

KAUP, Dr., Darmstadt. 6 Mammals, 5 species, mounted, from Europe.

SHUTE, J. G., Woburn, Mass. 7 Mammals, 3 species, in alcohol, including embryos of Opossum, from Newbern, N. C.

SLACK, J. H., M. D. 1 Cast of Fossil Skull, from New Jersey.

TENNEY, S., Cambridge, Mass. 1 Condylura, in alcohol, from Cambridge.

Secured with the Gray Fund.

COOKE, C., Student in the Zoölogical Department of the Scientific School. 5 Mammals, 4 species, in alcohol; 8 Mammals, 5 species, in alcohol, including two Antilocarpa Ruetea; 5 Mammals, 4 species, in alcohol; 1 skull of Camel; 4 skins, 3 species; 2 skeletons, 2 species, from Zanzibar.

GRIFFIN, W. H., Somerville, Mass. 3 Mammals, 2 species, in alcohol, from Somerville.

GULICH, J. T., Kanagawa, Japan. 4 Mammals, 3 species, in alcohol, from Japan.

RICH, J. G., Upton, Me. 4 Mammals, 4 species, fresh, including Otter and Sable; 15 Mammals, 5 species, in alcohol; 1 Otter and 1 Beaver, fresh; 1 Wolf, fresh; 1 Beaver, 1 Fisher, and 1 Sable, fresh; 6 carcasses for skeletons, 4 species; 4 Caribou, fresh; 2 young Bears, fresh; 7 Mammals, 5 species, including embryos of Caribou, Moose and Deer, in alcohol; 1 Canada Lynx, with 3 embryos, fresh; 6 skins of Muskrats (Fiber), prepared for exchange, all from northern Maine.

SEARS, Mr., Boston, Mass. 1 Chimpanzee, fresh, from Africa.

Report on the Collection of Birds, by A. E. VERRILL.

The work of numbering, cataloguing, and arranging the specimens in this department, commenced before the last report, has been continued by Mr. J. A. ALLEN and myself, until it is now nearly completed, so far as the alcoholic collections received during previous years are concerned. Much labor of this kind remains still to be done, however, before the collection can be put into as perfect order as is desirable, even for scientific use. In addition to the regular serial catalogue, Mr. ALLEN has commenced to make catalogues of the specimens belonging to each family, in order to remedy in some measure the inconvenience of the present method of packing them away in large kegs and barrels, made necessary by the crowded condition of the Museum. Mr. ALLEN has also made a large num-

ber of preparations illustrating the arrangement and structure of the feathers in different families. It is to be hoped that his health will soon permit him to resume these studies. Prof. H. J. CLARK has rearranged the collection of embryos, and made a number of preparations. A part of a collection of about 200 specimens, sent to Mons. AUGUSTE VOUGA to be mounted, has been returned in good order. Mr. S. R. JILLSON has also mounted quite a number of specimens. A collection of Laridæ in alcohol has been sent to ELLIOTT COUES, M. D., for study, while preparing a monograph of the family.

There have been received during the year 1,676 specimens, representing 820 species, in 64 lots. Among the most interesting and valuable additions are a collection of skins from the East Indies, presented by J. M. BARNARD, Esq., a collection of mounted European birds from Dr. KAUP; a collection of skins from Brazil, from Mons. BOURLEMAQUE, Director of the Museum at Rio Janeiro; a large number of birds in alcohol, from Zanzibar, collected by Mr. C. COOKE; a very valuable lot from the Amoor river, presented by H. A. PIERCE, Esq.; a collection of skins collected in Arctic America by R. KENNICOTT, from the Smithsonian Institution; a large number of specimens in alcohol, from Springfield, Mass., embracing some species never before found in New England, presented by Mr. J. A. ALLEN, with careful measurements of many of them, made while fresh; eggs and birds in alcohol, from Beaufort, N. C., from Mr. A. S. BICKMORE; a collection in alcohol from Norway, Me., from Mr. S. I. SMITH; a large number from Waterville, Me., collected by Prof. CHAS. E. HAMLIN.

The following is a complete list of the invoices received during the year:—

Donations.

AGASSIZ, A. Assistant at the Museum, 9 eggs of *Tringoides*, in alcohol, from Nahant, Mass.

ALLEN, J. A. Student in the Zoölogical Department of the Scientific School, 3 birds, mounted, from Cambridge; 5 birds, 3 species, fresh, from Cambridge; 183 birds, 80 species, 50 eggs, 9 species, in alcohol, from Springfield, Mass.

AQUARIAL GARDENS, Boston, Mass. 1 Heron, in alcohol, from Massachusetts.

BARNARD, J. M., Boston. 6 skins of Pheasants, 4 species, from China; 144 birds, 74 species, skins, from Malacca.

BICKMORE, A. S. Student in the Zoölogical Department of the Scientific School, 69 birds, 34 species; 184 eggs, 9 species, in alcohol; 6 bird skins, 6 species; 6 nests with eggs, 4 species, from Beaufort, N. C.

BOARDMAN, G. A., Milltown, Me. 8 birds, 4 species, in alcohol; 22 eggs, 7 species, dry, from Calais, Me., and vicinity; 2 skins, 2 species, (Curassow) from Brazil; 13 birds, 8 species, in alcohol, from New Brunswick.

BOURGET, D., Rio Janeiro. 54 skins, 51 species.

BOURLEMAQUE. 4 birds, 2 species, and 12 eggs, 5 species, in alcohol, from Brazil.

DALL, W. H., Medford, Mass. 13 specimens, 4 species, in alcohol, from Medford.

DECKEN, BARON VON DER. 5 skins, 5 species, mostly from Madagascar.

EAMES, W. H., Cambridge, Mass. 4 birds, 2 species, fresh from Cambridge.

EDMANDS, Miss A. M., Cambridge, Mass. 1 bird, fresh, from Cambridge.

FITCH, Miss CAROLINE M., Bedford, Mass. 1 Owl, fresh; 1 Wood Duck (*Aix sponsa*) fresh, from Bedford.

FLETCHER, Rev. J. C. 1 bird, in alcohol, and a remarkable nest, from Bahia, Brazil; 1 Parrot, in alcohol, from Monaos, and 1 Boat Bill (*Cancroma*) in alcohol, from Obidos, Brazil; 1 Secretary Vulture, in alcohol, from Cometa, Brazil.

HALL, W. F., South Boston. 10 birds' eggs, 5 species, dry, from various localities.

JILLSON, S. R., Feltonville, Mass. 9 specimens, 2 species, fresh, from Feltonville.

MANN, HORACE. Student in the Zoölogical Department of the Scientific School, 6 Crossbills, fresh, from Cambridge; 3 birds, 3 species, fresh, from Concord, Mass.

MARCUS, Dr., Villa Bella, Brazil. 1 bird, in alcohol, from Brazil.

MERRILL, Mrs. J. W., Cambridgeport, Mass. 1 Humming bird, in alcohol, from Cambridgeport.

OTIS, Dr. JENKS, U. S. N. 2 specimens, 2 species, skins, from West Indies.

PEIRCE, H. A., Boston, Mass. 22 birds, 13 species, in alcohol, from the Amoor river, collected by A. A. Smith.

PUTNAM, Capt. W. S., Salem, Mass. 9 birds, 7 species, in alcohol, from west coast of Africa.

PUTNAM, Capt. W. H. A., Salem. 1 Parrot, living, from Guyaquil, Peru.

PUTNAM, Mrs. W. H. A. 1 egg of Tinamus, from Caldera, Chili.

PUTNAM, F. W. Student in the Zoölogical Department of the Scientific School, 13 birds, 9 species, in alcohol, from Bridport, Vt.

ROCKWOOD, HENRY, New York. 1 bird, in alcohol, from Bridport, Vt.

SMITH, S. I., Norway Me. 2 birds, 1 species, fresh; 118 birds, 45 species, in alcohol, from Norway.

TREAT, U. S., Jr., Eastport, Me. 1 Podylimbus Podiceps, in alcohol, from Eastport.

TROUVELOT, L., East Medford, Mass. 6 birds' nests and eggs, dry, from Medford.

UNKNOWN DONORS. 2 Whip-poor-wills (antrostomous), fresh, from Cambridge.

VERRILL, A. E. Graduate of the Zoölogical Department of the Scientific School, 10 skins, 8 species, with measurements, from Norway, Me.; 11 birds, 7 species, fresh, from Cambridge; 3 birds, 3 species, in alcohol, from Norway, Me.

WHEELER, E. S., Berlin, Mass. 1 Heron, living, from Berlin.

By Exchange.

HAMBLIN, Prof. CHAS. E., Waterville, Me. 1 Colymbus torquatus, fresh; 75 birds, 34 species, in alcohol; 123 birds, 54 species, in alcohol, from Waterville.

KAUP, Dr., Darmstadt. 44 mounted birds, 29 species, from Europe.

LYCEUM OF NATURAL HISTORY, Williamstown, Mass. 80 eggs, 6 species, in alcohol, from Labrador.

NEWELL, K. B., Cambridge, Mass. 71 birds' eggs, fresh, with nests, 12 species, from Cambridge.

SMITHSONIAN INSTITUTION. 106 skins, 57 species, collected in Arctic America, by R. Kennicott.

TENNEY, Prof. S., Cambridge, Mass. 7 birds, 5 species, in alcohol, from Cambridge.

VOUGA, Mons. Le Capt., Neufchatel, Switzerland. 5 mounted birds, 5 species, from Neufchatel.

Secured with the Gray Fund.

ALLEN, J. A. Student in the Zoölogical Department of the Scientific School, 18 birds, 8 species, fresh, including a Snowy Owl, White-fronted Goose, and a remarkable specimen of domestic Turkey, which had run wild and reverted to its original appearance, taken in Pennsylvania; all bought in the Boston market.

COOKE, CALEB. Student in the Zoölogical Department of the Scientific School, 8 birds, 7 species, in alcohol; 52 birds, 18 species, in alcohol; 3 skeletons and 1 nest, from Zanzibar; 22 birds, 18 species, in alcohol, from Mozambique; 8 nests, 1 species, from Zanzibar.

GULICH, J. T., Kanagawa, Japan. 2 birds, 2 species, in alcohol; 5 skins, 5 species, from Japan.

RICH, J. T., Upton, Me. 1 Snowy Owl, fresh, from Upton.

STIMPSON, WM., M. D., Washington, D. C. 4 birds, 4 species, in alcohol, from Oban, Scotland.

During the year the following collections have been sent away in exchange:—

BOARDMAN, GEO. A., Milltown, Me. 35 eggs, 11 species, dry, miscellaneous.

NEWELL, K. B., Cambridge, Mass. 13 eggs, 13 species, dry, chiefly *Natatores*.

PARKER, B. G.; Cambridge, Mass. 2 skins, 2 species, from Massachusetts.

Report on the Collection of Reptiles, by F. W. PUTNAM.

A full series of the Ophidians belonging to the Museum was sent last year to Professor Jan, of Milan, for comparison; these have been returned with Professor Jan's identification of the species; thus increasing very much the scientific value of our collection of Ophidians, as we have now, in respect to North American species, the identification of one of the leading Herpetologists of Europe, added to those of Professor Baird and Mr. Kennicott.

During the year, nineteen hundred and eighty-four specimens, representing one hundred and eighty-three species new to the collection, have been received from sixty-five donors. Several hundred specimens have been collected especially for exchange. A number of fossil reptiles have also been received, but from want of room still remain in their original packages.

The want of glass jars still obliges us to retain in the cellar most of the specimens of this department. The work done during the year amounts to but little more than attending to the preservation of specimens, cataloguing the additions, and taking care of the Ophidians returned by Professor Jan.

But little has been done in the way of exchanges, the only specimens sent out, being twelve, comprising ten species, to the Essex Institute, of Salem.

The most important collections received are the following :

From Brazil, by the Rev. Mr. FLETCHER, Doctors WUCHERER, COUTINHO, MARCUS and JEFFRYS, DON ANTONIO DE LACERDA and Mr. BOURGET, consisting of 80 species and 170 specimens.

From Zanzibar, Mozambique, and Madagascar, by Messrs. COOKE, SOARES and GOODHUE, and BARON VON DER DECKEN.

From Japan, by Mr. GULICK.

From North Carolina, by Messrs. SHUTE and BICKMORE.

List of the Additions to the Collections of Reptiles.

*ANTHONY, J. G., assistant M. C. Z. Skeleton of Turtle from Natchez, Miss.

ATWOOD, Capt. N. E., Provincetown. Eggs of a Turtle, from Provincetown.

BARNARD, JAMES M., Boston. 2 specimens, 2 species, from Africa, new to the collection; 14 specimens, 9 species, from Hong Kong (?)—2 species new to the collection.

BICKMORE, A. S., student M. C. Z. 92 specimens, 11 species, from Beaufort, N. C.; 2 specimens, 1 species, from Shackelfort, N. C.; 1 specimen, 1 species, from Wind Hill Island, N. C.; 35 specimens, 4 species from Newbern, N. C.

BOURGET, D., Brazil. 24 specimens, 16 species, from Rio Janeiro, Brazil,—13 species new to the collection.

BRIDGHAM, Mrs. S. W., New York. 3 specimens, 2 species, from East Providence, R. I.

CARTER, S. R., Paris, Me. 50 eggs and 9 young of *Desmognathus fuscus*, from Paris, Me.,—eggs new to the collection.

COUTINHO, Dr., Brazil. 1 *Amphisbaena*, from Manaos, Brazil—new to the collection.

CUTTING, J. A., Boston Aquarial Gardens. 1 Python, from Africa; 1 Turtle, from West Indies.

DALL, W. H., Medford. 29 specimens, 9 species from Medford, Mass.; 16 specimens, 2 species, from Exeter, N. H.; 2 specimens, 1 species, from Illinois; 6 specimens, 4 species, from Nagasaki, Japan; new to the collection.

DEWEY, Prof. C., Rochester, N. Y. 3 *Menobranchus*, from Rochester, New York.

DEWITT, Capt. F., U. S. A. Young Turtle from Beaufort, N. C.

DECKEN, BARON VON DER, Zanzibar, Africa. Saurian, from Madagascar,—new to the collection.

EAMES, H. H., Cambridge, 20 specimens, 3 species, from Cambridge.
FILIPPI, Prof. Ph. De, Turin. 3 specimens, from the Alps; 2 specimens from near Caspian Sea.

FITCH, Miss, Bedford. Eggs of Turtle, from Bedford, Mass.

FLETCHER, Rev. J. C., Newburyport. 19 specimens, 4 species, from MONAOS, Brazil,—new to the collection; 5 specimens, 4 species, from Rio Janeiro, Brazil,—3 species new to the collection; 13 specimens, 9 species, from Para, Brazil,—8 species new to the collection; 22 specimens, 10 species, from Villa Bella, Brazil,—new to the collection; 8 specimens, 5 species, from Obidos, Brazil,—new to the collection; 1 *Chelys Matamata* (young), from River Tunantins, Brazil,—new to the collection; 1 *Chelys Matamata* (young), from Upper Amazon, Brazil.

FOWLER, S. P., Danvers. 12 specimens of a supposed new species of *Bufo*, from Danvers,—new to the collection.

GREEN, Dr. S. A., U. S. A. 9 specimens, 4 species, from Seabrook Island, S. C.; 16 specimens, 12 species, from Hilton Head, S. C.

GULICK, J. T., Japan. 89 specimens, 13 species, from Kanagawa, Japan,—new to the collection; 9 specimens, 2 species, from San Francisco, Cal.

HAMLIN, Prof. C. E., Waterville College. 6 specimens, 3 species, from Waterville, Me.

HARTT, C. F., student M. C. Z. 150 specimens, 7 species, from Cambridge.

HEARD, A., Boston. 3 Turtles, from Hong Kong, China.

JAN, Prof. G., Milan. 4 *Rhinophis Tiedemanni* JAN, from Ceylon,—new to the collection; 1 *Pseudopus*, from Dalmatia,—new to the collection; 1 *Vipera*, from Lago de Coma, Italy.

JEFFRYS, Dr., Brazil. 33 specimens, 25 species, from Obidos, Brazil,—20 species new to the collection.

KAUP, Dr. J. J., Darmstadt. 3 specimens, 2 species, from Darmstadt, Germany.

KNIGHT, E. F., Boston, (for a lady in Florence.) Saurian, from Florence, Italy.

LACERDA, DON ANTONIO DE, Brazil. 2 specimens, 2 species, from Bahia, Brazil,—new to the collection.

LYMAN, T., assistant M. C. Z. 2 young Turtles, from Venice,—new to the collection.

MARCUS, Dr., Brazil. 7 specimens, 5 species, from Villa Bella, Brazil,—new to the collection.

MAYBURY, Dr. E. 1 Saurian from Australia,—new to the collection.

MERRILL, J. C., Cambridge. 1 *Hyla*, from Cambridge.

NEWELL, K. B., Cambridge. 1 Snake, from Cambridge.

OTIS, Dr. JENKS. 39 specimens, 6 species, from St. Thomas,—4 species new to the collection.

ORDWAY, Lt. A., Twenty-Fourth Massachusetts Volunteers. 5 specimens, 5 species, from Newbern, N. C.

PEIRCE, H. A., Boston. Collected by A. A. SMITH. 1 Snake, from Nicolaefsk, Amour River,—new to the collection.

POTTEAU, P. 1 young Turtle, from China.

PUTNAM, F. W., student M. C. Z. Eggs of 6 species of *Batrachians*, from Cambridge.

PUTNAM, Capt. W. H. A., Salem. 4 specimens, 2 species, from Caldera, Chili,—new to the collection.

RUSSELL, ROBT. 1 Saurian, from Lausanne, Switzerland.

SCUDDER, Rev. D. C., Madras, India. 16 specimens, 10 species, from Periaculam, Southern India,—new to the collection.

SCUDDER, S. H., graduate M. C. Z. 6 specimens, 4 species, from Glen House, White Mountains.

SHURTLEFF, C. A., student M. C. Z. 4 specimens, 2 species, from Treat's Island, Coast of Maine.

SHUTE, J. G., Woburn. 156 specimens, 29 species, from Beaufort, N. C.

SMITH, S. I., Norway, Maine. Eggs of *Salamander sp.?* and a snake, from Norway, Me.,—eggs new to the collection.

STERNBERGH, Dr., Panama. 3 specimens, 3 species, from Panama, N. G.,—new to the collection.

TORRY, R. 2 Saurians, from the Pelew Islands.

TROUVELOT, L., Medford. 5 specimens, 4 species, from Medford.

TUCKER, J., Norway, Me. Very large specimen of *Chelydra serpentina*, from Norway, Me.

VERRILL, A. E., graduate M. C. Z. 24 specimens, 6 species, from Cambridge; 40 eggs and 3 adults, of *Desmognathus fuscus*, from Norway, Me.

VERRILL, C. F., Norway, Me. Snake from Norway, Me.

WARREN, Dr. MASON. Living specimen of the so-called "Hairy Turtle," from China,—new to the collection.

WUCHERER, Dr. O., Brazil. 34 specimens, 18 species, from Bahia, Brazil,—10 species new to the collection.

WYMAN, Prof. J., Cambridge. 2 Turtles, from Surinam,—new to the collection.

Left at the Museum by Persons unknown.

——— A snake from the cabin of the Ship "Eloisa," during a voyage from Bankok to China,—new to the collection.

——— 3 Snakes, from (?)

- Skin of a Rattlesnake, from (?)
 —— Living Turtle, from the Gulf of Mexico (?)

In Exchange.

NORMAL SCHOOL, Salem, Prof. CROSBY, Principal. 17 specimens, 12 species, from Madagascar,—5 species new to the collection. Collected by W. W. Goodhue, of Zanzibar.

SALMIN, C. L., Hamburg. 1 specimen, 1 species, from Cape of Good Hope,—new to the collection; 2 specimens, 2 species, from Java.

From the Gray Fund.

COOKE, C., student M. C. Z. 119 specimens, 38 species, from Zanzibar, Africa,—29 species new to the collection.

COOKE, C., and SOARES, J. C., Zanzibar. 37 specimens, 15 species, from Mozambique, Africa,—new to the collection.

NILES, W. H., student M. C. Z. 583 specimens, 15 species, from Worthington.

PUTNAM, F. W., student M. C. Z. 116 specimens, 10 species, from Bridport, Vt.

STIMPSON, Dr. WM., Washington, D. C. 5 specimens, 4 species, from near Liverpool, England.

BOUGHT. Young Python, from Africa.

Report on the Collection of Fishes, by F. W. PUTNAM.

A large number of duplicate specimens have been sent from the Museum, not only in exchange for other specimens, but also for the purpose of distributing authenticated specimens. Four thousand seven hundred and sixty-six alcoholic specimens, comprising one hundred and eighty-nine species, have thus been sent to twenty-one different persons and institutions.

The greatest possible pains have been bestowed upon the identification of these specimens. Nineteen hundred labels were written to accompany the specimens, and to make them authentic, every one was signed on the back.

The care of older specimens, and the cataloguing of those more recently received, and their distribution to their proper places in the Museum, consumed much time. The systematic

and several of the faunal collections, have also been advanced during the year.

The want of glass jars delays the arrangement very much, as now, with few exceptions, it has to be carried on by using large earthen jars, kegs and barrels of all sizes. This occasions a large amount of extra labor in tying parchment numbers to the specimens that are to be kept in these vessels, which would be avoided by the use of glass jars, containing only one species from a single locality. There is also much time wasted in finding any particular specimen, when needed for comparison. In a collection of between six and seven thousand species, this becomes quite a serious matter. An idea may be formed of the amount of labor required to keep this collection in order, by the fact that there are now in use, one hundred and ninety-nine barrels, kegs, and earthen jars, of sizes varying from five to forty gallons, besides one large tank and over ten thousand glass jars of all sizes.

During the year, the additions to this department have been quite large, amounting to 4,537 specimens, comprising 630 species. Of these, 353 were new to our collection, and many of them are representatives of undescribed species and genera. These specimens were received from sixty-two different sources, and with one or two exceptions, they are preserved in alcohol. Many fossil fishes have been received during the year, but owing to want of room for their arrangement, they have not yet been separated from other fossils received at the same time.

Special large collections of our native species have been made for the purpose of having an ample supply to send to such persons or institutions as may apply for them for scientific use. For this purpose, Professor Agassiz has collected many specimens at Nahant, and the valuable services of Captain Atwood, of Provincetown, have been secured. During my vacation, which was spent on Lake Champlain, I collected largely for the same purpose, the expenses being borne by the Gray Fund.

Much has also been done in forming a collection of young fishes; to illustrate their mode of growth.

There has seldom been a year when so many valuable collections have been received, as during the present, and I would call special attention to the following:

The large collection from the Amazon and Rio Negro, Brazil, made by the Rev. Mr. FLETCHER and friends whom he interested in our labors, while in Brazil. This collection was very rich in interesting and hitherto unknown species. For the special localities and number of specimens, I would refer to the list of additions annexed.

The collection from the Amour River, secured to the Museum by the kind interest of H. A. PEIRCE, Esq.

The collection from Kanagawa, Japan, made by Mr. GULICH. Among other valuable specimens contained in this collection, are those of the genus *Ditrema* Tem. et Schl., affording me the opportunity of personal examination of this genus, which, from the figure given in the "Fauna Japonica," I thought might prove to be congeneric with *Tæniotoca* A. Ag. The comparison of these specimens with the different genera of the family of *Holconoti*, convinces me that *Ditrema* is a distinct genus from all others in the family, though closely allied to *Tæniotoca* and *Hyperprosopon*. I therefore take this means to correct the mistake made in the "Museum Bulletin."

The large collection from the east coast of Africa, made by Mr. COOKE, is rich in species new to the Museum.

The collections from China, made by Messrs. HURD and CHAMBERLIN.

The European collections received from Don JUAN DE ELIZALDE, Capt. DE BROCA, Capt. A. VOUGA and Dr. KAUP, Messrs. LYMAN and STIMPSON, and the FREE PUBLIC MUSEUM of Liverpool.

The collection of authentic specimens from Professor POEY, of Cuban species, and that from the SMITHSONIAN INSTITUTE, of a few species from California, described by Mr. Gill.

The small but valuable collection from the coast of Chili, made by Capt. PUTNAM.

The collection received in exchange, from Mr. SALMIN.

The collection made by myself, at Lake Champlain.

Perhaps the most valuable single specimen received during the year is the *Branchiostoma* found by Mr. BICKMORE in the sand on Bird Shoal off Beaufort, N. C. With the exception of a single specimen in the collection of the Smithsonian Institution, from near the same locality, this is the only specimen of the genus ever found on our coast.

List of the Additions to the Ichthyological Department.

AGASSIZ, A., assistant M. C. Z. 62 specimens, 7 species of young, from Nahant.

AGASSIZ, Professor L. 2 *Grystes fasciatus*, from Big Sandy Lake, Wareham; 200 *Alausa tyrannus*, from Agawam River; embryos of *Acanthias americanus*, from Yarmouth; 774 specimens, 12 species, from Yarmouth; 361 specimens, 16 species, from Nahant.

ASPINWALL, Colonel. 1 *Cyclopterus*, from Nahant.

BARNARD, JAMES M., Boston. 1 *Toxotes jaculator*, from China; new to the collection.

BARTLETT, JOHN. 11 specimens, 10 species, from Florida Keys.

BARTLETT, Dr. 1 *Chironectes*, from Naushon.

BEAL, W. J., student M. C. Z. 8 specimens, 2 species, from Eastport, Me.

BICKMORE, A. S., student M. C. Z. 1 *Branchiostoma*, found in the sand on Bird Shoal, off Beaufort, N. C. New to the collection. 41 specimens, 7 species, from Beaufort, N. C. 1 species new to the collection.

BIRD, J. A. & Co., Boston. 1 large Eel, (stuffed,) from the Andros-coggin River.

BOARDMAN, GEO. A., Milltown, Me. 7 *Salmo* sp., from Schoodic Lakes, Me. New to the collection.

BOURGET, D., Rio Janeiro. 1 Eel, from Rio Janeiro, Brazil. New to the collection.

BROCA, Capt. DE. 47 specimens, 26 species, from Havre, France. 8 species new to the collection.

CABOT, Dr. S., Boston. 1 *Salmo* species, from Thompson's Pond, Me.; 3 eggs of Skate, from Fort Macon, N. C.

CHAMBERLAIN, A. P., Boston. 22 specimens, 17 species, from Shanghai, China. 6 species new to the collection.

CUTTING, J. A., Boston, Aquarial Gardens. 2 Embryos of *Acanthias*, from Massachusetts Bay.

ELIZALDE, DON JUAN J. DE, Cadiz. 85 specimens, 25 species, from Cadiz, Spain. 18 species new to the collection.

FILIPPI, Prof. PH. DE, Turin. 3 *Gobius*, from the Caspian Sea. New to the collection.

FLETCHER, Rev. J. C., Newburyport. 163 specimens, 76 species from Rio Janeiro, Brazil. 30 species new to the collection. 68 specimens, 28 species, from Para, Amazon River, Brazil. 28 species new to the collection. 123 specimens, 24 species, from Monaos, Rio Negro, Brazil. 24 species new to the collection. 18 specimens, 13 species, from Fonte Boa, 2,000 miles up the Amazon River. 13 species new to the collection. 47 specimens, 16 species, from Santarem, 600 miles up the Amazon River. 16 species new to the collection. 4 specimens, 2 species, from

Villa Bella, Amazon River; 2 species new to the collection. 3 specimens, 2 species, from Tunantins, 2,000 miles up the Amazon River; 2 species new to the collection.

GULICK, J. T., Japan. 88 specimens, 34 species, from Kanagawa, Japan; 30 species new to the collection.

GUNNING, W. D. 14 Uranidea, from Grand Rapids, Michigan.

HAMLIN, Professor C. E., Waterville College. 2 specimens, 1 species, from Waterville, Me.

HUNNEWELL, J. S., Boston. 11 Callichthys, from Surinam, S. A.

HEARD, AUG., Boston. 107 specimens, 26 species, from Hong Kong, China; 13 new to the collection.

HUTCHINS, Dr., U. S. A. 11 specimens, 3 species, fossil Shark's teeth, from Aquia Creek, Va.

JEFFREYS, Dr., Brazil. 4 specimens, 3 species, from Obidos, Brazil; new to the collection.

JOHNSON, W. C., Newburyport. 7 specimens, 4 species, from Newburyport.

KAUP, Professor J. J., Darmstadt. 5 Alansa, from Darmstadt, Germany; new to the collection.

LYMAN, TH., M. C. Z. 1 specimen, 1 species, from Ischl, Austria; new to the collection. 19 specimens, 4 species, from Salzburg; 1 species new to the collection. 70 specimens, 28 species, from Venice; 8 species new to the collection.

MARCUS, Dr., Brazil. 6 specimens, 2 species, from Villa Bella, on the Amazon, Brazil; new to the collection.

MAYBURY, Dr., Edgartown. 10 specimens, 2 species, from Edgartown.

OTIS, Dr. JENKS. 4 specimens, 3 species, St. Thomas.

PATERSON, Dr., Brazil. 3 Serrasalmo, from Rio San Francisco, Brazil; new to the collection.

PEIRCE, H. A., Boston. Collected by A. A. SMITH. 27 specimens, 10 species, from Amour River, near Nicolajefsk; new to the collection.

PUTNAM, Capt. W. H. A., Salem. 66 specimens, 11 species, from Caldera, Chili; new to the collection.

SANBORN, F. G., Boston. 5 specimens, 3 species, from Newport-News, Virginia.

SCHIFF, ——. Salmo species, from Lake St. John, Canada East.

SCUDDER, Mrs. D. C., Boston. Skin of a Skate from Madras, India; new to the collection.

SHUTE, J. G., Woburn. 16 specimens, 10 species, from Beaufort, N. C.

SIBLEY, Capt. U. S. A. 13 specimens, 4 species fossil Shark's teeth; 1 Vertebra of a fish, from Falmouth, Va.; new to the collection.

SMITH, C. M., Norway, Me. 29 Pomotis appendix, from Ponds in Norway, Me.

STEVENS, Rev. D. W., Mansfield. 26 Alausa tyrannus, from Taunton River.

STORY, A. W., Rockport. 1 Prionotus, from Pigeon Cove.

TENNEY, Professor S., Cambridge. 6 specimens, 1 species, from Milford, N. H.

THAYER, N., Boston. 1 Salmon, from Boston Market.

THOMSON, J. H., New Bedford. 2 specimens, 2 species, from Clark's Cove, New Bedford. 1 species new to the collection.

TORREY, R., Boston. 49 specimens, 22 species, from Pelew Islands. 6 species new to the collection.

VOUGA, Capt. A., Neufchatel. 8 specimens, Salmo, from Lake of Neufchatel, Switzerland.

WHITE and HOW, Messrs. A Fossil fish, from the Albert Mine, N. B. New to the collection.

WILLIAMS, B., Boston. 7 Osmerus viridescens, from Jamaica Pond.

UNKNOWN. 76 specimens, 23 species, from (East Indies.) (?) 4 specimens new to the collection.

Received in Exchange.

FREE PUBLIC MUSEUM OF LIVERPOOL, ENGLAND. 21 specimens, 5 species, from the River Nile; new to the collection. 1 Cyclopterus, from mouth of the Mersey; new to the collection. 1 Gymnotus, from Guiana, S. A.

C. L. SALMIN, Hamburg. 56 specimens, 40 species, from Java; 23 species new to the collection. 42 specimens, 25 species, from Singapore; species new to the collection. 17 specimens, 12 species, from Zanzibar; 10 specimens, 6 species, from Canton; 3 species new to the collection. 4 specimens, 2 species, from Japan; 8 specimens, 5 species from Manilla; 4 species new to the collection. 2 specimens, 2 species, from East Africa; 2 specimens, 2 species, from Cochinchina; 1 species new to the collection. 4 specimens, 2 species, from Kattagat, and 2 specimens, 1 species, from Jutland; 2 species new to the collection. 1 specimen, 1 species, from Elbe; 1 species new to the collection. 3 specimens, 3 species, no locality.

SMITHSONIAN INSTITUTION, Washington, D. C. 6 specimens, 6 species, (Types,) from Coast of California; 3 species new to the collection.

Received from the Gray Fund.

ATWOOD, Capt. N. E., Provincetown. 159 specimens, 26 species, from Cape Cod.

COOKE, C., M. C. Z. 52 specimens, 15 species, from Zanzibar, Africa; 10 species new to the collection. 20 specimens, 12 species, from Mozambique; 10 species new to the collection.

GUGGENHEIM, M., M. C. Z. 92 specimens, 5 species, from Yarmouth.

JOHNSON, B., Nahant. 9 specimens, 5 species, from Nahant.

POEY, Professor F., Havana. 26 specimens, 26 species, from Cuba; 6 species new to the collection. 2 specimens, 2 species, from St. Domingo.

PUTNAM, F. W., M. C. Z. 2,000 specimens, 39 species; young of 20 species; 18 preparations of the brains and internal organs, from Lake Champlain; 4 species new to the collection.

RICH, J. G., Upton, Me. 43 specimens, 7 species, from Richardson and Umbagog Lakes, Me.; 4 species new to the collection.

STIMPSON, WM., Washington, D. C. 27 specimens, 14 species, from Oban, Scotland; 7 species new to the collection. 48 specimens, 18 species, from Milford Haven, S. Wales; 5 species new to the collection. 118 specimens, 25 species, from the mouths of the Mersey and Dee; 8 species new to the collection.

BOUGHT. 1 Diodon, from Port-au-Prince, Hayti; 10 Temnodon, from Yarmouth.

Statement in regard to Specimens sent from the Museum.

South African Museum, Cape Town, Africa, L. LAYARD, Esq., Director. 360 specimens, 161 species.

Zoölogical Museum of Leyden, Holland, Professor SCHLEGEL, Director. 412 specimens, 177 species.

Zoölogical Museum of Strassburg, France, Professor SCHIMPER, Director. 319 specimens, 159 species.

Zoölogical Museum of Stuttgart, Wurtemberg, Professor KRAUSS, Director. 276 specimens, 134 species.

Zoölogical Museum of Christiana, Norway, Professor SARS, Director. 324 specimens, 136 species.

Zoölogical Museum of University in Vienna, Austria, Professor KNERR, Director. 196 specimens, 82 species.

Zoölogical Museum of Darmstadt, Germany, Professor KAUP, Director. 361 specimens, 148 species.

Museum of the Academy of Geneva, Switzerland, Professor PICTET, Director. 204 specimens, 77 species.

Anatomical Museum of Vienna, Austria, Professor HYRTT, Director. 303 specimens, 109 species.

Free Public Museum of Liverpool, England, T. J. MOORE, Esq., Director. 236 specimens, 104 species.

Museum of the University of Montpellier, France, Professor MARTINS, Director. 242 specimens, 111 species.

J. G. A. SALMIN, *Hamburg*. 780 specimens, 94 species.

Professor GEGENBAUR, *Jena, Germany*. 40 specimens, 19 species.

Professor VON SIEBOLD, *Munich, Bavaria*. 39 specimens, 18 species.

Professor R. WAGNER, *Göttingen*. 7 specimens, 4 species.

Lyceum of Natural History, of Williams College, Mass., S. M. BUCK, Curator. 70 specimens, 37 species.

Boston Society of Natural History, Boston, Mass., F. W. PUTNAM, Curator. 344 specimens, 108 species.

State Collection of Natural History, Boston, Mass., C. L. FLINT, Secretary. 68 specimens, 30 species.

State Normal School, Salem, Mass., Professor CROSBY, Principal. 133 specimens, 64 species.

Professor WYMAN, *Cambridge, Mass.* 1 specimen, 1 species.

Professor HAMLIN, *Waterville College, Maine*. 1 specimen, 1 species.

Total number of specimens, 4,766, of 189 different species.

Report on the Collection of Insects, by A. S. PACKARD, JR.

Good progress has been made during the past year in the final arrangement of the Insects. Mr. SCUDDER has placed on exhibition in the cases all the Orthoptera in the collection, having completed their arrangement, begun last year. He has also completed a temporary arrangement of several families of diurnal Lepidoptera, illustrating the European and Brazilian faunæ. Moreover, by removing from the cases boxes of unarranged insects, he has made more room for exhibiting other families. I have spent considerable study upon the hymenopterous families, Crabronidæ, Larridæ, Pompilidæ, and Sphegidæ, arranging them by faunal and systematic collections, which are placed in boxes, ready to be carried up stairs. Besides, all the Vespidæ in the collection are arranged in the same way; and there is a small typical collection representing the different families of Hymenoptera, which has been set aside to be placed in the room illustrating the principal types of animals.

There has been a steady increase in the number of specimens brought in during the year; the number amounting to nearly

17,000, and comprising between 2,000 and 3,000 species. By the Gray Fund has been secured 346 species, 1,516 specimens of different sub-orders, from Europe, labelled by Dr. IMHOFF, Basle, Switzerland. Also from Mr. COOKE, a very large collection, embracing 324 species, 2,577 specimens, from Zanzibar, Mozambique, and Cabasira, Africa. Mr. S. I. SMITH has continued to send valuable collections from Norway, Me.

By donation, a very large collection of insects from the Western States, and various localities in New England, with miscellaneous collections from China, Africa, South America and Hayti, altogether numbering 876 species, 2,476 specimens, have been received from Miss A. M. EDMANDS. Next in importance is a lot of insects from Cambridge and Norway, Me., presented by Mr. A. E. VERRILL, and amounting to 308 species, 1,298 specimens.

A collection sent from Kanagawa, Japan, by Mr. J. T. GULICK, of insects of all orders, with a large number of duplicates, both dry and alcoholic, is a most valuable addition. They are at once to be properly mounted, spread, and arranged in boxes for exhibition.

Of very special interest is a large series of the nests and young of several species of Humble Bees (*Bombus*) and Carpenter's Bees (*Megachile*) collected mostly by Mr. F. W. PUTNAM at Warwick, Mass., and Bridport, Vt. There are over a thousand specimens, either dry and pinned, or in alcohol, with their cells. Mr. Putnam has made some observations on the habits of these species, which will prove of great interest to entomologists. These colonies of bees and wasps, with many of their parasites, both in all stages of development, and in such abundance, afford excellent material, not only for ascertaining the amount of variation in the larvæ and pupæ of the different species and genera of bees, but also the mode of development of the pupa from the larva. In this connection should be urged the great importance of collecting at different seasons of the year whole colonies of our social and solitary bees and wasps, our ants and other hymenoptera. They can be easily collected in alcohol, and should be accompanied with the date of capture and other notes of interest. Already do such collections as these, and of larvæ and pupæ of other insects, obtained in great numbers, often by whole

broods, constitute an important feature in the entomological collections of the Museum. It is intended to place very soon upon the shelves of the Insect room a large number of bottles containing specimens, illustrating the early stages of the different orders of insects.

In exchange, there have been sent to the Lyceum of Natural History of Williams College, 81 species, 99 specimens of diurnal Lepidoptera, from North America and Europe. Of American Lepidoptera sent to Henry Edwards, Melbourne, Australia, there are 101 species, 165 specimens. Also to J. Akhurst, 3 species, 4 specimens of Coleoptera from Africa.

There have been sent for examination to P. R. Uhler, Baltimore, all the collection of pinned Hemiptera, comprising 230 specimens from New England and the Middle States, and those collected on the Saskatchewan River and Lake Winnepeg, by Mr. Scudder. 89 species, 153 specimens of Chilognaths have been sent to H. C. Wood, Jr.; and there have been received from the Smithsonian Institution, the types of species of Chilopoda described by the same gentleman.

I subjoin a table, giving the names of all those persons who have increased the collection of Insects, with the localities and number of specimens, and approximate number of species. Other details, as to the date of capture, the date of reception, and the condition of the specimens themselves, are entered at length in the Museum book.

Insects received from October 20, 1862, to October 20, 1863.

ACKERMAN, Professor. 2 species, 2 specimens Arachnida, from Port-au-Prince, Hayti.

AGASSIZ, Professor L. 1 species, 2 specimens, Diptera; 1 species, 3 specimens, Neuroptera, from Wareham, Mass. Total, 2 species, five specimens.

ALLEN, J. A., Springfield, Mass., Student in the Zoölogical Department of the Scientific School. 7 species, 96 specimens Arachnida, from Springfield, Mass.; 1 species, 1 specimen Diptera; 1 species, 15 specimens Arachnida, from Cambridge, Mass.; 1 species, 20 specimens Hemiptera, (Lice,) no locality. Total, 10 species, 132 specimens.

BARNARD, J. M., Esq., Boston. 3 species, 3 specimens Coleoptera; 2 species, 2 specimens Orthoptera; 1 species, 1 specimen Myriapoda, from China. Total, 6 species, 6 specimens.

BICKMORE, A. S., Cambridge, Student in the Zoölogical Department of the Scientific School. 5 species, 5 specimens Lepidoptera; 2 species, 2 specimens Diptera; 16 species, 243 specimens Coleoptera; 2 species, 60 specimens Hemiptera; 2 species, 12 specimens Orthoptera; 7 species, 64 specimens Neuroptera, from Newbern, N. C.; 1 species, 1 specimen Hymenoptera; 3 species, 3 specimens Lepidoptera; 16 species, 57 specimens Coleoptera; 1 species, 1 specimen, Hemiptera, from Beaufort, N. C. Total, 55 species, 449 specimens.

BOARDMAN, Mrs., Roxbury. 15 species, 30 specimens Lepidoptera; 5 species, 10 specimens Coleoptera, from Roxbury. Total, 20 species, 40 specimens.

BRIDGHAM, Mrs. S. W., New York City. 3 species, 186 specimens Hymenoptera; 74 species, 264 specimens Lepidoptera; 1 species, 1 specimen, Diptera; 4 species, 7 specimens Coleoptera; 1 species, 1 specimen, Hemiptera; 2 species, 2 specimens Neuroptera; 2 species, 2 specimens Arachnida, from Seekonk, Mass. Total, 87 species, 453 specimens.

CARNEY, O., Cambridge. 1 species, 12 specimens, and nest of *Polistes*, from Cambridge.

DALL, W. H., Medford, Mass. 1 species, 1 specimen Scolopendra, from Nagasaki, Japan; 1 species, 1 specimen Scorpion, from Calcutta; 1 species, 1 specimen Hymenoptera; 2 species, 200 specimens Lepidoptera; 17 species, 32 specimens Coleoptera; 1 species, 1 specimen of Myriapoda, from Medford; 1 species, 200 specimens *Clisiocampa*; 2 species, 36 specimens of Ants and their young; 3 species, 3 specimens Lepidoptera; 1 species, 1 specimen Coleoptera; 1 species, 1 specimen Orthoptera; 1 species, 1 specimen Arachnida, from Exeter, N. H.; 12 species, 112 specimens Ants, &c.; 21 species, 28 specimens Lepidoptera; 8 species, 108 specimens Diptera; 15 species, 19 specimens Coleoptera; 1 species, 5 specimens Hemiptera; 1 species, 2 specimens Orthoptera; 9 species, 12 specimens Neuroptera; 3 species, 5 specimens Arachnida; 1 species, 1 specimen of Myriapoda, from Medford. Total, 97 species, 727 specimens.

DAVIS, G. N., Esq. 8 species, 8 specimens of Lepidoptera; 3 species, 3 specimens Coleoptera.

EDMANDS, Miss A. M., Salem. 16 species, 28 specimens Hymenoptera; 50 species, 90 specimens Lepidoptera; 22 species, 69 specimens Diptera; 128 species, 254 specimens Coleoptera; 17 species, 44 specimens Hemiptera; 8 species, 19 specimens Orthoptera; 24 species, 63 specimens Neuroptera, from Cambridge; 4 species, 32 specimens of Ants; 35 species, 74 specimens Lepidoptera; 14 species, 15 specimens Diptera; 34 species, 79 specimens Coleoptera; 1 species, 1 specimen Hemiptera; 5 species, 58 specimens Orthoptera; 8 species, 53 specimens

Neuroptera; 9 species, 95 specimens Arachnida; 1 species, 1 specimen Myriapods, from Bridport, Vt.; 25 species, 75 specimens Lepidoptera; 20 species, 220 specimens Arachnida, from Warwick; 9 species, 110 specimens Coleoptera, from Williamstown; 12 species, 16 specimens Hymenoptera; 16 species, 75 specimens Lepidoptera; 16 species, 25 specimens Diptera; 28 species, 40 specimens Coleoptera; 16 species, 37 specimens Hemiptera; 6 species, 12 specimens Orthoptera, from West Beach, Mass.; 2 specimens of *Cicoda septemdecim*, from Virginia; 15 species, 15 specimens Lepidoptera; 14 species, 16 specimens Coleoptera, from Para, S. A.; 4 species, 20 specimens Hymenoptera; 7 species, 22 specimens Lepidoptera; 16 species, 100 specimens Coleoptera; 8 species, 50 specimens Hemiptera; 1 species, 2 specimens, Orthoptera; 1 species, 2 specimens Neuroptera, from China; 14 species, 27 specimens Hymenoptera; 5 species, 15 specimens Lepidoptera; 17 species, 20 specimens Diptera; 30 species, 50 specimens Coleoptera; 3 species, 6 specimens Hemiptera; 4 species, 12 specimens Orthoptera; 3 species, 3 specimens Neuroptera; 1 species, 1 specimen Arachnida, from Bethel, Me.; 15 species, 16 specimens Coleoptera; 10 species, 10 specimens Hemiptera; 4 species, 6 specimens Orthoptera; 2 species, 2 specimens Myriapoda, from West Northfield, Cook Co., Ill.; 2 species, 2 specimens Coleoptera, from Africa; 90 species, 400 specimens Coleoptera; 2 species, 2 specimens Hemiptera, from Nebraska; 30 species, 235 specimens Coleoptera, from Kansas; 1 species, 16 specimens Coleoptera, from Slave Lake; 4 species, 20 specimens Coleoptera, from Melrose, Mass; 6 species, 10 specimens Coleoptera from Hayti; 20 species, 30 specimens Lepidoptera, from Compton, N. H.; 1 species, 1 specimen Hymenoptera; 1 species, 1 specimen Diptera; 4 species, 4 specimens Coleoptera; 1 species, 1 specimen Hemiptera; 3 species, 3 specimens Orthoptera, from Danville, Ky.; 12 species 14 specimens Coleoptera, from Burlington, Vt. Total, 876 species, 2,476 specimens.

EDWARDS, W. H., Esq., Newburg, N. Y. 19 species, 22 specimens Lepidoptera, from Manilla, E. I.

ELLIS, P. P. 18 species, 119 specimens Lepidoptera; 21 species, 184 specimens Coleoptera; 3 species, 37 specimens Hemiptera; 1 species, 9 specimens Neuroptera, from Hong-Kong, China.

GREENE, S. A. 1 species, 1 specimen Lepidoptera; 2 species, 2 specimens Coleoptera; 1 species, 1 specimen Myriapoda, from Seabrook Island, S. C. Total, 4 species, 4 specimens.

FITCH, Miss C. M., Mount Vernon, Westchester Co., New York. 1 species, 1 specimen Hymenoptera; 2 species, 2 specimens Lepidoptera; 2 species, 2 specimens Diptera; 1 species, 1 specimen Coleoptera; 1 species, 1 specimen Hemiptera; 5 species, 5 specimens Orthoptera; 1 species, 1 specimen Neuroptera; 1 species, 1 specimen Arachnida,

from Mount Vernon, Westchester Co., N. Y.; 1 nest of Hymenoptera; 1 cocoon of *Samia Cecropia*; 1 nest of Arachnida from New Bedford. Total, 15 species, 20 specimens.

FLETCHER, Rev. J. C. 2 species, 3 specimens Hymenoptera; 15 species, 20 specimens Coleoptera; 1 species, 1 specimen Lepidoptera; 4 species, 4 specimens Hemiptera; 6 species, 7 specimens Orthoptera; 2 species, 40 specimens Neuroptera; 2 species, 2 specimens Myriapoda, from Manaos, Rio Negro, Brazil; 2 species, 6 specimens Coleoptera; 3 species, 3 specimens Lepidoptera; 4 species, 12 specimens Arachnida, from Para, S. A.; 2 species, 10 specimens Arachnida, from Villa Bella, S. A. Total, 42 species, 106 specimens.

GULICK, J. T., Esq. Many species, and a large number of specimens of Hymenoptera, Lepidoptera, Diptera, Coleoptera, Hemiptera, Orthoptera, Neuroptera, Arachnida, and Myriapoda, from Kanagawa, Japan, not yet counted.

HART, C. F., St. John, N. B., Student in the Zoölogical Department of the Scientific School. 3 species, 14 specimens Hymenoptera; 7 species, 7 specimens Diptera; 6 species, 10 specimens Coleoptera; 1 species, 30 specimens Hemiptera; 1 species, 8 specimens Orthoptera; 7 species, 45 specimens Neuroptera; 2 species, 3 specimens Arachnida, from Cambridge. Total, 27 species, 117 specimens.

JEFFRYS, D., Obidos, Brazil. 1 species, 1 specimen Coleoptera; 1 species, 1 specimen Orthoptera; 1 species, 2 specimens Arachnida, from Brazil. Total, 3 species, 4 specimens.

LACERDA, Don ANTONIO DE. 80 species, 113 specimens Coleoptera, and 1 species, 1 specimen Myriapoda, from Bahia, Brazil. Total, 81 species, 114 specimens.

LYMAN, THEODORE, Esq., Assistant in the Museum of Comparative Zoölogy. 7 species, 26 specimens Lepidoptera, and eggs of Bombyces; 5 species, 26 specimens Diptera; 2 species, 10 specimens Coleoptera; 1 species, 10 specimens Arachnida, from Brookline. Total, 4 species, 50 specimens.

MARCUS, M. D., Brazil. 1 species, 1 specimen Lepidoptera; 5 species, 15 specimens Orthoptera; 1 species, 1 specimen Myriapoda, from Villa Bella, River Amazon. Total, 7 species, 17 specimens.

NILES, W. H., Student in the Zoölogical Department of the Scientific School. 1 species, 11 specimens Diptera; 1 species, 8 specimens of Fleas from Hare; 22 species, 30 specimens Lepidoptera; 1 species, 1 specimen Diptera; 4 species, 50 specimens Orthoptera; 5 species, 19 specimens Neuroptera, from Worthington, Mass. Total, 34 species, 119 specimens.

PACKARD, A. S., Jr., Student in the Zoölogical Department of the Lawrence Scientific School. 60 species, 200 specimens Lepidoptera; 24 species, 205 specimens Hymenoptera; 10 species, 20 specimens Diptera; 4 species, 4 specimens Coleoptera; 11 species, 31 specimens Neuroptera, from Brunswick, Me.; 3 species, 3 specimens Hemiptera; 3 species, 6 specimens Neuroptera, from Fresh Pond, Cambridge; 15 species, 50 specimens Lepidoptera; 8 species, 15 specimens Coleoptera; 2 species, 25 specimens Arachnida, (nests and eggs,) from Cambridge; 12 species, 100 specimens Lepidoptera, from Maryland. Total, 152 species, 650 specimens.

PRINCE, F. A., Esq., Winchester. 1 species, 1 specimen Lepidoptera.

PUTNAM, F. W., Student in the Zoölogical Department of the Scientific School. 3 species, with nests and young, of *Bombus*; 2 species do. of *Megachile*; 1 species, 10 specimens Lepidopterous parasites; 3 species, 54 specimens Hymenopterous parasites; 1 species, 6 specimens Acaria, from Bridport, Vt.; 3 species *Bombus*; 1 species, 4 specimens Lepidopterous parasites; 1 species, 6 specimens Coleopterous parasites; 1 species, 6 specimens *Acarus*, from Warwick, Mass. Total, 14 species, 1,105 specimens.

RUSSELL, ROBERT, Esq. 1 species, 2 specimens Coleoptera, from Lausanne, Switzerland.

SALISBURY, STEPHEN. 1 specimen Coleoptera, from Yucatan.

SCUDDER, Mrs. D. C., Periaculum, Southern India. 3 species, 4 specimens Hymenoptera; 9 species, 10 specimens Lepidoptera; 13 species, 29 specimens Coleoptera; 21 species, 24 specimens Orthoptera; 1 species, 1 specimen Neuroptera; 6 species, 31 specimens Arachnids; 5 species, 5 specimens Myriapoda, from Periaculum, S. India. Total, 58 species, 104 specimens.

SCUDDER, S. H., Graduate of the Zoölogical Department of the Scientific School. 8 species, 16 specimens diurnal Lepidoptera, from England.

SHURTLEFF, C. A., Brookline. 7 species, 8 specimens Hymenoptera; 9 species, 16 specimens Lepidoptera; 12 species, 17 specimens Diptera; 8 species, 11 specimens Coleoptera; 10 species, 14 specimens Hemiptera; 10 species, 47 specimens Orthoptera; 6 species, 16 specimens Neuroptera, from the White Mountains, N. H.; 1 species, 1 specimen Hymenoptera; 2 species, 2 specimens Lepidoptera; 1 species, 6 specimens Diptera; 7 species, 33 specimens Coleoptera; 1 species, 1 specimen Hemiptera; 2 species, 75 specimens Orthoptera; 1 species, 1 specimen Arachnida, from Brookline. Total, 77 species, 248 specimens.

SHUTE, J. G., Woburn. 3 species, 4 specimens Hymenoptera; 4 species, 4 specimens Lepidoptera; 3 species, 3 specimens Diptera; 44 species, 332 specimens Coleoptera; 8 species, 83 specimens Hemiptera;

5 species, 31 specimens Orthoptera; 1 species, 1 specimen Neuroptera; 3 species, 14 specimens Arachnida; 4 species, 6 specimens Myriapoda, from Beaufort, N. C. Total, 75 species, 480 specimens.

THAXTER, MRS. L. L., Newton. 1 specimen Coleoptera, from Newton.

TORREY, R., Esq. 2 species, 6 specimens Orthoptera; 3 species, 4 specimens Arachnida; 1 species, 2 specimens Myriapoda, from the Pelew Islands. Total, 6 species, 12 specimens.

VERRILL, A. E., Graduate in the Zoölogical Department of the Scientific School. 1 species of *Bombus*, with the nest and young, 100 specimens; 1 species of *Vespa*, with the nest and young, about 350 specimens; 1 species of *Polistes*, with the nest and young, 37 specimens; 8 species, 14 specimens Hymenoptera; 32 species, 60 specimens Lepidoptera; 4 species, 5 specimens Diptera; 25 species, 36 specimens Coleoptera; 16 species, 323 specimens Hemiptera; 8 species, 54 specimens Orthoptera; 12 species, 45 specimens Neuroptera; 1 species, 14 specimens Myriapoda, from Cambridge; 3 species, 16 specimens Hymenoptera; 80 species, 91 specimens Lepidoptera; 14 species, 17 specimens, Diptera; 61 species, 75 specimens Coleoptera; 10 species, 18 specimens Hemiptera; 2 species, 7 specimens Orthoptera; 16 species, 27 specimens Neuroptera; 1 species, 5 specimens Arachnida, from Norway, Me. Total, 308 species, 1,298 specimens.

MISCELLANEOUS. Insects of all orders, with no localities given—24 species, 264 specimens.

By Exchange.

AKHURST, J., Esq. 5 species, 9 specimens, Hemiptera, from Manilla and Africa; 1 species, 1 specimen Arachnida, from New York.

SALEM NORMAL SCHOOL. Duplicates of the collection of W. W. Goodhue, Madagascar. 2 species, 11 specimens Lepidoptera; 3 species, 3 specimens Orthoptera; 1 species, 1 specimen Arachnida; 1 species, 1 specimen Myriapoda. Total, 7 species, 16 specimens.

Purchased with the Gray Fund.

COOKE, CALEB. 39 species, 160 specimens Hymenoptera; 98 species, 267 specimens Lepidoptera; 9 species, 65 specimens Diptera; 88 species, 543 specimens Coleoptera; 19 species, 209 specimens Hemiptera; 24 species, 332 specimens Orthoptera; 18 species, 106 specimens Neuroptera; 150 specimens Arachnida; 150 specimens Myriapoda, from Zanzibar, Africa. 1 species, 1 specimen Hymenoptera; 23 species, 36 specimens Lepidoptera; 13 species, 31 specimens Coleoptera; 2 species, 2 specimens Hemiptera; 6 species, 25 specimens

Orthoptera; 1 species, 1 specimen Neuroptera; 3 species, 7 specimens Arachnida; 5 species, 20 specimens from Mozambique. Also, from the same locality, in gum copal: 47 specimens Hymenoptera; 4 specimens Diptera; 7 specimens Coleoptera; 3 specimens Hemiptera; 11 specimens Orthoptera; 15 specimens Neuroptera; 3 specimens Arachnida. 7 species, 27 specimens Coleoptera; 4 species, 4 specimens Hemiptera; 8 species, 59 specimens Orthoptera; 1 specimen Arachnida; 2 species, 2 specimens Myriapoda, from Cabasira, Africa. Total, 324 species, 2,577 specimens.

IMHOFF, Dr., Basle, Switzerland. 23 species, 189 specimens Hymenoptera; 47 species, 117 specimens Lepidoptera; 17 species, 86 specimens Diptera; 244 species, 1,061 specimens Coleoptera; 15 species, 63 specimens Neuroptera, from Switzerland. Total, 346 species, 1,516 specimens.

SMITH, S. I., Norway, Me. 6 species, 7 specimens Hymenoptera; 100 species, 205 specimens Lepidoptera; 8 species, 14 specimens Diptera; 80 species, 131 specimens Coleoptera; 18 species, 73 specimens Hemiptera; 9 species, 65 specimens Orthoptera; 18 species, 31 specimens Neuroptera, from Norway, Me. Total, 240 species, 524 specimens.

OCTOBER 20, 1863.

Report on the Crustacea, by A. AGASSIZ.

The principal additions which have been made to this class, are those of Captain PUTNAM, who has sent valuable collections from the west coast of South America. The collection of Dr. STIMPSON, made on the coasts of Great Britain, has added a large number of the common English species to our Museum. Mr. C. COOKE, of Salem, has sent a large number of specimens from Zanzibar, and Mr. BICKMORE has added a number of species from Beaufort, N. C. Dr. W. STIMPSON, of the Smithsonian, has been engaged for a few months during the past year, in cataloguing the Crustacea. He has arranged the species from the west coast of North America, from China and the East Indies. The duplicates from these localities are now available for exchange. The specimens have been catalogued and put into glass jars, and are now on exhibition in the gallery of the northeast

room. The following are the additions to the Museum from different sources :—

THEODORE LYMAN, of Brookline. 6 species, 54 specimens. Collected at Venice and in Tyrol.

ROLLINS TORREY, of Manilla. 6 species, 14 specimens, from Manilla and the Pelew Islands.

AUGUSTINE HEARD, Esq., Boston. One specimen, from Shanghae.

A. P. CHAMBERLIN, of Boston. 4 species, 5 specimens, from Shanghae.

Captain W. H. A. PUTNAM, of Salem. 7 species and about 120 specimens from Mejillones; 10 species, 91 specimens from Caldera, Chili.

Dr. MARCUS, of Villa Bella. 2 species, from the Amazon.

Rev. J. C. FLETCHER, of Newburyport. 2 species, 4 specimens, from Para, S. A.

A. S. BICKMORE, Cambridge. 21 species, 237 specimens, Beaufort, N. C.

A. E. VERRILL, Cambridge. 2 species, from Chelsea Beach.

Dr. STERNBERGH, Panama. 10 species, 152 specimens, from Panama.

Dr. JENKS OTIS, U. S. N. 1 species, from Port-au-Prince.

C. F. HARTT, St. John. 6 species, 380 specimens, from Cambridge.

Dr. J. W. PAIGE, U. S. A. 4 species, from Stono River, S. C.

JOHN BARTLETT, Cambridge. 1 species, from the Florida reefs.

J. L. GULICK. 10 species, 30 specimens, from Kanagawa, Japan.

Professor C. DEWEY, Rochester, N. Y. 1 specimen, 20 specimens, from Rochester.

Dr. S. A. GREENE, U. S. A. 2 species, 7 specimens, Seabrook Island, S. C.

J. G. SHUTE, Woburn. 4 species, 7 specimens, Beaufort, N. C.

A. AGASSIZ, Cambridge. 8 species, 152 specimens, Nahant; 3 species, 47 specimens, Yarmouth.

With the Gray Fund there have been obtained from—

Dr. WM. STIMPSON, of Cambridge. 39 species, 164 specimens, from Oban; 14 species, 175 specimens, from Liverpool; 27 species, 98 specimens, from Milford.

C. COOKE, Salem. 39 species, 245 specimens, from Zanzibar.

In Exchange.

From the SMITHSONIAN INSTITUTION. 38 species, about 500 specimens, principally from Lower California, collected by Mr. Xanthus. The species are mostly named by Dr. Stimpson.

This makes a total of 273 species, 3,042 specimens. There has been sent only one collection of Duplicates to Professor H. Milne-Edwards, of the Jardin des Plantes, containing 45 species, a few from Hong Kong, the remainder from the west coast of North America.

Report on the Annulata, by A. AGASSIZ.

Two very important additions have been made during the past year to this class—the collections of Dr. Stimpson of English Annelids, and the Worms of the German Ocean, which have been received in exchange from Mr. C. L. Salmin, of Hamburg. These additions have not yet been catalogued.

Additions during 1862-63.

- DR. W. STIMPSON, Smithsonian. 28 species, 105 specimens, Oban ;
 10 species, 67 specimens, Liverpool ; 15 species, 26 specimens, Milford.
 THOS. J. MOORE, Liverpool Free Museum. 2 species, from Irish Sea.
 A. E. VERRILL, Cambridge. 1 species.
 DR. STERNBERGH, Panama. 3 species.
 MISS TALLANT, Nantucket. 1 species.
 C. L. SALMIN, Hamburg. 13 species, 17 specimens.
 DR. JENKS OTIS, U. S. N. 1 species, 3 specimens, Port-au-Prince.
 C. F. HARTT, Cambridge. 3 species, 310 specimens.
 W. H. NILES, Cambridge. 1 species, Worthington.
 JOHN BARTLETT, Cambridge. 3 species, 5 specimens, Florida.
 F. W. PUTNAM, Cambridge. 3 species.
 A. S. BICKMORE, Cambridge. 2 species, Beaufort, N. C.
 W. GLEN, Cambridge. 1 species, Nahant.
 A. AGASSIZ, Cambridge. 5 species, 45 specimens, Nahant.

Report on Mollusca, by ALBERT S. BICKMORE.

More than twice as many specimens have been added to the collection of Mollusca during the past year, than were received the year previous. Although a large portion of the specimens are dry, yet full series of nearly every species have been received in alcohol. The dry specimens have been unpacked, and are arranged in drawers fully labelled, in the

attic and laboratories, and the work of identifying the species and selecting full series for the faunal and systematic collections, that the great number of duplicates may be made available for exchange, is now going on.

The alcoholic specimens have been transferred to kegs and jars, like all those received during the previous years; but the work of identifying and separating them in the same manner as the dry specimens is at present deferred for the want of alcohol and bottles.

Nearly all the finest collections of shells, *e. g.*, that made by Mr. Cooke at Zanzibar, and those made by Mr. Garrett at the Sandwich Islands, Kingsmills Islands, and Feejee group, are not on exhibition in the cases, because their final arrangement is not yet complete, and the whole work would be lost in any attempt to place them on the few shelves now empty.

Mr. Bickmore's Beaufort collection will soon be worked up, and will then be temporarily put up in the northeast room, in the case now partly filled with land shells. Among the Bryofoa received, a splendid cluster of Eschara, presented by Mr. Dabney, deserves special mention.

Mollusca received at the Museum of Comparative Zoölogy during the year 1863.

AGASSIZ, A. Nahant, 2 species, 96 specimens.

AGASSIZ, Professor L. Nahant, 7 species, 4,037 specimens.

ANTHONY, J. G. Australia, 7 species, 14 specimens; New Zealand, 1 species, 3 specimens; New Hebrides, 1 species, 3 specimens; Monterey, Cal., 1 species, 1 specimen; Bolivia, 1 species, 21 specimens. Total, 11 species, 42 specimens.

BICKMORE, ALBERT S. Beaufort, N. C., 117 species, 14,484 specimens; Newbern, N. C., 8 species, 209 specimens; Plymouth, N. C., 4 species, 4 specimens; St. George, Me., 5 species, 3,215 specimens. Total, 134 species, 17,913 specimens.

CABOT, Dr. S., Boston. Fort Macon, N. C., 4 species, 58 specimens.

CHAMBERLIN, A. P. Shanghae, 1 species, 1 specimen.

COUTINHO, M. Brazil, 1 species, 4 specimens.

DABNEY, W. H. A magnificent cluster of Eschara.

DALL, C. H., Medford. New Zealand, collected by Mr. J. Whitridge, of Baltimore, 14 species, 628 specimens.

DOW, Capt. P. P. Muscat, 10 species, 150 specimens.

DROWNE, Rev. T. STAFFORD, Brooklyn, N. Y., (through Mr. Bickmore,) 1 specimen, 1 species.

EATON, W., Boston. Mollucca Islands. 8 species, 9 specimens.

FIVAZ, Rev. M., Lausanne, Switzerland. Several species and many specimens.

FOLIN, MARQUIS DE. Pouillac, Gironde. 10 species, 100 specimens.

FLETCHER, Rev. J. C., Rio Janeiro. 4 species, 63 specimens; Para, South America, 5 species, 5 specimens.

GLEN, W., Nahant. Nidus of Natica.

GULICK, Mr. Kanagawa, Japan, 4 species, 7 specimens.

GUNNING, Mr. W. D., Chicago. Alabama and Michigan, 26 species, 44 specimens.

HARTT, C. F., Lynn Beach. 1 species, 100 specimens; Cambridge, 1 species, 100 specimens; Massachusetts Bay, 8 species, 52 specimens, Total, 10 species, 252 specimens.

LYMAN, TH., Boston. Venice and Tyrol, 15 species, 81 specimens.

NICHOLS, C. B., Brooklyn, N. Y., (through Mr. Bickmore.) Various localities, 17 species, 59 specimens.

OTIS, Dr. JENKS, Port-au-Prince. 8 species, 14 specimens.

PACKARD, A. S., Jr., Brunswick, Me. Fossils. 6 species, 53 specimens.

PUTNAM, Captain W. H. A., Salem. Mexillones, 3 species, 14 specimens; Caldera, Chili, 24 species, 1,229 specimens.

PUTNAM, FR. W. Lake Champlain, 30 species, 306 specimens.

THOMPSON, J. H., New Bedford. 1 species, 10 specimens.

SHOVE, Dr. GEORGE, Yarmouth. 1 species, 32 specimens.

SHUTE, JAMES G., Woburn. Newbern battle-field, N. C., 46 species, 130 specimens.

STERNBERGH, Dr. J. H. Panama, 19 species, 77 specimens.

VERRILL, A. E., B. S. Kingsmills Islands, 4 species, 16 specimens.

By Exchange.

SALMIN, C. S. Azores, 2 species, 2 specimens.

SMITHSONIAN INSTITUTION. Various localities, 24 species, 100 specimens.

Secured with the Gray Fund.

COOKE, CALEB W. Zanzibar, 147 species, 1,432 specimens; Mozambique, 38 species, 1,130 specimens; Cabosira, 4 species, 11 specimens.

PARREYS, LUDWIG, Vienna. Various localities, 228 species, 1,607 specimens.

STIMPSON, Dr. WILLIAM. Oban, 112 species, 1,201 specimens; Liverpool, 26 species, 220 specimens; Milford, 66 species, 361 speci-

mens; East Coast of North America, 269 species, 1,646 specimens; Hong Kong, 1 species, 2 specimens. Total, 473 species, 3,428 specimens. Grand total, 1,443 species, 33,594 specimens.

Report on the Echinoderms, by A. AGASSIZ.

During the past year the arrangement of the collection of Echinoids has been finished by Mr. A. Agassiz. The systematic, generic, and faunal collections, as far as it was possible, have been completed. The collection, owing to want of room, is stored in drawers ready for exhibition. The alcoholic portion has been put into glass jars, and is at present arranged systematically in the northeast room. Mr. Theodore Lyman has catalogued all the Ophiurans which had been added to the collection of the Museum during his absence from the United States. Mr. A. Agassiz has also commenced the final arrangement of the Starfishes, and continued the catalogue of the Holothurians.

The additions to the Echinoderms have been numerous and valuable. Among the most interesting should be mentioned a large collection obtained in exchange from the Smithsonian, containing many species collected by Dr. Stimpson in the North Pacific Exploring Expedition; quite a complete collection of British Echinoderms obtained from Dr. Stimpson; an important collection of living and fossil Echinoderms from the Chevalier Verany, of Nice. The collections of Mr. Cooke, at Zanzibar; of Captain Putnam, on the West Coast of South America; of Mr. Moore, from the Irish Sea; of Mr. Bickmore, from Beaufort, N. C.; and the collection of Mr. Salmin, from Japan; Dr. Sternbergh, from Panama. Of special value for a faunal collection is the large series of dry Echinoderms sent to the Museum by Mr. Van Brunt, from Acapulco. Professor Valenciennes, of the Jardin des Plantes, has sent a small but invaluable collection of Echini, which having been carefully compared with the original specimens of Lamarck in the Jardin des Plantes, may be considered as types of the species described in the *Hist. Nat. des Anim. sans Vertèbres*. A large number of duplicates have been sent to different institutions; three large collections are

still awaiting to be exchanged. The following institutions and persons have received duplicate collections :—

Professor HAMLIN, Waterville, Me., 8 species.

NORMAL SCHOOL, Salem, 36 species.

Professor KRAUSS, for the Royal Museum at Stuttgart, 122 species.

Professor SCHIMPER, for the Museum of Strassbourg, 108 species.

Professor SARS, for the University Museum, Christiania, 68 species.

Professor SCHLEGEL, for the University Museum, Leyden, 68 species.

Professor KNERR, for the Imperial Museum, Vienna, 68 species.

SMITHSONIAN INSTITUTION, Washington, 42 species.

Mr. A. M. EDWARDS, New York, 15 species.

WILLIAMS COLLEGE, 24 species.

Mr. LAPHAM, Milwaukie, Wis. Fossil, 17 species.

Making a total of about 2,400 specimens.

Additions from October 30, 1862, to October 30, 1863.

Captain W. H. A. PUTNAM, Salem. 5 species, 60 specimens, Mexico; 4 species, 975 specimens, Caldera, Chili.

THEODORE LYMAN, 2 species, 5 specimens, Venice.

LIVEPOOL FREE MUSEUM, 4 species, 31 specimens, from Irish Sea, through Mr. THOMAS J. MOORE.

Captain J. ANDERSON, 2 species, about 300 specimens, Havre.

M. LE MARQUIS DE FOLIN, Pouillac, 2 species, 9 specimens.

J. B. VERANY, Nice, 12 species, 131 specimens.

SMITHSONIAN INSTITUTION, 68 species, 74 specimens.

Dr. W. STIMPSON, Smithsonian. 17 species, 78 specimens, Oban; 5 species, 17 specimens, Liverpool; 12 species, 39 specimens, Milford.

Captain N. E. ATWOOD, Provincetown, 8 specimens of *Astrophyton*.

CAILLAUD, M., Nantes. Specimens of *Echinus* boring in rock.

A. S. BICKMORE, Beaufort, N. C., 18 species, 479 specimens.

Dr. STERNBERGH, Panama, 3 species, 4 specimens.

Dr. S. CABOT, 7 specimens *Anaperus*, Fort Macon, N. C.

A. E. VERRILL, 2 species, 5 specimens.

C. L. SALMIN, 13 species, 24 specimens.

Miss TENANT, 1 species, Jarvis Island.

C. COOKE, 3 species, 8 specimens, from Island of Cabosira; 10 species, 36 specimens, Zanzibar; Mozambique, 9 species, 90 specimens.

Dr. JENKS OTIS, U. S. N. 5 species, 18 specimens, from Port-au-Prince.

W. S. BEALE, 2 specimens *Astrophyton*, Eastport.

D. B. VAN BRUNT, Acapulco, 10 species, 243 specimens.

JARDIN DES PLANTES, Professor VALENCIENNES, 9 species

C. F. HARTT, 2 species, 25 specimens, Massachusetts Bay.
Dr. J. W. PAIGE, 2 species, Seabrook Island, S. C.
A. AGASSIZ, Yarmouth, 1 species; Nahant, 6 species.
Making a total of 240 species, 1,912 specimens.

Report on the Acalephs, by A. AGASSIZ.

The only large collection which has been added to this class, is the valuable series of Hydroids collected by Dr. Stimpson on the coasts of Great Britain, which contains nearly all the more common species of those shores. The specimens which have been added have all been catalogued by Mr. A. Agassiz. Mr. Burckhart has made a magnificent series of diagrams of Acalephs, for exhibition above the glass cases. The following are the additions made in this class:—

Dr. W. STIMPSON, Smithsonian; 21 species, from Oban; 5 species from Liverpool; 5 species, from Milford.

Dr. STERNBERGH, Panama, 1 species, from Panama.

C. COOKE, Salem, 30 specimens of Physalia, from Mozambique Channel.

C. F. HARTT, St. John, 2 Lucernariæ, Chelsea Beach.

A. S. BICKMORE, 2 Physaliæ, from Beaufort, N. C.

Professor F. POEY, Havana, 1 species, Havana.

A. AGASSIZ, Cambridge, 4 species, 63 specimens, Nahant.

Making a total of 40 species.

A small collection of seven species of Hydroids has been sent to the Lyceum of Natural History at Williamstown.

Report on the Collection of Corals and Polyps, by A. E. VERRILL.

The collection in this department is now in excellent order, and, with the exception of a large number of fossils and alcoholic specimens, is on exhibition in the show cases. Nearly all the recent specimens, both dry and in alcohol, have now been identified, catalogued, and temporarily labelled. The work of cataloguing the fossils remains, however, still to

be done, but most of them have already received labels. The duplicates have also been separated, labelled and catalogued. During the year, fifteen collections, including 575 specimens, have been sent away for exchange, and twelve other collections are now ready for packing. In these collections, each specimen has a parchment number attached permanently to it, while authentic labels, correspondingly numbered and endorsed with the name of the person by whom they are named, are sent with them. In order to make the necessary corrections in the nomenclature of the described species, of which there are duplicates, and to make the new materials available for exchanges, Part III. of the Bulletin of the Museum of Comparative Zoölogy has been prepared, and is now printing. A preliminary report on the Halcyonoid Polyps collected by William Stimpson, M. D., on the North Pacific Exploring Expedition, under Captains Ringgold and Rodgers, has also been prepared. When the report is completed, a suite of the specimens will be presented to the Museum. The specimens in the Museum from the eastern coast of the United States, have been used in the preparation of a paper entitled "A Revision of the Polyps of the Eastern Coast of the United States, by A. E. Verrill," which is now printing.

The additions to this department during the year have been 24 lots, containing 1,006 specimens and 125 species. Among those that deserve special notice, either for their interest or extent, are the following: A large alcoholic collection of the British Polyps, made by Dr. Stimpson at Oban, Scotland, at the mouths of the Mersey and Dee, and at Milford Haven, South Wales; a valuable collection of Corals, from Mr. C. Cooke, Zanzibar; one from Dr. G. H. Otis, U. S. N., collected at St. Thomas; an alcoholic collection of great interest, from Mr. J. H. Sternbergh, Panama; a beautiful lot of *Gorgonidæ*, from Mr. D. B. Van Brunt, Acapulco, Mexico; a very valuable collection, embracing some species of great rarity, from Dr. J. W. Paige, U. S. N., collected at Stono Inlet, S. C.; a large and interesting collection from John Russell, Esq., from Manilla; a large collection of New England Polyps, in alcohol, from A. E. Verrill, collected at Eastport, Me.

The following is a complete list of the collections received:—

Donations.

AGASSIZ, A., Assistant at the Museum. 13 specimens, 2 species Actinidæ, in alcohol, from Nahant, Mass.

BICKMORE, A. S., Student in the Zoölogical Department of the Scientific School. 2 specimens Astrangia, dry; 25 specimens Zoantharia, 2 species, and 60 Alcyonaria, 1 species, dry; 15 Zoantharia, 3 species, and 4 Alcyonaria, in alcohol, from Beaufort, N. C.

CABOT, SAMUEL, M. D. 24 specimens Actinidæ, in alcohol, from Fort Macon, N. C.

DALL, W. H., Medford, Mass. 1 Stylaster, from New Zealand.

NICHOLS, C. B., New York. 2 specimens Stylaster, from the Pacific.

OTIS, JENKS, M. D., U. S. N. 166 Corals, (Zoantharia,) 22 species; 4 Alcyonaria, 2 species, dry, from St. Thomas.

PAIGE, J. W., M. D., U. S. A. 19 specimens Alcyonaria, 3 species, dry, including the rare species, *Telesto fruticulosa* and *Titanideum suberosum*, from Stono Inlet, S. C.

PUTNAM, Captain W. H. A., Salem, Mass. 4 Actinidæ, 2 species in alcohol, from Caldera, Chili.

RUSSELL, JONATHAN, Manilla. 90 Corals, (Zoantharia,) 5 species; 2 Tabulata, 2 species, dry, from Manilla.

STERNBERGH, J. H., Panama. 71 Gorgonidæ, 7 species, in alcohol, from Panama.

VAN BRUNT, D. B., Acapulco, Mexico. 15 Gorgonidæ, 5 species, dry, from Acapulco.

VERRILL, A. E., Graduate of the Zoölogical Department of the Scientific School. 250 specimens Actinidæ, 5 species in alcohol; 70 Alcyonium carneum, in alcohol, from Eastport, Me.; 2 Actinidæ, 1 species in alcohol, from Swampscott, Mass.

By Exchange.

BOWDOIN COLLEGE, Brunswick, Maine. 12 Corals, 8 species, dry, from the West Indies.

CARTER, S. A., Paris Hill, Me. 3 Corals, 3 species, dry, from Cape de Verde Islands.

COOKE, Mrs. M., Cambridge, Mass. 1 Madrepora flabellum, from the West Indies.

ESSEX INSTITUTE, Salem, Mass. 14 Corals, 7 species, dry, mostly from Zanzibar.

FREE PUBLIC MUSEUM OF LIVERPOOL, T. J. MOORE, Curator. 4 Corals, 1 species, from Singapore; 12 Actinidæ, 3 species, living, from England, forwarded through Captain J. Anderson.

Secured with the Gray Fund.

COOKE, C., Student in the Zoölogical Department of the Scientific School. 31 Actinidæ, 2 species, in alcohol; 2 Astræidæ, 2 species, dry; 155 Fungidæ, 15 species, dry, from Zanzibar.

STIMPSON, WILLIAM, M. D., Washington, D. C. 21 Actinidæ, 10 species, and 6 specimens Funiculina, in alcohol, from Oban, Scotland; 12 Actinidæ, 2 species and 26 Alcyonium digitatum, from the mouths of the Mersey and Dee; 12 Actinidæ, 6 species, in alcohol, from Milford Haven, South Wales.

The following collections have been sent away in exchange during the year:—

BOWDOIN COLLEGE, Brunswick, Maine. 21 Corals, 21 species, dry.

CARTER, S. A., Paris Hill, Maine. 3 Corals, 3 species, dry.

COOKE, Mrs. M., Cambridge, Mass. 1 Pocillopora, from Singapore.

CROSBY, Prof. A., Normal School, Salem, Mass. 13 Alcyonaria, 8 species, 18 Zoantharia, 18 species; 3 Tabulata, 3 species.

HAMLIN, Prof. CHARLES E., Waterville College, Maine. 7 Corals, 7 species.

KAUP, Dr., Darmstadt. 13 Alcyonaria, 12 species; 43 Zoantharia, 42 species; 6 Tabulata, 6 species.

KRAUSS, Prof., Stuttgart. 21 Alcyonaria, 16 species; 51 Zoantharia, 41 species; 5 Tabulata, 5 species; and a second collection, containing 13 Alcyonaria, 13 species; 29 Zoantharia, 29 species; 3 Tabulata, 3 species.

MCGILL COLLEGE, Montreal, Canada, Dr. DAWSON, Principal. 14 Alcyonaria, 9 species; 27 Zoantharia, 26 species; 2 Tabulata, 2 species.

MILNE-EDWARDS, Prof. H., Jardin des Plantes, Paris. 28 Madreporæ, 23 species; 10 Pocilloporæ, 10 species; a second collection, containing 21 Fungidæ, 21 species.

SCHIMPER, Prof. Wm., Strasbourg. 12 Alcyonaria, 10 species; 36 Zoantharia, 35 species; 6 Tabulata, 6 species.

TENNEY, Prof. S., Cambridge, Mass. 12 Alcyonaria, 11 species; 34 Zoantharia, 34 species; 7 Tabulata, 7 species.

VALENCIENNES, Prof., Jardin des Plantes, Paris. 25 Alcyonaria, 19 species, dry; 31 Alcyonaria, 20 species, in alcohol.

Report on the Library, by A. AGASSIZ.

Professor Marcou has been engaged during the past year in arranging the books according to their subjects, and in making catalogues of the different alcoves. Mr. A. Agassiz has made an

alphabetical catalogue of the library. A number of pamphlets on special subjects of natural history have been presented by Messrs. Scudder, Professor J. Hall, A. Agassiz, Thomas Bland, Professor Martins, Academy of St. Louis. Hon. S. Hooper, and Governor Andrew have presented to the library reports published by the government; Professor Agassiz has presented a few volumes. But the most valuable addition is the gift of Mr. James M. Barnard, who has presented a complete series of the Transactions of the Geological Society of London, and the Voyage de la Venus; Mr. W. G. Binney has presented a copy of Binney's Terrestrial Mollusks of the United States. The library is also indebted to the Essex Institute for a copy of its Journal and Proceedings; and to Professor Marcou for many pamphlets on geological subjects. The number of volumes added is forty-one, and thirty-one pamphlets.

[B.]

TRUSTEES OF THE MUSEUM OF COMPARATIVE ZOOLOGY.

1864.

THE GOVERNOR OF THE COMMONWEALTH,
JOHN A. ANDREW.

THE LIEUTENANT-GOVERNOR,
JOEL HAYDEN.

THE PRESIDENT OF THE SENATE,
JONATHAN E. FIELD.

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES,
A. H. BULLOCK.

THE SECRETARY OF THE BOARD OF EDUCATION,
JOSEPH WHITE.

THE CHIEF JUSTICE OF THE SUPREME JUDICIAL COURT,
GEORGE T. BIGELOW.

LOUIS AGASSIZ.

WILLIAM GRAY.

JACOB BIGELOW,
JAMES WALKER,
GEORGE TICKNOR,

NATHANIEL THAYER,
SAMUEL HOOPER,
JAMES LAWRENCE,

THEODORE LYMAN.

OFFICERS OF THE MUSEUM OF COMPARATIVE ZOOLOGY FOR

1864.

His Excellency JOHN A. ANDREW, Governor of the Commonwealth,
President.

WILLIAM GRAY, *Secretary.*

NATHANIEL THAYER, *Treasurer.*

LOUIS AGASSIZ, *Director of the Museum.*

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

GEORGE TICKNOR, LOUIS AGASSIZ, JACOB BIGELOW, GEORGE T. BIGELOW, *Committee on the Museum.*

ANNUAL REPORT

OF THE

TRUSTEES

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY,

AT HARVARD COLLEGE, IN CAMBRIDGE,

TOGETHER WITH

THE REPORT OF THE DIRECTOR,

1864.

BOSTON:
WRIGHT & POTTER, STATE PRINTERS,
No. 4 SPRING LANE.
1865.



Commonwealth of Massachusetts.

BOSTON, March 9, 1866.

MY DEAR SIR,—I herewith transmit the Report of the Trustees of the Museum of Comparative Zoölogy, with the Sixth Annual Report of Professor Agassiz, and the list of the trustees and officers for 1865.

Will you be kind enough to submit them to the Senate. Mr. Agassiz will be very glad to have two thousand copies for distribution, and to have the proofs sent to him for correction.

I am, very respectfully, yours,

WM. GRAY, *Secretary.*

HON. JONA. E. FIELD, *President of the Senate.*

Commonwealth of Massachusetts.

BOSTON, January 25th, 1865.

To the Honorable the Senate and the House of Representatives :

The Trustees of the Museum of Comparative Zoölogy, on the 26th day of October last, passed this vote :

“Voted, That the Secretary communicate to the legislature the Annual Report of Professor Agassiz, with a statement of the proceedings of this Board for the year past.”

The by-laws of the Trustees have been amended, by adding a proviso to the 11th article, in the following words :

“Provided, That five Trustees shall form a quorum at the stated quarterly meetings in April, July, and October ; but such quorum shall not have authority to make any appropriation beyond ordinary income actually received.”

Mr. Samuel G. Ward resigned the offices of treasurer and trustee, and his resignation was accepted on the 15th day of February last, when the Board adopted the following votes :

“Voted, That the thanks of this Board be presented to Samuel G. Ward, Esq., for his valuable and faithful services as treasurer and trustee, since the organization of the Board ; the Trustees recognizing, at the same time, the care and accuracy with which the books of the treasurer have been kept by Mr. Harris.

“Voted, That a copy of the above vote be communicated to Mr. Ward by the secretary, with a request that a copy be given to Mr. Harris.”

unanimously elected a trustee, to
resignation of Mr. Ward.

part, the balance of the appropriation, from the sales of the Back Bay
thousand two hundred and seven
by the Trustees.

see on the Museum, made to the
resents so fully the condition of the
tire in this Report :

n, ask leave to report,—

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not present examined every part of it,
it more than once. They are pleased
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of important and valuable specimens.
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ranged and labelled, they are crowded
high to be displayed for the purposes of
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building, quite as large as the present,
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system, on which the great purposes
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obtained by the Museum, through an
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lected from all parts of the world; and
scientific men of known authority, such

DEAR SIR:—In a few days I shall leave Cambridge to start on a journey to Brazil, chiefly to study the metamorphoses of the Fishes of the Amazon and the drift phenomena of the Andes. During my absence, my son, ALEXANDER AGASSIZ, is entrusted with the care of the Museum, and I take the liberty of bespeaking for him your kindness and confidence.

MUSEUM OF COMPARATIVE ZOOLOGY,

CAMBRIDGE, March 15, 1865.

Very truly yours,

L. AGASSIZ.

Commonwealth of Massachusetts

BOSTON

To the Honorable the Senate and the

The Trustees of the Museum of Comparative Zoology on the 26th day of October last, passed

“Voted, That the Secretary communicate to the Senate the annual Report of Professor Agassiz, with a copy of the Report of this Board for the year past.”

The by-laws of the Trustees have been amended by the addition of a proviso to the 11th article, in the following words:

“Provided, That five Trustees shall hold quarterly meetings in April, July, and October, and shall not have authority to make any appropriation of the funds actually received.”

Mr. Samuel G. Ward resigned the office of trustee, and his resignation was accepted on the 26th of February last, when the Board adopted the following resolution:

“Voted, That the thanks of this Board be given to Mr. Ward, Esq., for his valuable and faithful services as trustee, since the organization of the Board, and that at the same time, the care and accuracy of the accounts of the treasurer have been kept by Mr. Harris.”

“Voted, That a copy of the above vote be given to Mr. Ward by the secretary, with a request that he be thanked by Mr. Harris.”

Mr. Theodore Lyman was unanimously elected a trustee, to fill the vacancy caused by the resignation of Mr. Ward.

Since the last Annual Report, the balance of the appropriation by the Commonwealth, from the sales of the Back Bay lands, amounting to twelve thousand two hundred and seven $\frac{67}{100}$ dollars, has been received by the Trustees.

The report of the Committee on the Museum, made to the Trustees in October last, presents so fully the condition of the Museum, that I present it entire in this Report :

The Committee on the Museum, ask leave to report,—

That they have lately visited the Museum, without notice to Professor Agassiz ; and when he was not present examined every part of it, once with care, and portions of it more than once. They are pleased to be able to state, as the general result of their investigation, that they found the institution showing everywhere, marks of great prosperity, and of remarkable administrative talent.

Two things especially struck them. The first was the large accumulation, within the last year, of important and valuable specimens. Their number is obviously immense. From the cellar to the attic, in casks, in jars, and in boxes, all arranged and labelled, they are crowded together, waiting for room in which to be displayed for the purposes of instruction. Even the roof does not escape service. The skeleton of the remarkable whale, sent from Cape Cod, is deposited there, exposed to the weather, because no other place so suitable remained in which to stretch it out. A building, quite as large as the present, would be necessary either to exhibit all that ought to be exhibited, or even to develop the whole system, on which the great purposes of the Museum are founded, and must rest.

The other circumstance that much struck the Committee was the diligence and orderly service of the Museum. Some of the persons employed in it are of great experience and skill ; all are competent to the separate duties assigned them, and seem to fulfil their respective tasks, not merely with fidelity, but with interested zeal. The result is, that, notwithstanding the vast number of specimens received during the last year, all of them, except such as have come too recently to be yet dealt with, are in such exact order, that any one of them can be immediately found. A very considerable number of these specimens, it should be observed, have been obtained by the Museum, through an inexpensive system of exchanges from the great similar institutions abroad, where they had been collected from all parts of the world ; and being identified and labelled by scientific men of known authority, such

specimens necessarily bring to us the great benefit of authentic traditions of the science of Europe.

In conclusion, the Committee need only to add, that all the Lectures connected with the Museum, and largely dependent on its resources for their usefulness and success, have been carried on as usual, in a manner to reflect honor on the Commonwealth and on the country. At the present moment, a very interesting course by Prof. Agassiz on the domesticated animals, free to farmers and to all persons concerned in agriculture, is fully attended, and promises to be followed by uncommonly beneficial results. This, with other courses of lectures, delivered in the Museum, is, it will be remembered, part of a wide system of instruction, given under the authority of the University, to all comers, except undergraduates, whether members of the institution or not; a liberal system, which has been successful thus far, and is likely to be still more so in the future. Twelve such courses of lectures were delivered during the two terms of the last year, and seven more are now in progress, or about to begin, for the first term of the present year.

All which is submitted.

GEO. TICKNOR.

JACOB BIGELOW.

OCTOBER 26th, 1864.

The Sixth Annual Report of the Director, which is annexed, marked [A], gives a statement, in detail, of the operations at the Museum during the year.

The annexed paper, marked [B], has a list of the names of trustees, officers, and standing committees, for the year 1865.

On behalf and in the name of the Trustees.

WM. GRAY, *Secretary.*

[A.]

SIXTH ANNUAL REPORT

Of the Director of the Museum of Comparative Zoölogy, at Harvard College, in Cambridge, Massachusetts,

BY LOUIS AGASSIZ.

The past year has been the most prosperous in the history of the Museum, though owing to changes rendered necessary in its organization, the direction of its affairs has been unusually difficult and perplexing. The progress of the institution has been mainly due to the large accessions of specimens received in the course of the year from every class of the Animal Kingdom, a special account of which may be found in the subjoined reports, prepared by the superintendents of the different departments, and to the improvement of the internal arrangements, a work which is constantly going on in every part of the collections. The difficulties have arisen from the necessity of defining accurately the position of all the individuals engaged on different terms and in a different degree upon the work of the Museum, or availing themselves, for the sake of study, of the advantages afforded by our institution. In proportion as the Museum has been enlarged and acquired greater importance, claims have been advanced by those connected in various relations with its interests, which could not have been granted without damaging the institution itself; demands, the nature of which alone shows how much a higher standard of scientific culture, and a just appreciation of superior attainments, are needed among our scientific students.

The Faculty of the Museum has carefully considered these difficulties, and after protracted deliberations, framed regulations for the internal management of the establishment, as well as for the proper uses of the collections by all classes of students. Copies of these regulations are herewith submitted, and as they touch also upon our foreign relations, it is desirable that they should be reprinted with this Report.

Having been allowed from the beginning to arrange the Museum according to my own views, I may say that it has been my constant aim, in accordance with the principles set forth in my Essay on Classification, to discard every artificial arrangement, and to follow Nature's indications as far as it has been possible for the students of our science rightly to understand them. Believing as I do that a Zoölogical Classification must aim to be simply the reading of the natural relations existing among animals, which we may learn to decipher by studying their structure, their mode of growth, their order of succession in geological times and their geographical distribution upon the surface of our globe, I have discarded all the definite systems of Zoölogy and all the special classifications of any particular class based upon specific considerations, and have endeavored in each department of the Museum to represent if possible the sum of all our information in Special Zoölogy, Comparative Anatomy, Embryology, Paleontology and Zoölogical Geography. In this comprehensive work I have invited all the students of the zoölogical and geological departments of the Lawrence Scientific School to join, besides the special assistants appointed to take care of the different parts of the collections. Conflicts have of course frequently arisen in carrying out such a comprehensive plan, and in many instances have ended in the withdrawal of parties making unreasonable claims, or even in the dismissal of egotistical aspirants to unattainable positions. As teacher, responsible not only to the Faculty, the Corporation and the Board of Trustees of the Museum, but also to public opinion, I feel called upon here to add that unfortunately I have not yet been able, except in a measure, and in two or three instances, to complete the education of the students who had come to me for instruction. There is such a demand for men of learning to fill the various stations of life, in our colleges, and at the head of our other scientific establishments, that young men are offered tempting situations before they have gone through the last stages of their professional studies, and these temptations raise unduly the aspirations of even the least competent students. Under such circumstances a devoted student is a blessing to his teacher, as he is likely to be an honor to his country and a successful promoter of science.

The progress in the internal arrangement of the collections has been fostered by the coöperation of a number of assistants and students. Mr. Alex. Agassiz has had charge of the general distribution of the specimens received, with a view to referring everything for safe keeping and special identification to the assistants in charge of particular classes or families of animals. Mr. Anthony has given his undivided attention to the Mollusks, and during the past year has especially devoted himself to the identification and final arrangement of the land and fresh water shells, all of which are now ready for exhibition. Mr. Glen has been intrusted with the Ethnographical collections, besides his special department consisting of the microscopic preparations, illustrative chiefly of the structure of the solid parts of animals, a large number of which have been added to the already extensive series put up in former years. Mr. Uhler has revised the entire collection of insects, and placed it beyond the chances of injury or decay. This important and laborious undertaking has for the first time displayed the great value and unexpected importance of our Entomological collections, which had necessarily been allowed to accumulate without very special attention being paid to their contents. Besides this, Mr. Uhler has had charge of the library. Mr. Hyat has, at intervals, resumed his work upon the fossil Cephalopods, and promises to complete it as soon as possible. He has also made good progress in the catalogue of these remains. Mr. Shaler's return to the Museum, and his closer connection with our new organization, has already been highly beneficial to our collection of fossils. He has lately been intrusted with the general care of the entire department of Palæontology, and so far proceeded with the identification and classification of the Brachiopods, as to be able to make a special report upon that order, which is appended to this. Mr. Niles is progressing successfully with his investigation and study of the Crinoids, with a view to the publication of a catalogue of that order of the Radiates, the completion of which has been intrusted to him. In the preparation of this work I have aimed at introducing a nomenclature which shall be more in accordance with that used in describing other Echinoderms than is gener-

ally the case. Mr. Niles has also incidentally taken care of the Mammalia. Mr. St. John is in a similar way engaged upon the preliminary work of a part of our catalogue. With a view of testing their relative importance for the progress of science, as well as for the most appropriate arrangement of the Museum specimens, Mr. St. John is directed to prepare a faunal catalogue of the fossils of Waldron. This will at the same time lead to a correct appreciation of the peculiarities of the fauna of Wenlock, of Niagara and of Waldron and other localities of the same age. Mr. Hartt has been comparing the subcarboniferous fossils of the North American British Provinces, of which he has made extensive collections, with those of Europe, of which M. De Koninck's collection has brought to the Museum the most complete series; the special object in view being to ascertain the faunal combinations of those periods, and eventually to incorporate the results of these investigations in our catalogue. During the past year Mr. Allen has resumed his connection with the Museum, and has taken charge of the collection of birds, which he has put in excellent working order. Prior to his departure for the Sandwich Islands, Mr. Horace Mann had begun a monographic study of the fossil *Solens* and of the extensive group of *Fusus* and allied forms, but his journey has prevented the completion of this work. The progress made thus far in the preparation of diagrams to illustrate those objects which are either too small to be distinctly seen in the exhibition rooms, or too perishable to be exhibited at all, in the usual ways of preserving specimens, has fully satisfied me of the great value of such illustrations, not only for the special students of Natural History, but also for the general visitors of our rooms. The number of these diagrams prepared by Mr. Burkhardt during the past year is already too large to allow them all to be put up in the exhibition rooms. My special task of superintending all the work in every department, and of seeing that every one does his best and that which is most useful to the Museum, in proportion to his obligations to our institution, is becoming more and more arduous as the arrangement of the collections is advancing and decisions are to be made concerning their final disposition. The time will come, when a further subdivision of labor will be a necessity, and I trust by that time we

shall have a sufficient number of competent students ready to take up the work.

The publications of the Museum have proceeded very slowly, notwithstanding my constant efforts to accelerate the printing of a first volume of our illustrated catalogue; but unforeseen circumstances have made it impossible for me to proceed with greater diligence. In the first place, the high prices of the materials necessary for this work, which have rendered the strictest economy imperative, and the scarcity of working men, have induced me to pause, lest the means granted for this purpose by the legislature should not be sufficient. In the second place, I have been disappointed in my collaborators. Investigations made under my direction, in the Museum, and which I looked upon as materials for the catalogue, have been, without my knowledge, published elsewhere. Meanwhile, however, the Monographic Review of the Ophiurans, by Mr. Theodore Lyman, and that of the Acalephs, by Mr. A. Agassiz, have been set in types, and will soon be ready for publication. Preparatory to this more elaborate illustration of our collections, a bulletin has been issued containing short notices of a considerable number of new genera and species of Fishes, Polyps and Echinoderms. These sheets have been circulated among the correspondents of the Museum.

The principal work done in the Museum, during the past year, relates to the limitation of the faunæ, among living animals, as well as among the fossils. In proportion as we advance in the study of the geographical distribution of animals, we find that local collections, however carefully made and labelled, do not yet of themselves furnish the basis for a natural limitation of the faunæ. Even the most complete lists of animals found in an extensive region contribute but indifferent materials for the study of a fauna, as such lists may embrace the representatives of two distinct faunæ, bordering upon one another. Moreover, it is time that a distinction be made in this kind of researches between a zoölogical realm and a zoölogical province, as well as between representative species and animals characteristic of wider areas, and bearing no special relation to the fauna of their home; and upon these points our information is still very scanty. Zoölogical provinces, properly speaking, and to which I would, for the present

limit my remarks, are areas tenanted by distinct faunæ, characterized by representative species which exclude one another in their geographical distribution. However, the knowledge of the range of these representative species will only give us the means of ascertaining the true boundaries of natural faunæ, and is not sufficient to fill the picture of a fauna with all its belongings. This can only be done by a special study within the limits of the fauna, after these limits have once been settled. In their natural association with one another, upon the surface of the earth, animals bear very different relations. There are those which range over the most extensive tracts of land, neither coinciding with the natural boundaries of a zöological realm, nor in any way marking the limits of a fauna; as, for example, the American Panther, (*Felis concolor*), which is found east of the Rocky Mountains, from Canada to the southernmost extremity of South America. Others, such as the Moose and the Reindeer, characterize climatic zones, without defining faunæ. Others coincide with peculiar physical features without marking faunæ, such as the animals of the deserts of Africa, &c., and yet all these animals contribute to give a definite aspect to the fauna over which they range; but they will not help us to determine the boundaries of the fauna, even if we were to trace with the utmost accuracy their special distribution. It will thus appear that the study of a fauna requires specific investigations, made with a clear understanding of what should be aimed at in order to make the science of the geographical distribution of animals all that it ought to be hereafter.

The work done in that direction, in the Museum, has already extended to comparisons between the faunæ of the present age and those characteristic of earlier periods, through all the geological ages, chiefly with the view of ascertaining whether there is any probability of tracing a genetic connection between the animals of successive geological periods, or between those of different geographical areas, and how far geographical distribution and specific distinction are primary facts in the plan of creation. It must be obvious that the question of the origin of species is not likely to be discussed successfully before the laws of the geographical distribution of organized beings have been satisfactorily ascertained.

The comparisons rendered necessary by the study of the geographical distribution of animals, have led to a very careful revision of the specific characters of a large number of specimens, collected in distant localities, and has often ended in the identification of animals from different regions supposed to be distinct, as also in the separation of others supposed to be identical. In order to record these results permanently in the Museum, some of these specimens have been put up with provisional names in the systematic collection, while the others are displayed in the faunal collections. This work is regularly credited to those who have performed it, as well upon the labels of the specimens as upon the sheets of the catalogue.

As this arrangement progresses, the limited dimensions of our building become daily more felt. Piles of drawers full of specimens properly mounted, carefully labelled, and ready for exhibition, are accumulated in all the working rooms, to such an extent that even the passage-ways are encumbered, and until a new part of our building is put up, all these specimens must remain shut and inaccessible to visitors as well as to students; except on rare occasions which may justify the labor of removing entire tiers of drawers for the sake of finding some specimen wanted in a special investigation. However, such is now the order introduced in the Museum, that tedious and time absorbing as the search may be, there is no specimen within our walls which cannot be reached with comparative ease. Another difficulty arising from our limited space, is the impossibility of exhibiting the general plan adopted for the final arrangement of the collections in their mutual relations to one another. It is apprehended that years may pass before this part of our plan can fairly be developed. I regret the more any delay in that respect, since I see that the directors of other Museums begin to feel the imperfections of the present arrangement of their collections, and are proposing as new, schemes identical with those which for many years have been in active operation with us. I would particularly refer to the recent suggestions of Dr. J. E. Gray, published in a recent number of the "Annals and Magazine of Natural History," the burden of which coincides, though on a limited scale, with what we have been doing upon a much more extended plan for several years past.

Every step towards the final arrangement of any part of the collections naturally adds to the usefulness of the Museum. Though open every day and at all hours, notwithstanding the necessary limitations of the regulations, it was at first visited by a few persons only. But as it became generally known that all were invited to come, free of charges, and that the instruction delivered at the Museum was equally accessible to everybody, visitors became steadily more numerous, and the attendance of the lectures increased at the same rate. Now the number of visitors is probably as large as in any similar institution in the centre of a population like ours, and the courses of lectures are regularly attended by large and attentive audiences, whenever the subjects of instruction are of a popular character, or, when more special, by the professional students of our special schools. During the past year three courses, one upon domesticated animals, another upon the methods of study in Zoölogy, and a third upon the marine animals of the Bay of Massachusetts, the two former by myself, the latter by Mr. A. Agassiz, have been added to the regular courses of Zoölogy and Geology delivered in the Museum to the members of the Lawrence Scientific School and the senior class of the undergraduate department, and to which the teachers of the public schools are also admitted by right. This combination of public lectures, with a large Museum, is a feature which our institution shares with the Jardin des Plantes, but which is wanting in the British Museum, as well as in most other European Museums.

The exchanges begun two years ago have continued upon a very satisfactory footing, and the Museum is constantly adding, in this way, to its other resources, authentic specimens described abroad, so that it is hoped that little by little the scientific tradition of the Old World will be transferred to America, enabling students in Natural History hereafter to find here what they are now obliged to seek for in Europe, whenever they attempt to make somewhat extended investigations. We are particularly fortunate in having obtained, to this end, the assistance of the Jardin des Plantes; and Professors Milne-Edwards, Valenciennes, and Duméril, have already made repeated invoices to the Museum during the past year. The Museums of Vienna, of Copenhagen, of Darmstadt, of Liverpool, of Stuttgardt, have

continued the exchanges which had previously been established, and through Professors Redtenbacher, Steenstrup, Kaup, Krauss, Fraas, and Mr. Thomas J. Moore, many valuable acquisitions have been made by the Museum. In order to simplify the exchanges somewhat, we have also had the assistance of several dealers in Natural History specimens, who have invariably made prompt returns to the Museum. Mr. J. G. Salmin, of Hamburg, particularly, has secured for us many of the more common species of European animals.

In addition to the public museums, intercourse has not been neglected with private individuals, in order that we might participate in the results of their investigations, and colonial museums, where the treasures accumulated during the first scientific explorations of their respective countries have been deposited, have answered our application for exchanges in the most liberal manner. I mention particularly Mr. Layard, of the South African Museum, Professor McCoy, Dr. Haast, Henry Edwards, W. Theobald, Jr., Mr. Rigacci, the Marquis de Folin, Professor Michekoff, Mr. Parreys, Mr. Elizalde, Count de Kornis, Professors Geyenbaur, Capellini, Gastaldi, Marcus, Blanchet, Chavannes, and many others.

The Museum is also indebted to private individuals for the acquisition of valuable collections, the expenses of which were principally defrayed by the Gray Fund. Among these are the collections made by Professor Marcou, in the United States. Mr. Rich has been engaged in obtaining specimens for the Jardin des Plantes, as well as completing the collection of our common wild animals. Mr. A. Garret has sent a valuable collection from the Society Islands, collected with the greatest care. Mr. Cooke has continued to send specimens from Zanzibar. Mr. Anthony has also examined many collections in the Northern States, with a view to supplying the deficiencies of the Museum. Captain N. E. Atwood has rendered great assistance in procuring Fishes from Provincetown. During the vacations the students of the Museum have generally collected largely while engaged in explorations in the fields, and I must mention particularly the extensive collection of fossils made in the West by Mr. O. St. John, especially in Indiana and Ohio. The collections made in Nova Scotia by Mr. C. F.

Hartt, at Burlington, in Iowa, by Mr. W. H. Niles, and at Nahant, Naushon, and Eastport, by myself and Mr. A. Agassiz.

In the distribution and forwarding of the packages of this large number of collections, I have been materially assisted by the agents of the Panama R. R. Co., of the Pacific Mail S. S. Co., by Messrs. Wells, Fargo & Co., by Mr. James M. Barnard, by Messrs. H. C. Brooks & Co., Rufus Wills & Son, by Mr. Isaac Taylor, Messrs. Glidden & Williams, B. K. Hough, Lee & Brown, P. L. Everett, H. A. Pierce, and Captain James Anderson, who have at various times forwarded, free of expense, very extensive invoices of specimens.

The number of individuals who have taken interest in making collections for the Museum is constantly increasing.

During the past year sixty-three cans have been sent to forty-five persons, and there have been returned thirty-eight cans by twenty-three persons. There still remain outstanding nearly one hundred cans, the greater number of which will probably return during this year. I must mention especially among the contributors of specimens, Capt. N. E. Atwood, who was indefatigable in procuring for us specimens of Cetaceans in general, and particularly a very fine right whale, captured in the vicinity of Provincetown. I have to thank Rev. J. C. Fletcher, Messrs. A. de Lacerda, Henry Sawyer, and Henry Hitch, for their continued interest in procuring South American specimens; Gen. Carlton, Lieut. Col. T. Lyman, and the Smithsonian Institution, for several invoices of specimens; Dr. Marcus de Souza, and Mr. T. G. Cary, for Indian implements and dresses; Sir Alexander Bannerman, and Mr. Henry Poole, for a large invoice of fossils from Nova Scotia; Capt. W. H. A. Putnam, for a large collection of fishes from the East Indies; Mr. T. Blake, for a most interesting collection from Siam.

The collections of fossils received at the Museum have been kept separate thus far, and no attempt has as yet been made to do more than render them easily accessible, but I hope that in consequence of the appointment of Mr. N. S. Shaler as assistant in Paleontology, their arrangement will now proceed rapidly.

Among the most valuable accessions to the Museum, during the past year, I would mention the splendid skeleton of a right whale, and of other Cetacea, secured from Cape Cod; a perfect specimen of a mummified penguin (*Alca impennis*), presented

by Sir Alexander Bannerman, late governor of Newfoundland ; the collection of Crinoids, bought of the Rev. Mr. Barris, including about fifteen hundred well preserved heads of these interesting fossils ; the skeletons of two celebrated race horses, well preserved, one of which, Prince, presented by Mr. Beckwith, was for years the master of our turf. The giraffe, obtained from the Jardin des Plantes ; the collections of reptiles and fishes from Siam, presented by Mr. Blake ; the collections sent by Mr. Layard, from the Cape of Good Hope, and those made by Mr. Garrett, at the Society Islands, are among the most impressive additions we have ever received.

I should be wanting in courtesy and gratitude, and should do injustice also to my own feeling, did I not make special mention of the continued interest shown in our Museum by the Emperor of Brazil. His majesty has caused to be made, in our behalf, a special collection of the fresh water fishes of the vicinity of Rio de Janeiro, containing over a thousand specimens of different species, most interesting in themselves, and especially so to me, as part of them were among the first objects which attracted my attention in the earliest years of my scientific pursuits.

The pecuniary resources available during the past year for the management of the affairs of the Museum have amounted to \$15,460, appropriated by the Board of Trustees and by the Corporation for the general purposes of the Museum, in accordance with the intentions of the donors of the funds, from which this sum is the interest. Besides this, I have received, from private sources, the sum of \$6,250, in addition to the \$2,500 paid by the Corporation for the salary of the Professor of Zoölogy. The combined resources which have benefited the Museum during the past year amounting thus to not less than \$24,210, all of which have been accounted and vouched for in the faculty of the Museum.

Report on the Mammalia, by J. A. ALLEN.

During the early part of the present year, the collection of Mammals was revised by Mr. A. E. Verrill and Mr. W. H. Niles, and so rearranged as to be best available for examination.

The numbering and cataloguing of the specimens and species has been continued, as new collections have come in. The collection of bats, sent to Dr. H. Allen last year for monographic study, has been returned, with his identification of the species. The shrews and spermophili, sent to Professor S. F. Baird for examination, have likewise been identified and returned, as have the weasels, sent to Mr. R. Kennicott. Mr. W. H. Niles has commenced the study and arrangement of the skeletons.

The whole number of additions to the collection has been over 60 lots, from 54 different sources, embracing 506 specimens, and 78 species, of which a large proportion are new to the collection. A number of mounted specimens of much value have been received, among which are included a pair of East India deer, a giraffe, several large and interesting quadrumana and carnivora, and a young hippopotamus, in exchange, from the Jardin des Plantes, a kangaroo and other animals from Australia from Mrs. G. R. Russell, all of which will soon be placed in cases in the exhibition rooms.

To the osteological department has been made the valuable addition, through the Gray fund, of a skeleton of a right whale, secured by Captains Atwood and Soper, of Provincetown, and prepared by Messrs. A. Agassiz, Niles, and O. St. John. Among the alcoholic collections lately received are a number of very valuable embryos, including a small collection from Cape Town, Africa, in exchange, from Mr. L. Layard. Valuable collections of ancient human remains and implements have been received from Mr. T. G. Cary, of San Francisco, Cal., and from Messrs. H. Christy and Lartet, from France.

Additions to the Mammalia, from Nov. 20, 1863, to Nov. 20, 1864.

BY DONATION.

AGASSIZ, A., Assistant in M. C. Z. 1 Guinea Pig, fresh; 1 Bat, in alcohol, from Nahant, Mass.

ALLEN, J. A., Student in M. C. Z. 25 specimens, 7 species, in alcohol, and 3 skins, 1 species, from Springfield, Mass.; 2 skins, 1 species, from Wayne Co., N. Y.

ARNOLD, DR. G. J., Roxbury, Mass. 4 Human Embryos, in alcohol.

AQUARIAL GARDENS, Boston. 1 young Seal, fresh, from Newfoundland.

BEAL, W. J. 29 specimens, 8 species, from Rollin, Mich.

BECKWITH, H. G., Hartford, Ct., the body of the celebrated race-horse Prince, fresh.

BOARDMAN, G. A., Milltown, Me. 2 specimens, 2 species, from Milltown.

BRIMMER, MARTIN. 1 specimen, skin, from Chili, collected by Capt. Gillies, U. S. N.

CABOT, J. E., Brookline, Mass. 8 specimens, 2 species, in alcohol, from Brookline.

CANDEE, W. S., Milwaukie, Wis. 1 pair of Elk's Horns.

CARNEY, O., Cambridge. 5 specimens, 1 species, in alcohol, from Cambridge.

CARY, T. G., San Francisco, Cal. Human Remains and Bones of Animals, San Mateo, Cal.

COOK, DAVID S., San Francisco, Cal. 4 Human Skulls, from San Francisco, through T. G. Carey.

CHANDLER, T. P., Jr., Student in M. C. Z., Brookline, Mass. 1 Bat, living, Brookline, Mass.

CHRISTY, H., and LARTET. Human remains, flint implements, and bones of animals, from Dordogne, France (Grotte de Ezzies.)

CHURCH, Capt. EDWIN, of bark Arab, New London, Ct., through RICH. H. CHAPPELL. 2 Cetacean tusks, from Head's Island, Indian Ocean.

DAVIS, C. F., Panama. 2 Monkeys, in alcohol.

DAVIS, G. N., Rio Janeiro, Brazil. 25 specimens, 24 species, in alcohol, from Brazil.

EAMES, W. H., Cambridge. 2 specimens *Hesperomys lezeopus*, fresh.

EDWARDS, H., Melbourne, Australia. 3 skulls, 3 species, from Australia.

FLETCHER, Rev. J. C. 3 skins, 2 species; 3 skeletons, 3 species; 2 specimens, 2 species, in alcohol, and 2 living *Cælogenyx brunnea*, all from Pernambuco, Brazil.

FROST, IRVING, Norway, Me. 3 specimens, 1 species, and 4 living *Tamias striatus*, from Norway.

GLEN, W., Cambridge. Cast of head of Condor.

GUERNSEY, J. W. Part of a skeleton of an Otter, from Newfoundland, N. H.

JOHNSON, E. A., Essex, Mass. Malformed skull of *Arctomys monax*.

LACERDA, DON ANTONIO DE. 17 specimens, 12 species, in alcohol, from Bahia, Brazil.

LYMAN, T., Assistant in M. C. Z., Brookline, Mass. 1 Shrew, fresh, from Brookline; 1 Rat, in alcohol, from Virginia.

MANN, B. P., Concord, Mass. 23 Embryos, 3 species, in alcohol, from Concord.

MANN, H., Student in M. C. Z. 10 specimens, 5 species, in alcohol, from Concord.

MELENDY, A., Amherst, Mass. 1 Gray Squirrel, fresh, from Amherst.

PAGE, Dr. J. W., U. S. A., Newbern, N. C. Skull of an idiotic Negro, from Collins's Plantation, N. C.

PEARCE, H. A., Boston. Jaws of a Cetacean.

PUTNAM, Capt. W. H. A. 4 specimens, 4 species, in alcohol, from Batavia.

RUSSELL, Mrs. G. R. 3 specimens, 3 species, mounted, from Australia, collected by J. O. FARRELL.

SAWYER, HENRY, Surinam. 3 Cetacean bones, from Surinam.

SHALER, N. S., Assistant in M. C. Z. 1 Bat, in alcohol, from Cambridge.

SHEDD, W. B., Malden, Mass. 1 specimen, in alcohol, from Malden.

SHUTE, J. G., Woburn, Mass. 14 specimens, 4 species (chiefly embryos,) in alcohol, from Woburn.

ST. JOHN, O. H., Student in M. C. Z. 1 Beaver, living, from Little Sioux, Iowa.

ST. JOHN, O. O., Waterloo, Iowa. 2 young Prairie Wolves, living, from Waterloo.

WRIGHT, CHARLES. 1 Shrew, in alcohol.

BY EXCHANGE.

DAVIS, H., McGregor, Iowa. 3 skulls, 3 species, and a horn of a Buffalo.

FREE PUBLIC MUSEUM, Liverpool. 4 casts of quadrumanous skulls.

JARDIN DES PLANTS, Paris. 15 specimens, 13 species, mounted.

KAUP, Dr., Darmstadt. 1 Badger, from Europe.

LAYARD, L., Cape Town, Africa. 23 specimens, 14 species, in alcohol, and an eye of a whale, dry, from Cape Town.

SALMIN, C. L., Trieste. 1 large Bat, in alcohol.

SMITHSONIAN INSTITUTE, Washington, D. C. 210 specimens, 3 species, in alcohol.

WITH THE GRAY FUND, THROUGH

AGASSIZ, A., Assistant in M. C. Z. 7 Black Fish skulls, from Provincetown, Mass.; and 1 red, and 2 gray, Squirrels, living; 1 live Bear, from Oldtown, Me.

ATWOOD, Capt. N. E., Provincetown, Mass. Porpoise, from Provincetown.

ATWOOD, Capt. N. E., and Capt. R. Soper. 1 Right Whale, Provincetown, Mass.

CARY, L. C., Norway, Me. 2 Flying Squirrels, in alcohol, from Norway.

COOK, C., Student in M. C. Z. 4 embryos of Rodents, 1 species, in alcohol, from Zanzibar, Africa.

GARRETT, A. 5 specimens, 5 species, in alcohol, from Society Islands.

RICH, J. G., Upton, Me. 1 Lynx, 1 Martin, 4 Woodchucks, 2 Red Squirrels, 3 Hedgehogs, several Mice, and 2 Rabbits, all living; 11 specimens, 3 species, in alcohol, all from Maine.

SPECIMENS SENT OUT IN EXCHANGE.

TO THE JARDIN DES PLANTES, Paris. In April, 2 Gray Squirrels and 1 Red Squirrel; in May, 2 Red Squirrels, 2 Woodchucks, 1 Lynx, 2 Striped Squirrels, 1 Pine Martin, all living.

Report on the Birds, by J. A. ALLEN.

Nearly all the alcoholic collections received up to the present time have been divided in either faunal or family collections, and arranged in kegs and barrels in the cellar; this work having been continued since the report of last year, by Mr. A. E. VERRILL. This collection, and that of the mammals, is now arranged as well as the limited space that can at present be allotted to it in the Museum will allow; it is quite available for use, although much work yet remains to be done in numbering and cataloguing before it can be fully and satisfactorily arranged. Nothing has been done with the dry specimens beyond attending to their safety.

The collections that have been received during the year amount to 49 lots, from 40 sources, and embrace 284 species, represented by 1,767 specimens. Collections of Brazilian birds, of much value, have been received from Don ANTONIO DE LACERDA, Rev. J. C. FLETCHER and M. D. BOURGET, chiefly in alcohol; a fine collection of skins from Chili, through Mr. Martin Brimmer; a valuable lot from Australia, from Mr. H.

Edwards; collections of valuable mounted specimens from Europe, received in exchange, from Dr. Kaup and the Jardin des Plantes; a large alcoholic collection of Panama birds from C. F. Davis and Dr. J. H. Sternberg; a very large and valuable invoice of young birds and eggs in alcohol, from C. L. Salmin, of Hamburg; a similar lot from Dr. Stimpson, made on the islands off the east coast of Virginia; also, large collections of New England birds from Mr. H. Mann, of Concord, and J. A. Allen, of Springfield, and, with the Gray Fund, from Mr. J. G. Rich, of Upton, Me., a considerable collection of skins and of skulls, and of preparations of wings, &c., through the same means, from Springfield, Mass.

Additions to the Ornithological Department, from November 20, 1863, to November 20, 1864.

DONATIONS.

AGASSIZ, A., Assistant in M. C. Z. 1 Sparrow, from Nahant, Mass.

ALLEN, J. A., Student in M. C. Z. 172 specimens, 51 species, with measurements of most of them when fresh; 12 heads of domestic Turkey, 1 do. of domestic Duck, 6 do. of common Fowl, and 10 eggs of common Fowl, all in alcohol; 14 nests, 12 species; 70 eggs, 17 species, dry, all from Springfield, Mass.; nest of Chimney Swift, and a double nest of *Dendroica aestiva*, containing an egg of the Cow Bunting, from Lodus, Wayne county, N. Y.

BATES, C. H., Worthington, Mass. 1 living Snowy Owl, (*Nyctea nivea*), from Worthington.

BOARDMAN, GEO. A., Milltown, Me. 18 specimens, 15 species; 60 eggs and young birds, 12 species, in alcohol, from Milltown.

BOURGET, D., Rio de Janeiro. 10 specimens, 6 species, in alcohol, from Brazil.

BRIMMER, MARTIN. 17 specimens, 16 species, skins, from Chili, collected by Capt. GILLIS, U. S. N.

BANNERMAN, SIR ALEXANDER. Mummy of *Alca impennis*, from Funk Island.

DAVIS, C. F., and J. H. STERNBERG, Panama. 45 specimens, 38 species; 6 eggs, 1 species, in alcohol, from Panama.

DAVIS, G. N., Rio de Janeiro, Brazil. 6 specimens, 6 species, in alcohol, from Rio de Janeiro.

EDWARDS, HENRY, Melbourne, Australia. 15 specimens, 11 species, skins, from Australia.

FLETCHER, Rev. J. C. 29 skins, 26 species, skins; 11 specimens, 10 species, in alcohol; 6 eggs, 2 species, dry, all from Pernambuco, Brazil.

FOWLER, S. N. 1 skin of White Heron, and 2 preparations of brains, 2 species, from Port Royal, S. C.

HITCH, HENRY. 1 Humming Bird's nest, from Pernambuco, Brazil.

LACERDA, Don ANTONIO DE. 65 specimens, 25 species, skins, and 2 specimens, 2 species, in alcohol, from Bahia, Brazil.

LINCOLN, L. M., Upton, Me. 1 Heron.

LYMAN, TH., Assistant in M. C. Z. 23 specimens, 18 species, in alcohol, from Spezzia.

MANN, B. P., Concord, Mass. 3 specimens, 2 species, and several embryos, 2 species, in alcohol, from Concord; 3 specimens, 2 species, in alcohol, and part of a skeleton, from Labrador.

MANN, H., Student in M. C. Z., Concord, Mass. 88 specimens, 30 species, in alcohol, from Concord and from Minnesota; 237 specimens, in alcohol, from Concord.

PAGE, Dr. J. W., Newbern, N. C. Skin of an Owl, from Newbern.

PROPRIETOR OF FRESH POND HOTEL, Cambridge. 1 Bald Eagle, living.

PUTNAM, Capt. W. H. A. 7 specimens, 6 species, in alcohol, from Java.

RICE, M. S., Newton, Mass. 1 Humming Bird's nest.

SANDS, A. I., Brighton, Mass. 1 Snowy Owl, living.

SAWYER, HENRY, Surinam. 1 Owl, in alcohol, from Surinam.

STEARNS, ——. Nest of common Humming Bird, with eggs, from Cambridge.

STIMPSON, Dr. WM. 24 eggs, 12 species, dry, and 18 embryos, 10 species, in alcohol, from Hog Island, Eastern Shore of Virginia.

THAXTER, L. L. 1 specimen, in alcohol, from the Island of Shoals.

TROUVELOT, L., East Medford, Mass. 34 eggs, 8 species, dry; 12 embryos, 4 species, in alcohol; all from Medford.

UNKNOWN. Nest and four eggs.

BY EXCHANGE.

DAVIS, H., McGregor, Iowa. 11 specimens, 11 species, in alcohol, from McGregor.

ESSEX INSTITUTE, Salem, Mass. 1 Snowy Owl, fresh.

JARDIN DES PLANTES, Paris. 33 specimens, 32 species, mounted.

KAUP, Dr., Darmstadt. 19 specimens, 18 species, mounted, from Europe.

SALMIN, C. L., Hamburg. 85 specimens, 26 species, young birds, and 210 specimens, 23 species, of eggs, in alcohol, from Europe.

SHUTE, J. G., Woburn, Mass. 1 Sandpiper, in alcohol, from Woburn.

WITH GRAY FUND, THROUGH

ALLEN, J. A., Student in M. C. Z. 82 specimens, 51 species, skins, with a series of measurements taken from the specimens when fresh; 71 skulls, 46 species; 317 specimens of preparations of wings, tails and feet, of 50 species; all from Springfield, Mass.

BISSEL, E. S. 2 live Wild Geese.

FROST, IRVING, Norway, Me. 2 Owls, living, from Norway.

GARRETT, A. 3 specimens, 3 species, in alcohol, from Society Islands.

PURCHASED. 1 Bald Eagle, living.

RICH, J. G., Upton, Me. 36 specimens, 18 species; 15 embryos, 3 species, and 9 eggs of Spruce Partridge, all in alcohol, and from Upton.

COLLECTIONS SENT OUT.

BOARDMAN, To G. A., Milltown, Me. 24 specimens; 10 species, dry eggs.

ESSEX INSTITUTE, To the, Salem, Mass. 16 specimens, 11 species, dry eggs.

JARDIN DES PLANTES, To the, Paris. 1 Bald Eagle and 1 Snowy Owl, living.

SHUTE, To J. G., Woburn, Mass. 31 specimens, 19 species.

Report on the Reptiles, by A. AGASSIZ.

Mr. Putnam has been engaged for about three months in separating the duplicate Testudinata and arranging them for exchanges. He has also rearranged the whole collection of Reptiles stored in the cellar, in order to make it more accessible. The additions worthy of special notice are a collection of reptiles sent by Professor A. Aug. Duméril from the Jardin des Plantes. A collection received in exchange from Mr. Lazard of the South African Museum. The reptiles sent from Brazil by Mr. Lacerda, Dr. Marcus, Dr. Brunet, M. Bourget, Rev. Dr. Fletcher. A very valuable collection from Bangeok, Siam, sent by Mr. F. Blake. The live stock of reptiles sent at different times by Mr. B. P. Mann, from Concord, have been of

great use for invoices to the Jardin des Plantes. The collections which have been sent to Professor Jan, to Professor Baird, and to Dr. Cope for examination, have been returned by them. Fifteen large collections of specimens were sent to different institutions as will be seen below.

DONATIONS OF REPTILES.

- ALLEN, J. A. 26 specimens, 13 species, Springfield.
 ANDREW, Gov. J. A. 1 specimen, 1 species, Hilton Head, S. C.
 AQUARIAL GARDEN. 2 specimens, 2 species, Hayti and W. Indies.
 BEAL, W. J. 2 specimens, 1 species, Rollin, Mich.
 BENNETT, CALEB W. 1 specimen, 1 species, Holyoke, Mass.
 BLAKE, F. 22 specimens, 13 species, Bangkok.
 BOURGET, D. 222 specimens, 33 species, Brazil.
 BRUNET, Dr. 24 specimens, 17 species, Pernambuco.
 CHANDLER, T. P., Jr. 1 specimen, 1 species, Brookline.
 CHAMBERLIN, Mrs. A. P. 2 specimens, 1 species, South Africa.
 DAVIS, C. F. and J. H. STERNBERG. 26 specimens, 12 species,
 Panama.
 DAVIS, H. 12 specimens, 6 specimens, McGregor, Iowa.
 EAMES, H. H. 7 specimens, 4 species, Cambridge.
 FLETCHER, J. C. 27 specimens, 15 species, Brazil.
 GREENE, Dr. S. A. 5 specimens, 3 species, Hilton Head, S. C.
 HARTT, GEO. L. 3 specimens, 1 species, St. John.
 HARTT, C. F. 114 specimens, 9 species, Cambridge and St. John.
 HITCH, HENRY. 2 specimens, 1 species, Pernambuco.
 JILLSON, S. 2 specimens, 1 species, Feltonville.
 LACERDA, A. DE. 39 specimens, 27 species, Bahia.
 LEAVITT, Dr. C. F. 11 specimens, 6 species, Port Hudson, La.
 LOVERING, J. W. 6 specimens, 1 species, Fresh Pond.
 LYMAN, T. 5 specimens, 3 species, Culpepper, Va.
 MANN, B. P. 74 specimens, 14 species.
 MANN, H. 51 specimens, 11 species, Concord, Mass., and Minnesota.
 MAYOR, A. 2 specimens, 1 species, Neufchatel.
 MELENDY, A. 3 specimens, 1 species, Amherst.
 MOFFAT, R. C. 1 specimen, Bahamas.
 PAGE, U. S. A., Dr. J. W. 1 specimen, 1 species, Bogue Sound, N. C.
 PECK, G. W. 2 specimens, 1 species, Mass.
 PUTNAM, Capt. 5 specimens, 4 species, Batavia.
 SHEDD, W. B. 8 specimens, 3 species, Malden.
 SHUTE, J. G. 14 specimens, 7 species, Newberne, and Concord,
 N. H.

- SMITH, S. T. 11 specimens, 3 species, Norway, Me.
 SMITH, A. A. 1 specimen, Seghalian Island.
 SOUZA, DR. MARCUS DE. 2 specimens, 1 species, Amazon River.
 STIMPSON, W. 2 specimens, 2 species, Somers Pt., N. J.
 THAXTER, L. 2 specimens, 1 species, Isle of Shoals.
 TREAT, U. S. 3 specimens, 1 species, Eastport, Me.
 TROUVELOT, L. 7 specimens, 2 species, Medford.
 TUCKERMAN, H. 1 specimen, Cambridge.

RECEIVED IN EXCHANGE.

- DAVIS, H. 4 specimens, McGregor, Iowa.
 DUMÉRIL, A. AUG. 55 specimens, 55 species, various localities.
 EDWARDS, H. 2 specimens, 2 species, Melbourne.
 FOLIN, L. DE. 2 specimens, 2 species, Pozillac.
 LAYARD, L. 66 specimens, 37 species, Cape Good Hope.
 SALMIN, C. L. 33 specimens, 14 species, various localities.
 SMITHSONIAN INST. 23 specimens, 12 species, various localities.

WITH THE GRAY FUND.

- COOKE, C. 10 specimens, 10 species, Zanzibar.
 GARRETT, A. 9 specimens, 9 species, Society Is.
 POEY, F. 1 specimen, Havana.
 RICH, J. G. 20 specimens, 3 species, Upton, Me.
 SHEPARD, C. 1 specimen, Davenport.
 Total, 1,064 specimens, about 150 species.

REPTILES SENT FROM THE MUSEUM.

- SMITHSONIAN INSTITUTION. 7 species, 12 specimens.
 ESSEX INSTITUTE, 9 species, 17 specimens.
 C. L. SALMIN, Hamburg. 14 species, 100 specimens.
 Prof. DUMÉRIL, Jardin des Plantes. 26 species, 83 specimens.
 W. THEOBALD. 24 species, 68 specimens.
 Dr. REDTENBACHER, K. K. Hof Museum, Vienna. 22 species, 58 specimens.
 Prof. G. SCHIMPER, Strasburg. 21 species, 57 specimens.
 Prof. KRAUSS. 17 species, 43 specimens.
 Dr. KAUP. 16 species, 41 specimens.
 Prof. MARTINS. 12 species, 31 specimens.
 L. LAYARD, Cape Town. 12 species, 29 specimens.
 Prof. MCCOY. 12 species, 37 specimens.
 UNIVERSITY MUSEUM, Copenhagen. 11 species, 21 specimens.
 Prof. GEGENBAUR. 7 species, 17 specimens.
 Prof. EDWARDS, Jardin des Plantes, alive. 9 species, 52 specimens.
 Total, 24 species and 654 specimens.

Report on the Collection of Fishes, by A. AGASSIZ.

The Selachians have been undergoing a revision by Professor Agassiz. Mr. St. John has continued his studies of the Fossil Fishes. Mr. Putnam has been for some time engaged in cataloguing and taking care of the specimens received. Owing to the crowded state of the Fish room, it has been necessary to re-arrange to a considerable extent the collections stored in the cellar. This part of the collection is increasing so rapidly that the whole time of one individual is needed merely to take the proper care of the specimens on their arrival.

Among the invoices specially to be noticed are the collections made by Captain Putnam, at Batavia, the immense collection of Society Island fishes from Mr. Garrett, the valuable invoice of Mr. Blake, from Bangeok, of Dr. Stimpson, from Somers' Point, New Jersey, of Captain Atwood, of Provincetown, of Professor Poey, of Havana, of Mr. C. Cooke, from Zanzibar, of Dr. Watson, from Tennessee, of Mr. Lacerda, Dr. Brunet, Mr. D. Bourget, Dr. Fletcher, from Brazil; the collection of Mr. A. A. Smith, made in the Gulf of Tartary, the collections of Mr. Salmin, from the Adriatic and the Elbe, the collection of Fishes from the Bermudas, presented by the proprietor of the Aquarial Gardens, of Professor Baird, from Wood's Hole, of Mr. Rockwood, from Lake Champlain, the specimen of *Lepidosireu* obtained by purchase, and the invoices of Mr. Rich.

DONATIONS OF FISH.

- ADAMSON, Mr. 1 specimen. Pernambuco.
 AGASSIZ, L. & A. 50 specimens, 6 species, young. Nahant.
 AQUARIAL GARDENS. 84 specimens, 33 species. Fresh Pond and Bermuda.
 ATWATER, Mrs. C. 1 blind fish. Mammoth Cave, Kentucky.
 ATWOOD, N. E. 33 specimens, 13 species. Provincetown.
 BANNERMAN, Sir A. 20 specimens. 1 species. Newfoundland.
 BEAL, W. J. 10 specimens, 1 species. Rollin, Michigan.
 BLAKE, F. 25 specimens, 18 species. Bangeok.
 BOARDMAN, GEO. A. 27 specimens, 6 species, Grand Menan, and Schudic Lakes, Maine.
 BOURGET, D. 43 specimens, 28 species. Rio de Janciro.
 BRUNET, Dr. 10 specimens, 9 species. Pernambuco.
 BUFORD, C. 2 specimens, 2 species. Rock Island.
 BURKHARDT, J. 1 specimen.

CARY, T. G. 1 specimen. Japan.

CHESBOROUGH, Dr. 200 specimens, 6 species. Chicago, Illinois.

DABNEY, Miss O. 7 specimens. Fayal.

DAVIS, C. F., and STERNBERG, Dr. 2 specimens, 2 species.
Panama.

FITCH, S. P., Dr. Fossil fish scales. Vicksburg.

FLETCHER, J. C. 56 specimens, 20 species. Rio Grande del Norte
and Rio Tpojuco, Brazil.

GLEN, W. 1 Blennius.

GREENE, Dr. S. A. 1 specimen, Hilton Head, S. C.

HAMILTON, Captain. 14 specimens, 14 species. Bermudas.

HARTT, C. F. 8 specimens, 3 species. St. John, N. B.

HARTT, G. L. B. 91 specimens, 9 species. St. John, N. B.

HECO, J. 1 specimen. Kanagawa.

HITCH, HENRY. 1 specimen. Pernambuco.

JOHNSON, B. 3 specimens. Nahant.

JONES, J. M. 2 specimens, 2 species. Bermudas.

LACERDA, A. DE. 25 specimens, 11 species. Bahia.

LOVELAND, C. THATCHER. 36 specimens, 10 species. Chatham.

LOUSADA, Marquis de. 1 specimen. Boston.

MANN, B. P. 1 specimen. Labrador.

MANN, H. 38 specimens, 4 species. Concord River.

PAGE, GEO. S. 1 specimen.

PAGE, Dr. J. W. 2 specimens, 2 species. Neuse River.

PUTNAM, Captain W. H. A. 600 specimens, 37 species. Batavia.

RICHMOND, Captain. 1 specimen. Feejee Islands.

ROCKWOOD, D. P. 52 specimens, 11 species. Bridport, Vt.

SAWYER, HENRY. 9 specimens, 2 species. Surinam.

SHAW, Q. A. 47 specimens, 2 species. Nahant.

SMALLEY, O. 1 specimen.

SMITH, A. A. 22 specimens, 12 species. Seghalian Island.

THAXTER, L. 2 specimens, 2 species. Isle of Shoals.

THOMPSON, J. H. 1 specimen. New Bedford.

TISDALE, S. P. 24 specimens, 1 species. Agawam.

TREAT, U. S. 27 specimens, 11 species. Eastport, Maine.

VERRILL, A. E. 17 specimens, 6 species. Eastport.

WATSON, L. 190 specimens, 25 species. Nashville, Tennessee.

RECEIVED IN EXCHANGE.

EDWARDS, HENRY. 5 specimens, 2 species. Hobson's Bay, Victoria.

FOLIN, L. DE. 10 specimens, 5 species. Pozillac.

LAYARD, S. 25 specimens, 15 species. Cape of Good Hope.

- MOORE, THOMAS J. 7 specimens, 2 species. Liverpool.
 SALMIN, C. L. 131 specimens, 44 species. North Sea.
 SMITHSONIAN. 64 specimens, 20 species. Wood's Hole. Prof.
 S. F. Baird.

WITH THE GRAY FUND.

- COOKE, C. 354 specimens, 54 species. Zanzibar.
 GARRETT, A. 1,000 specimens, about 300 species. Society Islands.
 GRAY FUND. 1 specimen. Lake Michigan.
 POEY, F. 41 specimens, 41 species. Havana.
 REICHE BROTHERS. 1 specimen. Senegal.
 RICH, J. G. 11 specimens, 4 species. Upton, Maine.
 STIMPSON, W. 65 specimens, 22 species. Somers' Point, N. J.
 Total—3,460 specimens, and about 740 species.

Report on the Collection of Insects, by P. R. UHLER.

During the past year fair progress has been made in reducing the collection to a state of order, and it now remains less liable to injury from the attacks of parasites.

Mr. Packard has pinned the Japanese insects received from Mr. J. T. Gulick. He has placed some of the Geometridæ and Pyralidæ of the New England and Middle States on exhibition up stairs, and he has pinned and spread some of the alcoholic specimens of Coleoptera. He has also placed some of the alcoholic larvæ on exhibition, and assorted a portion of the alcoholic specimens into separate drawers.

The Hymenoptera which were sent to Mr. Edward Norton for identification have been returned well determined, and Mr. Norton has kindly added to them a number of types of his monograph of the genus *Allantus*.

The increase of the collections, since the last Report has been very great. The whole number of specimens added during that time amounts to 40,288, of 13,398 species. Of this number, 5,738 specimens were presented; 32,705 were purchased with the Gray Fund, and 1,845 received in exchange.

Some of these collections are of the highest interest, as exhibiting the features of the insect Faunæ of several of the

less known portions of the globe. Particularly to be mentioned in this connection are the collections made by Mr. Caleb Cooke in Zanzibar, and those just received from Mr. H. Edwards, of Melbourne, Australia.

The Museum has also obtained with the Gray Fund, the extensive type collections of Dr. F. E. Melsheimer and Rev. Daniel Ziegler. The former of these was the first considerable collection ever brought together in the United States, and was commenced more than eighty years ago, by the father of the present Dr. F. E. Melsheimer. Most of the oldest of these specimens, notwithstanding their great age, are in a fine state of preservation.

The specimens of pinned Hemiptera which were sent to me for identification, were returned undetermined, but the earliest opportunity will be embraced to furnish them with their names.

I have been closely engaged in disentangling the mass of confusion in which I found the insects involved when I came here, and I have at length succeeded in placing the insects of the different Faunæ in separate boxes; so that a species from a given locality may be found when called for. The work of spreading and setting the specimens is proceeding as rapidly as the slow nature of the work will admit, and a considerable number of boxes of specimens are now ready to be placed on exhibition.

Subjoined will be found a list of the names of persons who have contributed to the increase of the collections, with the localities, number of specimens and apparent number of species received from each.

Insects received from October 20, 1863, to October, 1864.

AGASSIZ, A. 1 species, 30 specimens Diptera; 4 species, 80 specimens Arachnida, from Mendocino, Calif. 1 specimen *Alypia octomaculata*; 1 specimen *Lophocampa tessellaris*, from Cambridge, Mass. Total, 7 species, 112 specimens.

AGASSIZ, Professor L. Eggs of *Telea polyphemus*; eggs of *Cossus Robinia*; 5 species, 7 specimens Coleoptera; 4 species, 4 specimens Lepidoptera; 1 species, 4 specimens Diptera; 1 species, 1 specimen Myriapoda, from Nahant, Mass.; 15 species, 35 specimens Neuroptera; 2 species, 11 specimens Coleoptera; 3 species, 5 specimens Hymenoptera, from Natick, Mass.; 3 species, 4 specimens Neuroptera, from Nashon

Island; 1 species, 1 specimen Coleoptera; 3 species, 6 specimens Orthoptera; 3 species, 3 specimens Neuroptera; 11 species, 28 specimens Lepidoptera; 3 species, 3 specimens Hemiptera; 26 species, 261 specimens Diptera, from Nahant, Mass. Total, 81, species, 373 specimens.

ALLEN, J. A., Springfield, Mass. 7 species, 8 specimens Hymenoptera; 28 species, 53 specimens Lepidoptera; 7 species, 16 specimens Diptera; 37 species, 70 specimens Coleoptera; 8 species, 50 specimens Hemiptera; 18 species, 93 specimens Orthoptera; 1 specimen, 1 species Neuroptera; 3 species, 16 specimens Myriapoda; 1 specimen, 1 species Arachnida, from Springfield, Mass. Total, 111 species, 308 specimens.

ANTHONY, J. G., Assistant, M. C. Z. 1 species, 1 specimen Hymenoptera, from Cambridge, Mass.

BARTLETT, JOHN. 1 species, 1 specimen Coleoptera, from Cuba.

BELLOWS, A. H. 1 specimen Saturnia luna, from Walpole, N. H.

BOURGET, D. 1 species, 1 specimen Lepidoptera; 1 species, 1 specimen Coleoptera; 3 species, 3 specimens Orthoptera; 1 species, 1 specimen Arachnida, from Rio de Janeiro, Brazil. Total, 6 species, 6 specimens.

BRADFORD, Mr. 1 species, 1 specimen Orthoptera, from Cambridge, Mass.

BRIDGHAM, Mrs. S. W., New York City. 8 species, 16 specimens Lepidoptera, from New York; 3 species, 4 specimens Lepidoptera, from East Indies; 6 species, 17 specimens Lepidoptera, from Para, Brazil; 4 species, 5 specimens Lepidoptera, from Bogota, New Granada. Total, 21 species, 42 specimens.

CHANDLER, J. S. 1 species, 30 specimens Hymenoptera; 1 species, 50 specimens Arachnida, from Brookline, Mass.; 1 species, 1 specimen Neuroptera, from Cambridge, Mass. Total, 3 species, 81 specimens.

CURTIS, Lieutenant, Pelham. 1 species, 1 specimen Hymenoptera; 1 species, 1 specimen Hemiptera; 1 species, 4 specimens Orthoptera, from Virginia. Total, 3 species, 6 specimens.

DAVIS, C. F. and STERNBERGH, Dr. J. H. 7 species, 260 specimens Hymenoptera; 8 species, 10 specimens Lepidoptera; 1 species, 3 specimens Diptera; 20 species, 50 specimens Coleoptera; 5 species, 8 specimens Hemiptera; 9 species, 18 specimens Orthoptera; 1 species, 1 specimen Neuroptera; 3 species, 30 specimens Arachnida; 3 species, 20 specimens Myriapoda, from Panama. Total, 56 species, 400 specimens.

DAVIS, H. 12 species, 14 specimens Coleoptera; 2 species, 5 specimens Orthoptera; 3 species, 4 specimens Hymenoptera; 3 species, 7 specimens Hemiptera; 6 species, 9 specimens Lepidoptera; 2 species, 2 specimens Diptera; 3 species, 11 specimens Myriapoda; 2 species, 4 specimens Arachnida, from Macgregor, Iowa. Total, 33 species, 56 specimens.

EAMES, H. H. Nest, workers and larvæ of *Vespa maculata*, 35 specimens, from Cambridge, Mass.

EDMANDS, Miss A. M. 2 species, 5 specimens Coleoptera, from west coast of Africa; 2 species, 8 specimens Coleoptera, from Para, Brazil; 8 species, 8 specimens Lepidoptera; 7 species, 14 specimens, Coleoptera; 3 species, 3 specimens Hemiptera, from Salem, Mass.; 1 species, 25 specimens Coleoptera, from Marblehead, Mass.; 8 species, 8 specimens Lepidoptera; 6 species, 40 specimens Coleoptera; 15 species, 60 specimens Hemiptera; 3 species, 12 specimens Neuroptera; 10 species, 20 specimens Diptera, from West Beach, Mass.; 1 larva of *Datana*; 1 larva of *Halisidota*, from Hallowell, Me.; 18 species, 70 specimens Coleoptera; 1 species, 50 specimens Hemiptera, from Bethel, Me.; 1 larva of *Halisidota tessellaris*; 2 larvæ of Diptera, from Cambridge, Mass.; 1 species, 8 specimens Diptera; 8 species, 12 specimens Coleoptera; 4 species, 4 specimens Hemiptera; 3 species, 10 specimens Orthoptera, from N. Conway, N. H.; 2 species, 10 specimens Hymenoptera; 3 species, 20 specimens Hemiptera; 1 species, 5 specimens Orthoptera, from China. Total, 108 species, 471 specimens.

ESSEX INSTITUTE, Salem. 10 specimens of lice, from White Owl.

FLETCHER, Rev. J. C. 12 species, 1,234 specimens Hymenoptera; 5 species, 12 specimens Lepidoptera; 12 species, 18 specimens Coleoptera; 11 species, 19 specimens Orthoptera; 1 species, 70 specimens Termites; 2 specimens, 2 species Hemiptera; 3 specimens, 3 species Myriapoda; 3 species, 4 specimens Arachnida, from Pernambuco, Brazil. Total, 40 species, 1,361 specimens.

FOLIN, Marquis de. 18 species, 25 specimens Coleoptera; 3 species, 4 specimens Orthoptera; 4 species, 6 specimens Hemiptera; 3 species, 5 specimens Diptera; 4 species, 4 specimens Hymenoptera; 3 species, 3 specimens Arachnida, from Pouillac, France. Total, 35 species, 45 specimens.

FRAZER, Mrs. A. A. 1 species *Sphinx*, from Red Sea; 2 species, 2 specimens Coleoptera; 1 species, 1 specimen Neuroptera, from Ceylon; 1 species, 2 specimens Coleoptera, from Island of Elephanta. Total, 5 species, 7 specimens.

GREENE, Dr. S. A. 1 specimen, 1 species Lepidoptera; 6 species, 8 specimens Coleoptera; 1 species, 1 specimen Hemiptera; 1 species, 1 specimen Orthoptera; 2 species, 2 specimens Myriapoda, from Hilton Head, S. C. Total, 11 species, 13 specimens.

GROTE, A., President Asiatic Society of Calcutta. 42 species, 83 specimens Lepidoptera, from Calcutta.

HARRINGTON, G. 1 specimen, 1 species Lepidoptera, from Cambridge, Mass.

HAXEL, P. 80 species, 310 specimens Coleoptera; 21 species, 60 specimens Hemiptera, from Quincy, Ill. Total, 101 species, 370 specimens.

HITCH, H. 1 chrysalis of Lepidopteron, from Pernambuco, Brazil.

LACERDA, A. DE. 3 species, 103 specimens Hymenoptera; 6 species, 6 specimens Lepidoptera; 21 species, 23 specimens Coleoptera; 4 species, 5 specimens Hemiptera; 13 species, 61 specimens Orthoptera; 6 species, 27 specimens Arachnida, from near Bahia, Brazil. Total, 53 species, 224 specimens.

LAYARD, F. 7 species, 14 specimens Coleoptera, from Ceylon.

LEAVITT, DR. 7 species, 8 specimens Coleoptera; 4 species, 8 specimens Orthoptera; 1 species, 1 specimen Lepidoptera; 1 species, 1 specimen Neuroptera; 3 species, 7 specimens Hemiptera; 2 species, 3 specimens Myriapoda, from Port Hudson, Miss. Total, 18 species, 28 specimens.

LYMAN, T. 1 *Epantheria oculatissima*; 1 *Xylocopa*; 1 *Halictus*; 1 Bacteria; 4 species, 4 specimens Arachnida; 2 species, 2 specimens Myriapoda, from Culpepper, Va. Total, 11 species, 17 specimens.

NORTON, E. 16 species, 45 specimens Hymenoptera, from Connecticut.

PACKARD, A. S., Jr. 1 species, 8 specimens Lepidoptera; 1 species, 2 specimens Orthoptera; 1 species, 2 specimens Neuroptera; 1 species, 4 specimens Arachnida; 1 *Lepisma*, from foot of Mount Monadnock, N. H. Total, 5 species, 17 specimens.

PAGE, DR. J. W. 2 species, 20 specimens Hymenoptera; 8 species, 10 specimens Lepidoptera; 1 species, 1 specimen Coleoptera; 2 species, 2 specimens Arachnida, from Newbern, N. C. Total, 13 species, 33 specimens.

PRAY, Mrs. W. M. 1 specimen Bacteria and eggs, from Westfield, N. Y.

PUTNAM, F. W. 2 species, 11 specimens Hymenoptera; 1 species, 1 specimen Diptera; 1 species, 1 specimen Arachnida; 1 species, 1 specimen Myriapoda, from Newburyport, Mass. Total, 5 species, 14 specimens.

RICHMOND, Captain. 1 species, 2 specimen *Phyllium*, from Feejee Islands.

SAUNDERS, W. 1 larva of *Epantheria oculatissima*, from London, C. W.

SHUTE, J. G. 25 cocoons of *Tinea*; 1 *Thyridopteryx* case, from North Carolina. Total, 2 species, 26 specimens.

SNOW, Mr. 1 species, 1 specimen Coleoptera, from Cambridge.

UHLER, P. R. 34 species, 96 specimens Coleoptera; 11 species, 28 specimens Lepidoptera; 36 species, 82 specimens Hemiptera; 58 species,

228 specimens Diptera; 5 species, 20 specimens Hymenoptera; 11 species, 26 specimens Neuroptera, from Cambridge, Mass. Total, 155 species, 470 specimens.

UHRLAUB, E. 2 varieties of *Papilio turnus*, from Lutherville, Md.

VERRILL, A. E. 4 species, 4 specimens Hymenoptera; 15 species, 16 specimens Coleoptera; 4 species, 6 specimens Hemiptera; 4 species, 5 specimens Neuroptera; 42 species, 71 specimens Lepidoptera; 3 species, 4 specimens Diptera; 3 species, 4 specimens Orthoptera; 1 species, 1 specimen Arachnida, from Cambridge, Mass. 1 species, 1 specimen Hemiptera; 1 species, 2 specimens Orthoptera, from Eastport, Me. 4 species, 10 specimens Orthoptera; 1 species, 1 specimen Arachnida, from Grand Menan, Me. Total, 83 species, 185 specimens.

BY EXCHANGE.

AKHURST, J. 10 species, 119 specimens Hemiptera; 1 species, 1 specimen Coleoptera: 1 species, 1 specimen Orthoptera, from Panama. Total, 12 species, 121 specimens.

EDWARDS, H., Melbourne. 370 species, 1,336 specimens Coleoptera; 112 species, 178 specimens Lepidoptera; 60 species, 102 specimens Hymenoptera; 21 species, 45 specimens Orthoptera; 7 species, 11 specimens Neuroptera; 56 species, 122 specimens Hemiptera; 21 species, 47 specimens Diptera; 1 species, 1 specimen Myriapoda: 1 species, 3 specimens Scorpions; 5 pupa cases and cocoons of Lepidoptera; 20 cocoons of Hymenopterous parasite from a caterpillar; 3 pupæ of Parnidæ, from Melbourne, Australia. Total, 651 species, 1,873 specimens.

FOLIN, Marquis de. 3 species, 3 specimens Lepidoptera; 20 species, 60 specimens Coleoptera, 3 species, 20 specimens Hemiptera; 1 species, 6 specimens Neuroptera; 3 species, 14 specimens Arachnida.

WITH THE GRAY FUND.

COOKE, CALEB. 47 species, 73 specimens Lepidoptera; 82 species, 250 specimens Coleoptera; 44 species, 2,091 specimens Hymenoptera; 51 species, 221 specimens Hemiptera; 25 species, 89 specimens Diptera; 59 species, 152 specimens Orthoptera; 13 species, 32 specimens Neuroptera; 8 species, 8 specimens Arachnida; 4 species, 5 specimens Myriapoda, from Zanzibar, Africa. Total, 333 species, 2,821 specimens.

IMHOFF, Dr., Basle, Switzerland. 32 species, 105 specimens Hymenoptera; 90 species, 210 specimens Lepidoptera; 17 species, 50 specimens Diptera; 107 species, 550 specimens Coleoptera; 6 species, 20 specimens Orthoptera; 2 species, 15 specimens Neuroptera, from Basle, Switzerland. Total, 254 species, 950 specimens.

MELSHEIMER, Dr. F. E. 2,200 species, 10,272 specimens Coleoptera; 125 species, 235 specimens Hymenoptera; 3 species, 9 specimens Neuroptera; 28 species, 44 specimens Hemiptera, from York County, Pa.; 1,894 species, 3,018 specimens Coleoptera; 23 species, 25 specimens Hymenoptera; 90 species, 94 specimens Diptera, from Europe. 422 species, 593 specimens Coleoptera, from Brazil. 74 species, 89 specimens Coleoptera, from China. 8 species, 8 specimens Coleoptera, from Java. 14 species, 18 specimens Coleoptera, from Australia. 8 species, 9 specimens Coleoptera, from Mexico. 39 species, 42 specimens Coleoptera, from Africa. 4 species, 5 specimens Coleoptera, from Siberia. 9 species, 13 specimens Coleoptera, from West Indies. Total, 4,941 species, 14,474 specimens.

SMITH, S. I. 87 species, 205 specimens Hymenoptera; 188 species, 510 specimens Lepidoptera; 85 species, 210 specimens Diptera; 85 species, 200 specimens Coleoptera; 21 species, 142 specimens Orthoptera; 22 species, 70 specimens Hemiptera; 20 species, 90 specimens Neuroptera, from Norway, Me. Total, 508 species, 1,427 specimens.

UHLER, P. R. 13 species, 69 specimens Hemiptera; 25 species, 39 specimens Coleoptera; 4 species, 7 specimens Hymenoptera; 2 species, 2 specimens Lepidoptera; 39 species, 143 specimens Diptera; 5 species, 16 specimens Neuroptera, from Chelsea Beach, Mass.; 4 species, 6 specimens Lepidoptera; 1 species, 1 specimen Hymenoptera; 3 species, 14 specimens Diptera; 9 species, 50 specimens Neuroptera; 9 species, 36 specimens Hemiptera; 6 species, 28 specimens, from Natick, Mass.; 12 species, 38 specimens Coleoptera; 7 species, 120 specimens Hemiptera: 6 species, 47 specimens Neuroptera; 2 species, 5 specimens Diptera; 9 species, 86 specimens Neuroptera; 8 species, 70 specimens Coleoptera, from Waltham, Mass.; 8 species, 12 specimens Coleoptera; 10 species, 33 specimens Neuroptera; 4 species, 11 specimens Lepidoptera; 1 species, 3 specimens Diptera, from Auburndale, Mass.; 5 species, 8 specimens Orthoptera; 6 species 16 specimens Hemiptera; 5 species, 12 specimens Diptera; 2 species, 2 specimens Neuroptera; 1 species, 19 specimen Myriapoda, from Braintree, Mass.; 7 species, 49 specimens Coleoptera; 4 species, 9 specimens Hymenoptera; 22 species, 85 specimens Hemiptera; 2 species, 8 specimens Orthoptera; 3 species, 11 specimens Lepidoptera; 10 species, 14 specimens Diptera; 3 species, 4 specimens Neuroptera, from York County, Pa.; 6 species, 18 specimens Neuroptera; 11 species, 14 specimens Lepidoptera; 14 species, 75 specimens Hemiptera; 9 species, 14 specimens Diptera, from Baltimore, Md. Total, 297 species, 1,194 specimens.

ZIEGLER, Rev. D. 1,794 species, 6,262 specimens Coleoptera; 11 species, 39 specimens Orthoptera; 119 species, 255 specimens Hemiptera; 6 species, 16 specimens Neuroptera; 60 species, 135 specimens

Hymenoptera; 280 species, 361 specimens Lepidoptera; 80 species, 168 specimens Diptera, from York County, Pa.; 1,789 species, 2,946 specimens Coleoptera; 4 species, 4 specimens Orthoptera; 29 species, 46 specimens Hemiptera; 14 species, 17 specimens Hymenoptera; 228 species, 301 specimens Lepidoptera; 173 species, 225 specimens Diptera, from Europe; 378 species, 558 specimens Coleoptera; 2 species, 2 specimens Orthoptera; 8 species, 10 specimens Hemiptera; 12 species, 17 specimens Lepidoptera, from Brazil; 11 species, 13 specimens Lepidoptera; 1 species, 1 specimen Orthoptera; 12 species, 39 specimens Hemiptera; 1 species, 3 specimens Hymenoptera; 55 species, 87 specimens Coleoptera, from China; 12 species, 16 specimens Coleoptera; 4 species, 5 specimens Hemiptera, from Java; 110 species, 170 specimens Coleoptera, from Africa; 34 species, 46 specimens Coleoptera, from Mexico; 40 species, 52 specimens Coleoptera, from Cuba; 14 species, 19 specimens Coleoptera, from Australia; 21 species, 24 specimens Coleoptera, from Siberia. Total, 5,302 species, 11,837 specimens.

OCTOBER, 26, 1864.

Report on the Crustacea, by P. R. UHLER.

The following list includes the additions which have been made to this class since the last Report. The whole number received amounts to 310 species, comprising 3,235 specimens:—

AGASSIZ, A. 7 species, 45 specimens, from Nahant and Nashua.

ANTICOSTI EXPEDITION, Messrs. Verrill, Shaler, and Hyatt, (partly Gray's fund.) 22 species, 208 specimens, from Anticosti Island.

DABNEY, Miss O. 9 species, 27 specimens, from Fayal, Azores.

DAVIS, G. N. 6 species, 18 specimens, from Rio de Janeiro.

FLETCHER, Rev. J. C., and Dr. BURNET. 5 species, 26 specimens, from Pernambuco, Brazil.

FOLIN, MARQUIS DE. 7 species, 105 specimens, from Pouillac, Gironde, France.

HAMILTON, Capt. 3 species, 3 specimens, from Florida.

HARTT, C. F. 1 species, 200 specimens, from Cambridge; 2 species, 11 specimens, from St. John, N. B.; 3 species, 167 specimens, from Halifax Harbor. Total, 6 species, 481 specimens.

JONES, J. M. 3 species, 5 specimens, from Bermuda.

LACERDA, A. DE. 3 species, 14 specimens, from Brazil.

LIVERPOOL FREE PUBLIC MUSEUM. 1 species, 6 specimens, from Calcutta; 2 species, 16 specimens, from Smyrna.

LOVELAND & THATCHER. 3 species, 7 specimens, from Chatham, Mass.

LYMAN, T. 3 species, 3 specimens, from Spezzia.

NILES, W. H. 1 species, 6 specimens, from Provincetown.

PUTNAM, Capt. W. H. A. 7 species, 15 specimens, from Batavia, Java; 10 species, 150 specimens, from Gulf Stream. Total, 17 species, 165 specimens.

SMITH, A. A. 4 species, 9 specimens, from Seghalian, Gulf of Tartary.

TREAT, U. S. 3 species, 52 specimens, from Eastport, Me.

VERRILL, A. E. 14 species, 96 specimens, from Eastport, Me.

WRIGHT, CHARLES. 5 species, 46 specimens, from Hong Kong, China.

WITH THE GRAY FUND.

COOKE, CALEB. 13 species, 210 specimens, from Zanzibar.

GARRETT, A. 99 species, 1,519 specimens, from Society Islands.

SALMIN, C. L. 8 species, 28 specimens, locality unknown.

SHEPARD, C. 1 species, 7 specimens, from Davenport, Iowa.

STIMPSON, Dr. WM. 2 species, 10 specimens, from Somer's Point, N. J.

IN EXCHANGE.

EDWARDS, H. 3 species, 6 specimens, from Melbourne, Australia.

LAYARD, L. 2 species, 17 specimens, from Cape Town, Africa.

MILNE EDWARDS, Prof. H. 58 species, 100 specimens; types from the Jardin des Plantes.

Report on the Annulata, by P. R. UHLER.

The following additions have been made during the past year to this class. The whole number received amounts to 110 species, embracing 701 specimens:—

AGASSIZ, A. 23 species, 231 specimens, from Nahant.

ANTICOSTI EXPEDITION, Messrs. Verrill, Shaler, and Hyatt. 3 species, 11 specimens, from Chedabucto Bay; 5 species, 33 specimens, from Anticosti Island; 10 species, 125 specimens, from Eastport, Me. Total, 18 species, 169 specimens.

DAVIS, H. 1 specimen of Gordius, from Macgregor, Iowa.

GREEN, Dr. S. A. 1 species, 5 specimens, from Groton, Mass.

HARTT, C. F., Student in M. C. Z. 3 species, 33 specimens, from St. John, N. B.

HITCH, H. 1 specimen of *Lumbricus*, from Pernambuco.

JONES, J. M. 1 species, 1 specimen, from Bermuda.

LIVERPOOL FREE PUBLIC MUSEUM. 1 species, 3 specimens, from North Wales, collected by J. W. Williams, Esq.

SMITH, A. A. 1 specimen of *Aphrodite*, from Seghalian, Gulf of Tartary.

TREAT, U. S. 1 species, 3 specimens of *Nereis*; 3 tubes of *Clymene*, from Eastport, Me.

VERRILL, A. E. 13 species, 120 specimens, from Eastport, Me.

WITH THE GRAY FUND, FROM

GARRETT, A. 42 species, 122 specimens, from the Society Islands.

IN EXCHANGE.

FOLIN, MARQUIS DE. 2 species, 2 specimens, from France.

LAYARD, L. 1 species, 6 specimens, from Cape Town, Africa.

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

The assistant in charge of the Mollusca herewith presents his annual report of changes in that department, its present condition, and future prospects.

More has been done during the current year to increase the number of species, as well as to add to the real value of the collection, than in any previous year since the Museum was established; in addition to which, definite and well-digested plans have been adopted and partially executed, which in time will not only present the collection in a new and attractive form to the general observer, but also afford the best opportunity for study to the scientific investigator. To this end, the specimens have been carefully mounted upon glass tablets, properly prepared, and so arranged that several characteristic views of each species may be seen and studied at the same time; in addition to which, highly instructive and finely prepared sections of the shells have been made by Mr. Glen, whose fine taste and delicate workmanship, thus brought into requisition, afford us the very best opportunity for a perfect insight into the interior

arrangements of the molluscous household, and will, we trust, also give us a more reliable clew to a perfect arrangement of the mollusca themselves.

All the mollusks in alcohol have, since the last report, been examined and put into better order by Mr. Bickmore, and may now be considered beyond the fear of injury for some time to come.

Considerable progress has been made in the classification of a portion of the pulmonate Gasteropods, and before our next report, we hope to chronicle further progress in this direction. Important measures have also been projected, and are in process of consummation, by which, we trust, our collection may be largely augmented and our resources for that purpose be extended far beyond their present limit. These measures will, we believe, when fully developed, place our collection of mollusca in a position second to none on this continent, and but little inferior to any in Europe.

Prominent among these measures we may note the contemplated purchase of two collections of shells, well known among naturalists in this country as containing many specimens and species of unusual interest. These collections are so dissimilar that in the purchase of both, neither would to any great extent duplicate the other. One of them, Mr. Anthony's, is composed entirely of terrestrial and fluviatile shells, to the number of 5000 species, including a very large number from our southern waters, from whence, during our present struggle, we cannot hope to draw any fresh supplies. It is also rich in typical specimens, including representatives of all the species of his own description, as well as a very large number derived from other authors, thus making it, to a large extent, a typical collection; while the vast number of desirable duplicates, more in number, we believe, than belongs to any collector on this continent, will enable us to carry on our exchanges advantageously for many years to come. The other collection, that of Dr. Gould, needs no special comment, being well known to all those conversant with natural history in this country. It is said to contain about 10,000 species of marine, fluviatile, and terrestrial shells, embracing not only his own types of the United States exploring expedition shells, but also those of the

shells of Massachusetts, &c., &c., and for this reason will be particularly valuable in an institution like ours.

Our exchanges in this department have not been neglected, and a larger number of packages have been sent abroad than in any previous year. About 20 packages of large size have thus been sent, numbering 1447 species. The contributions received have been from 34 sources, by which we have added 1767 species during the current year. These figures do not exhibit a very large increase over the preceding year, but in reality the additions are of far more importance than would appear from the data given, most of the specimens received having been new to our collection, while the few duplicates will be useful in future exchanges.

Among the contributions received during the past year are some which deserve special notice. From H. Cuming, Esq., of London, we received 90 species, 296 specimens, of rare shells in alcohol, most of them new to our collection in this form.

Miss C. Dabney also sends us in alcohol 23 species and 88 specimens. A fine collection of Bermuda shells was also received from J. M. Jones, Esq. From the Marquis de Folin we have 157 species European shells, in exchange; also, in like manner, from G. W. Tryon, Jr., Esq., of Philadelphia, over 200 species of very desirable shells, mostly West Indian.

Dr. W. Newcomb, of California, sends us, among other contributions, an unusually fine series of 120 species of *Achatinella* from the Sandwich Islands—these being correctly named, with all their varied and perplexing synonymy, are peculiarly valuable; and in this genus no one has so completely worked out the species and unravelled the synonymy as Dr. Newcomb.

Other contributions, less numerous in species, but all very acceptable, have been received; from H. Hammond, 31 species; T. Layard, 42 species; J. A. Lapham, 22 species; Prof. Marcou, 4 species; J. G. Shute, 7 species; Jean Rigacci, 23 species; J. H. Thompson, 24 species.

The contributions to the Museum, other than by exchange, have been from the following sources, viz.: J. G. Anthony, 371 species; Alexander Agassiz, 4 species; Anticosti expedition, 58 species; W. J. Beal, 3 species; A. S. Bickmore, 14 species; W. G. Binney, 3 species; T. Bland, 3 species; G. N. Davis, 2 species; Joseph Heco, 15 species; C. F. Hartt, 28 species;

Theodore Lyman, 6 species ; F. W. Putnam, 7 species ; M. Simon, 5 species ; Mrs. L. L. Thaxter, 3 species ; A. E. Verrill, 83 species ; Prof. Wyman, 1 species ; Rev. J. C. Fletcher, 19 species.

With the Gray fund we have secured some valuable contributions ; from C. Cooke, Zanzibar, 98 species and 7,500 specimens ; from a collection made by Mr. C. Wright, in Cuba, over 100 species ; from W. Stimpson, 127 species, and from C. Shepard, 44 species.

All the pulmonate Gasteropods in the Museum, except those very recently received, have been mounted, and all the fluviatile shells, except Naiadæ, are also mounted, and now await suitable space for their proper exhibition, which we hope will not long be wanting.

Report on the Collection of Brachiopoda, by N. S. SHALER.

Since the last report, work has been begun upon the collection of Brachiopoda, with a view to reducing the magnificent store of materials, in the possession of the Museum, to the shape best fitted to aid in the advancement of American palæontology.

As the greatest value of the collection consists in the precision with which the locality of the specimens is given, and the importance of the labels attached to them by authors, the first effort was to secure the specimens from all danger of accidental displacement, likely to occur even with the most careful handling. To do this effectually, it was necessary to catalogue the whole collection, after the plan which had been adopted in other departments of the museum. In pursuance of this plan, over twelve hundred lots of specimens from palæozoic horizons, comprising, however, scarcely a tithe of the collection, have been catalogued and numbered ; and it is confidently expected that the coming year will see the whole collection similarly secured against accident.

The new species collected by the Anticosti expedition in 1861, have been described ; and the manuscript is now ready for publication in the " Bulletin." The sub-family of Leptænidæ has been worked up monographically, the specimens mounted

on tablets, and made ready for the exhibition rooms. A monograph of the genus *Atrypa* is in preparation, and will be ready for publication in the catalogue during the coming year.

A preliminary survey of the collections has furnished the following data, from which the magnitude and value of the collections, which fill our store-rooms, may be estimated.

The Palæozoic Brachiopoda, not including those from American localities, where collections have lately been made under the direction of the curator, amount to more than five thousand lots, including over fifty thousand specimens. From many important American localities we have large collections, which have been made by students and assistants of the Museum, which not only serve as a complete series of many of our American species, but afford most valuable material for foreign exchanges. Of these collections those of the Anticosti expedition from the Gulf of St. Lawrence, of Mr. Hartt, from the carboniferous strata of Nova Scotia, and of Mr. St. John, from Waldron Richmond, Spurgin's Hill, and other points in Indiana, are particularly noticeable, as well from the amount of materials as for their value in determining the relations of many of the most important sections of the American Palæozoic series.

The collections from the European mesozoic and cœnozoic formations increase our list of specimens from typical localities to over ten thousand lots, or upwards of one hundred thousand specimens. Most of the material has come to us from the hands of the best paleontologists of Europe.

By the purchase of the collections of Professors Bronn and de Koninck the Museum obtained possession of most of the original specimens described by those authors. Effort has been made to increase the advantages, given by the possession of typical specimens, by a system of exchanges with those palæontologists who are at present working on this branch. With this view, collections of the Brachiopoda, collected by the Anticosti expedition, have been forwarded to a number of the leading palæontologists of Europe, and the answers, as far as received, give promise of a very favorable response.

When the arrangement of the collection is completed it will require an area equal to all the shelving in one of our exhibition-rooms for its display. It will, therefore, have to remain for the present in our store-rooms, inaccessible to the general public.

Report on Radiates, by A. AGASSIZ.

During the past year Mr. Niles has been engaged in arranging the Crinoids, and in making diagrams for the Museum Catalogue. For the sake of examining the fine collection of Burlington Crinoids, he has spent his vacation at Burlington, where Dr. Barries, Charles Wachsmuth, Esq., and Dr. Thieme gave him all the facilities to be desired, and allowed him the freest use of their collections for examination. Mr. A. Agassiz has continued the arrangement of the Starfishes, which was begun last year, as far as time could be spared from the general care of the Echinoderms received. Mr. Verrill has been occupied in making the faunal arrangement of the Polyps of the eastern shores of North America, and in making a Faunal List of the collections of the Anticosti expedition. He has also taken the general care of the Polyps during the beginning of the year. For the Acalephs, the few specimens which have been added to the collection, have been at once catalogued by Mr. A. Agassiz.

The printing of the first part of the Illustrated Catalogue of the Museum, containing the Ophiuridæ, by Lieutenant-Colonel Lyman, is now completed. The Catalogue of Acalephs, by Mr. A. Agassiz, is in the press. The Third Part of the Museum Bulletin, containing the lists of Polyps sent in exchange by Mr. Verrill, has been published and distributed with the Annual Report of the past year. Mr. T. G. Cary has very kindly undertaken to prepare from the Museum Catalogue the faunal sheets of Radiates; he has finished the Ophiurans, and has made some progress with the Polyps also.

Among the most interesting additions to the Radiates are, for Echinoderms, the collection sent by the Imperial Museum of Vienna, through Dr. Redtenbacher from the Red Sea. Also a small collection from Mr. James Barnard, as well as the collection secured with the Gray Fund from Mr. A. Agassiz, made at the Society Islands. For the Acalephs, the collection of duplicates sent by the Smithsonian Institution, of Hydroids, collected by Dr. Stimpson, in the North Pacific Exploring Expedition, and the collections of the Anticosti expedition, are the most interesting.

In Polyps, the most valuable invoices are a small collection of typical species, sent by Professor Edwards, from the Jardin

des Plantes ; a collection from the Red Sea, sent by Dr. Redtenbacher, from the Vienna Museum ; the collections sent by the Smithsonian Institution, from the Northwestern Boundary survey of the North Pacific Exploring Expedition, collected by Dr. Stimpson ; and lastly, a few exceedingly fine specimens from Fayal, sent by Miss O. Dabney.

The number of specimens of Radiates sent from the Museum during the past year is quite large, as will be seen by the list given below. The Polyps which have been sent were some of the collections originally set aside by Mr. Verrill, still remaining available. The collections of Echinoderms were picked out during the past year by Mr. A. Agassiz.

DONATIONS OF ECHINODERMS.

- AGASSIZ, A. 145 specimens, 8 species, Nahant.
 ANTHONY, J. G. 114 specimens, 27 species, various localities.
 BARNARD, JAMES M. 96 specimens, 26 species, various localities.
 BOARDMAN, G. A. 6 specimens, 3 species, Grand Manan.
 DABNEY, Miss O. 36 specimens, 3 species, Fayal.
 HAMILTON, Capt. 6 specimens, 2 species, Bermudas.
 JONES, J. M. 2 specimens, 2 species, Bermudas.
 LYMAN, T. 22 specimens, 3 species, Spezzia.
 MANN, B. P. 76 specimens, 2 species, Labrador.
 MÜLLER, Dr. FRITZ. 6 Ophiurans, Desterro, Brazil.
 RICE, HENRY P. 25 specimens, 1 species, Naples.
 SMITH, A. A., through H. A. PEIRCE. 2 species, 3 specimens, Seghalian Island.
 STIMPSON, Dr. W. 2 specimens, 1 species, Hog Island, N. Y.
 TREAT, U. S. 1 specimen, 1 species, Eastport, Me.
 VERRILL, A. E. 208 specimens, 14 species, Eastport, Me.
 VERRILL, A. E., Shaler, N. S. HYATT, A. (Gray Fund, partly.) 45 specimens, 6 species, Anticosti Ex., Eastport, Me. 7 specimens, 4 species, Chedabucto Bay. 12 specimens, 4 species, Anticosti.

ACQUIRED—GRAY FUND.

- BREWSTER, G. W. 9 specimens, 3 species, Australia.
 COOKE, C. 26 specimens, 8 species, Zanzibar.
 GARRETT, A. 117 specimens, 15 species, Society Islands.
 STIMPSON, Dr. W. 2 specimens, 1 species, Somer's Pt., N. J.

IN EXCHANGE.

- EDWARDS, HENRY. 26 specimens, 5 species, Melbourne, Australia.
 FOLIN, L. DE. 12 specimens, 2 species, Gironde.

MOORE, THOS. J. 18 specimens, 2 species, Great Britain and Alexandria.

POEY, Prof. 1 specimen, Cuba.

REDTENBACHER, K. K., Hof Museum, Vienna. 9 specimens, 6 species, Red Sea. Collected by Frauenfeld.

SALMIN, C. L. 4 specimens, Hamburg, Greenland.

Total 900 specimens, and about 150 species.

THE FOLLOWING COLLECTIONS WERE SENT AWAY.

JARDIN DES PLANTES. 94 species.

Prof. KAUP, Darmstadt. 76 species.

LIVERPOOL FREE MUSEUM. 38 species.

Dr. HAAST New Zealand. 68 species.

Prof. MERIAN, Basle. 62 species.

Prof. CAPELLINI, Bologna. 54 species.

Prof. MCCOY, Melbourne. 47 species.

Prof. LAYARD, Cape of Good Hope, 43 species.

MUSÉE DE LAUSANNE. 41 species.

Prof. GASTALDI, Turin. 122 species.

Containing 122 species and about 1,300.

ACALEPHS—DONATIONS.

AGASSIZ, A. 40 specimens, 38 species, Nahant, Naushon.

DABNEY, Miss O. 2 specimens, Fayal.

PUTNAM, Capt. W. H. A. 20 specimens, 1 species, Gulf-weed.

VERRILL, A. E. 7 specimens, 5 species, Eastport, Me.

VERRILL, A. E., SHALER, N. S., HYATT, A. (Gray Fund in part.)
Anticosti expedition. 32 specimens, 17 species, Mingan Island, Anticosti and Eastport, Me.

GRAY FUND.

COOKE, C. 7 specimens, 4 species, Zanzibar.

GARRETT, A. 4 specimens, 2 species, Society Islands.

IN EXCHANGE.

SMITHSONIAN INSTITUTION, 19 species from the N. P. Ex. Ex., collected by W. STIMPSON. A small collection was sent to the Smithsonian Institution, containing 9 species from California, collected by A. AGASSIZ.

POLYPS—DONATIONS.

ATWATER, Mrs. S. C. 2 Fossil Corals, Iowa City.

DABNEY, Miss O. 2 species, 4 specimens, Fayal.

- FITCH, Dr. L. P. 4 specimens, 1 species, Vicksburg, Miss.
 HAMILTON, Capt. 3 specimens, 1 species, Florida.
 HECO, J. 2 species, Kanagawa, Japan.
 JONES, J. M. 1 species, Bermudas.
 JIMENIO, J. 2 specimens, Tabulata, Cuba.
 NICHOLS, C. B. 2 species, Pacific Ocean.
 STIMPSON, Dr. W. 3 specimens from Hog Island, N. J.
 THAXTER, L. L. 25 specimens, Isle of Shoals, Mass.

GRAY FUND.

- GARRETT, A. 60 specimens, 22 species, Society Islands.
 COOKE, C. 20 specimens, 9 species, Zanzibar.

IN EXCHANGE.

- EDWARDS, Prof. H. MILNE, in exchange with Jardin des Plantes.
 14 specimens, 12 species.
 FOLIN, Marquis L. de. 17 specimens, 1 species, Gaboon country.
 PARVIN, Prof. 20 specimens, 3 species, Iowa City.
 REDTENBACHER, Dr., Vienna Museum. 28 specimens, 21 species,
 from the Red Sea and Indian Ocean, collected by Frauenfeld.
 SALMIN, C. L. 4 specimens, 1 species, Hamburg.
 SMITHSONIAN INSTITUTION. Types of Dana's species.
 SMITHSONIAN INSTITUTION. 10 specimens in alcohol, collected by
 N. W. Boundary Survey. 35 specimens, 30 species Corals and Alco-
 holic Polyps, North Pacific Exploring Ex., collected by Dr. STIMPSON.

CORALS SENT FROM THE MUSEUM.

- ESSEX INSTITUTE. 34 specimens, 34 species.
 THOS. BARNETT. 11 specimens, 11 species.
 Prof. CAPELLINI. 39 specimens, 39 species.
 Dr. ROMINGER. 40 specimens, 40 species.
 BUFFALO SOCIETY OF NAT. HIST. 24 specimens, 24 species.
 Prof. PARVIN, Iowa City. 24 specimens, 24 species.
 Prof. SHELDON, Davenport. 24 specimens, 24 species.
 H. DAVIS MCGREGOR, 24 specimens, 24 species.
 Total, 40 species and 216 specimens.

*Summary Report of the Fossils Received during the year ending
 October, 1864.*

- ANTHONY, J. G., Western States. 1 box.
 BARNETT, THOMAS, Niagara Falls. 5 boxes. (In exchange.)
 CARLTON, Gen. J. H., New Mexico. 1 box.
 CHASE, Rev. JNO. Coal Measures of Nova Scotia.

- CHRISTY, H. From caves of Dordogne. 1 box.
DAVIS, H., Macgregor, Iowa. 3 boxes. (In exchange.)
FITCH, Dr. L. P., Vicksburg, Miss. 2 boxes.
HARTT, C. F., Nova Scotia. 11 boxes.
LANGER, Dr., Davenport, Iowa. 1 box.
LIVRAMENTO, Baron de, Brazil. 1 box.
LYMAN, Lieut.-Col. THEO., Virginia. 2 boxes.
MANN, HORACE, Western States. 1 box.
MARCOU, Prof. J., Western States. 5 boxes. (Gray Fund.)
MARCOU, Prof. J., Burlington, Iowa. 1 box.
OWENS, THOMAS, Bristol, Maryland. 1 box.
PARVIN, Prof., Iowa City. 1 box. (In exchange.)
POOLE, HENRY, Glace Bay, Nova Scotia. 6 boxes.
RIGACCI, J., Monte Mario. 2 boxes. (In exchange.)
ROMINGER, Dr. C., Western States. 1 box. (In exchange.)
SAWYER, HENRY, Surinam, S. A. 5 boxes.
SENIOR, MED., Bristol, Md. 1 box.
ST. JOHN, O., Western States. 13 boxes. (Gray Fund.)
VERRILL, A. E., Eastport, Me. 1 box.
WINSLOW, Dr., Paita, S. A.
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Report on the Library, by P. R. UHLER.

The increase of the Library during the past year has not been very great, but, nevertheless, some works of interest have been added to it.

Prof. Louis Agassiz has presented a number of volumes, and the following gentlemen have also contributed to its enlargement:—Messrs. A. Agassiz, J. Heco, A. Ordway, Dr. M. Wyman, J. M. Barnard, Prof. Marcou, S. H. Scudder, Prof. J. Hall, P. R. Uhler, and C. F. Hartt. The Boston Society of Natural History has presented an almost complete set of its Journal, and Proceedings, and the Naturforschende Gesellschaft, Emden, has presented some pamphlets. Several valuable works on Entomology were purchased from Dr. F. E. Melsheimer, and a set of the British Museum Lists of Geometridæ were obtained to supply the means for working up a portion of the Lepidoptera in the Museum collection. A physical map of North Carolina was added by purchase, and a geological map of the Roman States was presented by Prof. Ponzi.

REGULATIONS

FOR THE

MUSEUM OF COMPARATIVE ZOOLOGY.

At a meeting of the Faculty, held November 5, 1863, it was voted to adopt, until otherwise ordered, the following Rules and Regulations for the administration of the Museum, viz. :—

1. That all assistants in the Museum be annually appointed by the Faculty upon nomination of the Curator, and that their compensation be fixed by the Faculty upon recommendation of the Curator.

2. To obtain an appointment in the Museum a candidate is expected to furnish satisfactory evidence of his ability to co-operate in the general work of the institution, and of his desire faithfully to devote himself to this task. An original investigation, or a series of preparations requiring exceptional skill, may be taken as such evidence, if coupled with a detailed account of the candidate's scientific pursuits up to the time of application.

3. The Curator is authorized to employ temporarily, in the Museum, individuals who may not be entitled to a regular appointment, as assistants, or may be unwilling to accept such a position.

4. No one connected with the Museum shall be allowed to own a private collection, or to traffic in specimens of Natural History, except for the benefit of the Museum. If an officer of the Museum, or a student working for the Museum, possesses a private collection with which he is unwilling to part, he must deposit the same in the Museum during his connection with the institution.

5. No one connected with the Museum is authorized to work for himself in the Museum during the working hours fixed for Museum work. Whatever is done by any one connected with the Museum, during that time, is to be considered as the property of the Museum, but due credit is to be given him by the Curator in his Annual Reports. Any claim or grievance concerning this kind of work may be submitted to the Curator, or to the Faculty through the President of the University, at any time within three months after the publication of the Annual Report.

6. Every one admitted to work regularly in the Museum is expected to be at his work within the walls of the Museum at least seven hours every day, unless duly authorized to be absent. Vacations from Museum work are to be considered as a reward for special application and effective work, but not as a right.

7. No one is authorized to publish, or present to learned societies, anything concerning his work at the Museum, without the previous consent of the Curator. All such contributions are to be submitted to the Curator for examination.

8. While intrusted with a special department, an assistant or worker in the Museum shall have the privilege of freely examining every specimen belonging to that department, (but not those of other departments,) and of taking specimens out of the cases for special investigations; but he shall not dissect or alter the condition of any specimen without special leave of the Curator. He shall further enjoy the privilege of using freely the Museum Library, and taking down to his desk, under the prescribed regulations, all the books needed for his work. No books or specimens are to be taken out of the Museum building without special leave of the Curator.

9. All the specimens and books temporarily removed from their proper place for use shall be returned to their shelves at the close of every month, unless special leave for an extension of time has been obtained from the Curator.

10. Every one is expected to keep his working place in the Museum clean, and himself to do what is necessary to this end. He may, however, call upon the Janitor to remove the offals of his work.

11. The rights and duties of the assistants, not specified above, shall be determined by the Curator, his determination being subject to the revision and final decision of the Faculty.

As a public Museum necessarily differs in character from collections belonging to private learned societies, (whose members may have an equal right to the common property of the society,) and should, therefore, be conducted upon different principles, it is thought advisable by the Faculty of the Museum of Comparative Zoölogy to enact the following regulations for the public and private use of that institution, viz. :—

1st. For the convenience of the officers of the establishment, the Museum shall be opened daily, by the Janitor, at 8 A. M., and closed at dark, Sundays excepted, all the year round.

2d. The public shall be admitted to the exhibition rooms, daily, from 11 A. M. to 4 P. M., Sundays and Mondays excepted. The window-curtains may be partly raised during these hours, to improve the light, though they should always be lowered on the side on which the sun shines, as the direct sunlight may injure the specimens.

3d. The whole of Monday, as well as the early and late hours of the other days of the week, are reserved for cleaning the rooms and arranging the specimens upon the shelves.

4th. The working rooms and magazine shall never be accessible to visitors without special leave from the Curator or the Director.

5th. Students shall have access to their respective working rooms whenever the Museum can be opened; but they shall not be allowed to open the cases containing the specimens in the exhibition rooms without special leave from the Curator.

6th. A special collection shall be set aside for the use of beginners, upon which they may practise until their ability properly to handle specimens is fairly tested.

7th. Advanced students and original investigators applying themselves to the study of special subjects, shall be allowed the use of such specimens relating

to their investigations as are already arranged and put up in the exhibition rooms. They may be permitted to remove such specimens from the shelves of the Museum to some of the working rooms, for the sake of greater convenience in their researches, and be furnished with all the facilities necessary for their work. No specimen, however, to be removed from its place in the Museum without a previous special order of the Curator.

8th. Materials not yet worked up and catalogued by the officers of the Museum may also be intrusted to special investigators, and placed at their disposal in the same way as above stated, always under the condition that such persons be competent to make a good scientific use of them. The Curator may, however, at all times, reserve such materials for the use of the officers of the Museum, or for himself, whenever the interests of the institution and of science may require it. The Curator is especially expected to exercise the utmost caution in granting such facilities, in order to prevent an indiscreet use of the most valuable property of the Museum; and also to discountenance the practice of describing isolated species, and the like fragmentary work. All the specimens described shall be entered in the Museum Catalogue, and provided with a label, signed by the person who named them.

9th. Specimens needed for special investigations by naturalists residing at a distance from Cambridge may be sent to them by the Curator, and allowed to remain away for a limited time, provided the applicant for such a favor is known to be capable of using such specimens for the advancement of science, and provided also that some other scientific man, equally known in the scientific world, or some learned society with which he may be connected, shall vouch with him for the safe return of the specimens lent, within the time specified. No beginner shall be allowed such favors; they shall be extended only to men who are known in the scientific world as original investigators.

10th. It is expected that all persons availing themselves of the facilities afforded by the Museum for their researches shall take the best possible care of the specimens; that they shall not alter their condition by dissections or otherwise, without special leave; that they shall carefully preserve all the labels, numbers, or other indications relating to their origin which may be connected with them; and finally, that, in their publications, they shall make due acknowledgment of their indebtedness to the Museum; otherwise these advantages shall thereafter be denied them.

[B.]

TRUSTEES OF THE MUSEUM OF COMPARATIVE ZOOLOGY.

1865.

THE GOVERNOR OF THE COMMONWEALTH,

JOHN A. ANDREW.

THE LIEUTENANT-GOVERNOR,

JOEL HAYDEN.

THE PRESIDENT OF THE SENATE,

JONATHAN E. FIELD.

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES,

A. H. BULLOCK.

THE SECRETARY OF THE BOARD OF EDUCATION,

JOSEPH WHITE.

THE CHIEF JUSTICE OF THE SUPREME JUDICIAL COURT,

GEORGE T. BIGELOW.

LOUIS AGASSIZ.

WILLIAM GRAY.

JACOB BIGELOW.

NATHANIEL THAYER.

JAMES WALKER.

SAMUEL HOOPER.

GEORGE TICKNOR.

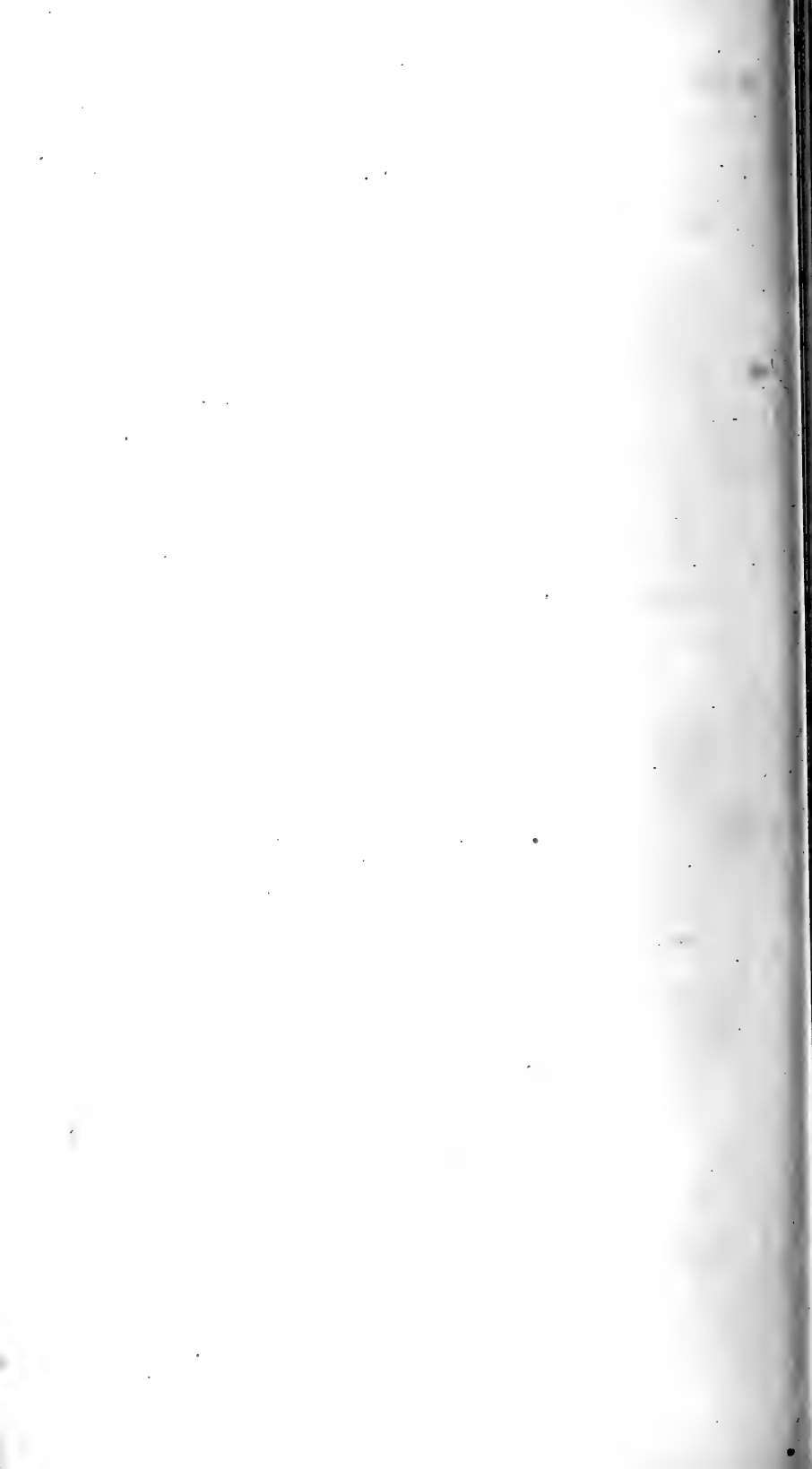
JAMES LAWRENCE.

THEODORE LYMAN.

OFFICERS OF THE MUSEUM OF COMPARATIVE ZOOLOGY FOR

1865.

His Excellency JOHN A. ANDREW, Governor of the Commonwealth,
*President.*WILLIAM GRAY, *Secretary.*NATHANIEL THAYER, *Treasurer.*LOUIS AGASSIZ, *Director of the Museum.*SAMUEL HOOPER, JOSEPH WHITE, NATHANIEL THAYER, JAMES LAWRENCE,
*Committee on Finance.*GEORGE TICKNOR, LOUIS AGASSIZ, JACOB BIGELOW, GEORGE T. BIGELOW,
Committee on the Museum.



ANNUAL REPORT

OF THE

TRUSTEES

OF THE

MUSEUM OF COMPARATIVE ZÖÖLOGY,

AT HARVARD COLLEGE, IN CAMBRIDGE,

TOGETHER WITH

THE REPORT OF THE DIRECTOR,

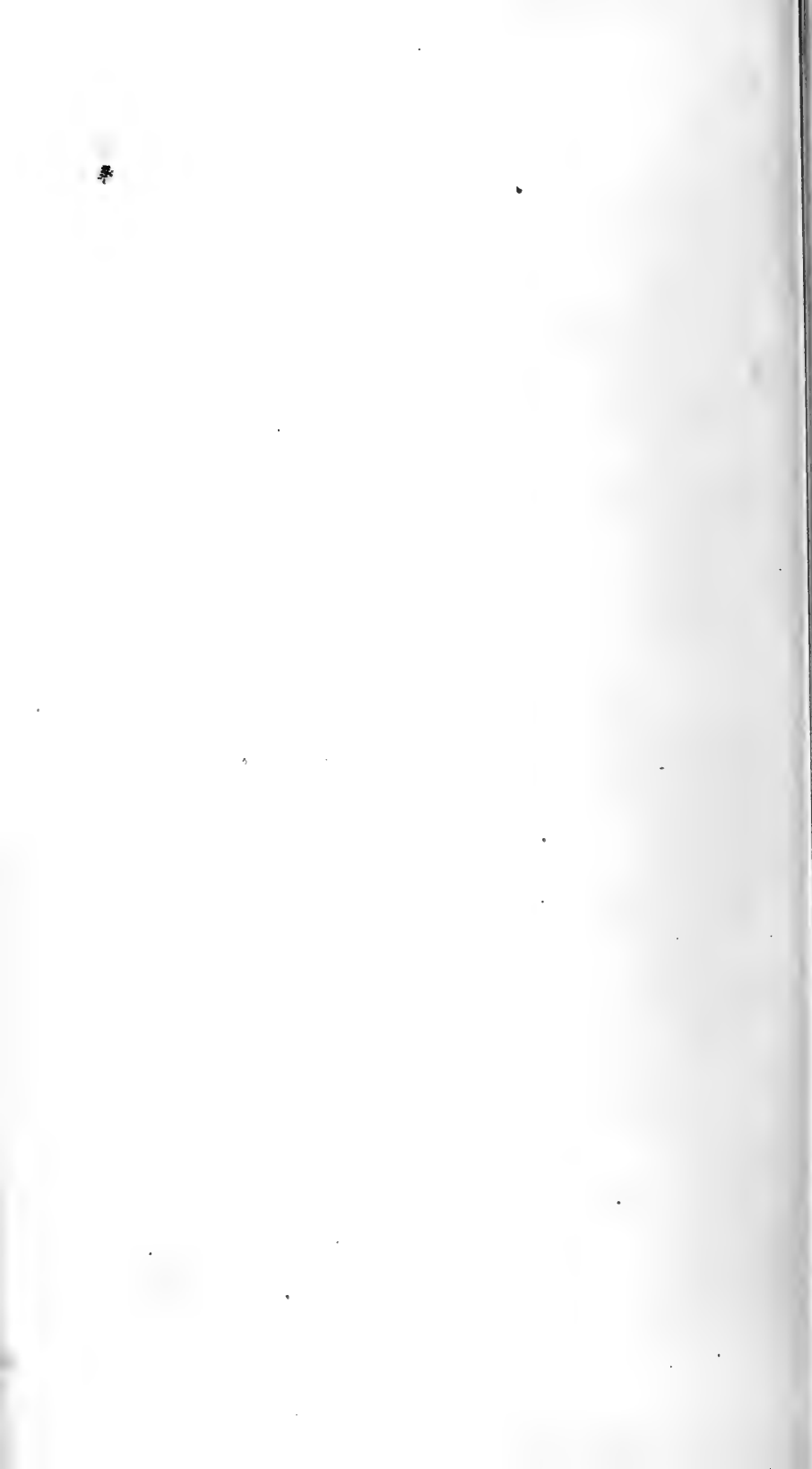
1865.

BOSTON:

WRIGHT & POTTER, STATE PRINTERS

No. 4 SPRING LANE.

1866.



Commonwealth of Massachusetts.

BOSTON, January 31, 1866.

To the Honorable the Senate and House of Representatives :

The Trustees of the Museum of Comparative Zoölogy respectfully present their Report for the past year.

Mr. Nathaniel Thayer resigned the office of treasurer on the first day of August last, and Mr. Theodore Lyman was chosen to fill the vacancy.

On Mr. Thayer's resignation the Trustees adopted the following vote :

Voted, That the resignation of Mr. Thayer be accepted, and the thanks of this Board be presented to him for his faithful discharge of the duties of the office.

The transactions of the Museum for the year may be classed under two divisions, one relating to the administration at Cambridge, and the other to the expedition of Professor Agassiz to Brazil.

In regard to the first division, from the reports of the Committee on the Museum, it appears, that the shelves in the rooms where its resources are exhibited for the purpose of instruction have been filled up under the direction of Mr. Alexander Agassiz. Mr. Shaler has been employed in arranging the ample collection of fossils, so that the department of Paleontology is nearly complete in general arrangement. Mr. Uhler brought back large collections from Hayti, having been essentially aided by Mr. Wiener, American Consul at Jérémie. A large number of packages has been received from different parts of the world.

The first number of the illustrated catalogue of the Museum, printed from the funds given for the purpose by the Commonwealth, has been issued. For the letter press of this volume the Museum is indebted to Mr. Theodore Lyman.

The operations of the Museum, under the charge of Mr. Alexander Agassiz, during the absence of the Director, have been conducted to the entire satisfaction of the Trustees; and his report, which is annexed, marked [A,] gives a statement in detail of its history for the year ending October 1st, 1865.

In regard to the second division, the expedition to Brazil, we shall receive full accounts, illustrated by his own enthusiasm, from Professor Agassiz, on his return, which is looked for in the coming summer. The Trustees however, think that it will be interesting to the legislature of the Commonwealth, which is so watchful of everything which promotes and develops the advancement of learning, and the progress of science, to receive some account of the expedition. For the large results which are promised, the community will recognize its obligations to the munificence of Mr. Nathaniel Thayer.

Before the departure of Professor Agassiz the Secretary of the Navy instructed our national vessels to take charge of and bring home, on their return, any collections committed to them as fruits of the expedition.

The party embarked at New York on board the Colorado, on the second day of April last for Rio de Janeiro. It consisted of sixteen persons, eight of whom were trained naturalists. A free passage to Rio was given by the Pacific Mail Steam-ship Company to the whole party. The Colorado was furnished by the owners with a large aquarium on deck, and all other appliances requisite for scientific investigations on the voyage.

On the twenty-second day of April the Colorado entered the bay of Rio, and Professor Agassiz, who had previously enjoyed a correspondence with the Emperor of Brazil, was received by him in the kindest manner. His majesty has continued to show great interest, and furnish great aid in every way. Free transportation has been provided by the railroads and other conveyances; and the facilities of communication by coaches, travelling at the rate of ten miles an hour, and rail cars at a speed of twenty to thirty miles an hour, are in striking contrast

with the journeys of his predecessors on the same field with the slow, sure-footed mule.

Professor Agassiz has delivered lectures in Rio to larger audiences than he ever before attracted. He writes: "Naturalists will be surprised at the revelations I am about to make concerning the extraordinary variety of animal life in the waters of the Amazon. We have been accustomed, for instance, to consider one hundred species as the probable maximum number of fishes living in any of the great streams of the world; there are not so many known from the Nile, the Ganges, or the Mississippi. The discovery of about fifteen hundred species of fishes in this vast fresh water basin was as unexpected to me, as would be the discovery of a large inland commerce in the interior of Africa carried on by steam navigation."

In conclusion, I present copies of the Orders passed by the Trustees:

Ordered, That the grateful acknowledgments of this Board be offered by the President to Nathaniel Thayer, Esq., for his munificent, kind, and well-considered arrangements, enabling Professor Louis Agassiz, in the way he most desires, and in the most efficient manner, to serve the interests of the Museum, and the cause of science, during his present absence in South America.

Ordered, That the grateful acknowledgments of this Board be presented to the Pacific Mail Steam-ship Company, to their agent, Mr. Allan McLane, and to Mr. George Bradbury, captain of their good ship the Colorado, for the free passage and excellent facilities of all kinds furnished by them to Professor Louis Agassiz and his associates on their voyage from New York to Rio de Janeiro, undertaken for scientific purposes connected with the Museum of Comparative Zoölogy, at Cambridge, Massachusetts.

Ordered, That his excellency John A. Andrew, governor of this Commonwealth, being *ex officio* President of this Board of Trustees of the Museum of Comparative Zoölogy in Cambridge, Massachusetts, do present to his majesty Don Pedro the Second, Emperor of Brazil, the grateful acknowledgments of the Trustees for the important contributions made by his imperial majesty to the resources of the institution under their care, and for the important countenance and kindness he has shown to Professor Louis Agassiz and his assistants now travelling in

his imperial majesty's dominions for purposes connected with the interests of this Museum, and with the advancement of science.

Ordered, That the President of this Board offer to the Secretary of the Navy their grateful acknowledgments for the facilities afforded under his directions to Professor Agassiz, relative to the transmission home of such collections as he may make for the advancement of science, during his present residence in South America.

The paper annexed, marked [B,] contains a list of the Trustees, their officers and committees, for 1866.

For the Trustees,

WM. GRAY, *Secretary.*

[A .]

SEVENTH ANNUAL REPORT

Of the Museum of Comparative Zoölogy, at Harvard College in Cambridge, Massachusetts,

By ALEXANDER AGASSIZ, *Assistant in Charge.*

As the report of the Museum Committee to the Trustees, together with the action of the Board of Trustees relative to the expedition now collecting in Brazil, is printed with this Report, it is hardly necessary for me to do more than allude again to the munificent aid given by Mr. Nathaniel Thayer to the Director of the Museum, for the purpose of making a thorough scientific survey of certain parts of Brazil, with the view not only of advancing the interests of the institution, to which he has been such a generous friend, by adding the immense collections to be brought together to our stores, but also in the hope of giving Professor Agassiz larger materials for the solution of problems with which he has been identified from the commencement of his scientific career.

How far the aim of the expedition is likely to be accomplished can be gathered from the statements presented by the Museum Committee concerning the progress of the Thayer Expedition; since that period later advices from Professor Agassiz show that he has been eminently successful in making collections, as previous to his ascent of the Amazons no less than seventy-five barrels and boxes had been filled and were awaiting shipment at Rio Janeiro, Bahia and Pará. The unprecedented facilities offered to the expedition by the Brazilian government, as well as by the steam-boat and railroad companies, will contribute largely to its success and to the accumulation of collections. The Amazons Navigation Company, by placing a steamer at the disposal of Professor Agassiz, will enable him to make an exhaustive ichthyological survey of the Amazons and its tribu-

taries. The ichthyological collections will undoubtedly be the main feature of the expedition, and the inhabitants of the various hydrographic basins will be collected in such a thorough manner that it is hoped some light will be thrown on the geographical distribution of fishes, taking the different fresh water basins of Brazil as our basis.

The erratic phenomena have also been most successfully observed in the vicinity of Rio Janeiro, especially at Tijuca, a cluster of hills about 1,800 feet high and about seven miles from Rio, where a drift-hill is found with innumerable erratic boulders, as characteristic as any ever seen in New England. Professor Agassiz had already observed unmistakable traces of drift in the province of Rio and in Minas Geraes, but, everywhere connected with the drift itself, was such an amount of decomposed rocks of various kinds that it would have been difficult to satisfy any one not familiar with the drift that here was an equivalent of the northern drift; but there is found at Tijuca the most palpable superposition of drift and of decomposed rock, with a distinct line of demarcation between the two. This locality afforded an opportunity of contrasting the decomposed rocks, which form a characteristic feature of the whole country, with the superincumbent drift, so that hereafter any one may distinguish them, whether found in contact or separately. The decomposed rocks are quite a new feature in the structure of the country, granite, gneiss, mica slate, clay slate, in fact all the various kinds of rocks usually found in metamorphic formations, are reduced to the condition of a soft paste, exhibiting all the mineralogical elements of the rocks as they were before their decomposition; but now completely disintegrated and resting side by side as if accumulated artificially. Through this loose mass there runs here and there larger or smaller dykes of quartz rock, or of granite or other rocks, equally disintegrated; but they retain the arrangement of their materials, showing them to be disintegrated dykes in large disintegrated masses of rock; the whole passing unmistakably to rocks of the same kind in which the decomposition or disintegration is only partial, or no trace of it visible, and the whole mass exhibits then the appearance of an ordinary metamorphic set of rocks. It is plain that such masses, forming everywhere the surface of the country, must be a great obstacle to the

study of the erratic phenomena, and it is not strange that those who seem familiar with the country should entertain the idea that the surface rocks are everywhere decomposed and that there is no erratic formation nor drift here. But upon close examination it is easy to see that while the decomposed rocks consist of the small particles of the primitive rocks, which they represent, with their dykes and all other characteristic features, there is not a trace of larger or smaller boulders in them; while the superincumbent drift, consisting of similar parts, does not show the slightest sign of the indistinct stratification characteristic of the decomposed metamorphic rocks below it, nor any of the decomposed dykes, but is full of various kinds of boulders of different dimensions. The boulders have not yet been traced to their origin; the majority consist of a kind of greenstone, composed of nearly equal amounts of a greenish black hornblende and feldspar; this greenstone is said by mining engineers to be found in Entre Rios, on the Parahyba, where iron mines are worked in a rock like these boulders. Thus far the only evidence furnished of the action of glaciers is the extensive accumulation of drift, similar in its characteristics to northern drift. No trace has been found of glacial action, properly speaking, such as polished surfaces, scratches and furrows.

The decomposition of the surface rocks and the extent to which it takes place in Brazil is very remarkable, and points to a new geological agency, thus far not noticed in our geological theories. It is obvious that the warm rains falling upon the heated soil must have a very powerful action in accumulating the decomposition of rocks; and, as these rains have fallen for ages in succession upon hot stones, instead of wondering at the amount of decomposed rocks, we should rather wonder that there are any rocks left in their primitive condition. All the rocks being, however, encased in a lining of the decomposed part of their surface, they are thus protected by a rotten crust from further decomposition.

As the expedition is almost entirely composed of young men formerly working at the Museum, the force left to carry on our operations at home has been greatly reduced, and consequently less has been done than in former years for the arrangement of the collection; but it is hoped that on the return of the

Brazilian expedition we shall be able to start anew the business of the Museum, and, with the increased materials at our command, insure even more than formerly the good will of kindred institutions.

During the past year the work done at the Museum has been chiefly confined to taking care of the specimens received, and preparing the exchanges, which have now become quite extensive. An examination of the special reports will show how large a proportion of our additions have been derived from this source. The exchanges have been discontinued in some of the departments since the spring, owing to the reduced number of the assistants, and have been almost entirely confined to entomology, conchology, and paleontology. The additional work devolving upon the assistant in charge has made it impossible for him to do anything besides the usual routine work of the Museum. As much work as possible was bestowed upon the dry specimens, owing to the increased cost of alcohol, and the paleontological collection, a great part of which had thus far remained in the original packages, has been made accessible by Mr. N. S. Shaler, and several exchanges have been made in that department. Mr. Uhler has had charge of the articulates and of the library, and is making excellent progress in the entomological department, which under his charge, with the assistance of Miss S. H. Cook, is gradually becoming more and more useful. Owing to Mr. Uhler's absence for several months in Hayti and in Maryland, for the purpose of making collections for our exchanges, rather less time has been devoted than during the past year to the arrangement of the collection. Mr. Anthony, who started with the Thayer expedition, was obliged to return on account of ill health, and, having distributed the material accumulated during his absence, has again taken charge of the mollusca, and begun the exchanges interrupted by his departure for Brazil. Mr. Glen has been in charge of the microscopical department, and has devoted the greater part of his time in making sections of shells and echinoderms. The number of these sections has now become quite extensive, and will form a most valuable addition in the final arrangement of our collections. Mr. Niles has been engaged in the study of the crinoids, and has nearly completed their arrangement, having

passed in review the different collections in possession of the Museum. Messrs. St. John and Hartt were engaged, previous to their departure for Brazil, in working up the collections of fossils they had made in the Western States and in Nova Scotia during the summer of 1864. Mr. Allen was for a time in charge of the birds and mammals, and left the collection in very good order previous to his departure for Brazil. .

The remaining departments were left in my charge, but little besides making up a few exchanges, and taking care of the new additions, could be done.

After many unavoidable delays, the first number of the Illustrated Catalogue of the Museum has been published; the Ophiuridæ and Astrophytidæ, by Theodore Lyman. It has been distributed among the scientific societies of this country, as well as to individuals specially interested in those animals. A few copies have also been sent to Europe, and the remainder of the edition will be distributed to foreign societies with the second number, which will shortly be published. Owing, however, to the sudden departure of Mr. Burkhardt, who was engaged in coloring the plates of the first number, the whole edition could not be completed, though a sufficient number of copies were finished to satisfy our immediate wants. The fourth number of the Museum Bulletin, on the Brachiopoda of the Island of Anticosti, by Mr. N. S. Shaler, has also been lately issued. In exchange for these publications, the Museum may hereafter expect valuable additions to its library, by receiving similar publications from other museums and scientific societies, as well as original investigators.

During the first term of the academic year 1864-5, Professor Agassiz delivered the usual course of lectures to members of the scientific school and undergraduates, open also to public teachers. A special course of university lectures on mollusca, was also delivered by him at the Museum. During the second term, the lectures on zoölogy were omitted, but will be delivered during the present term by myself. Three other courses of university lectures were delivered at the Museum, one on the geological succession of the Brachiopoda, by Mr. Shaler, delivered during the last term. During the present term, Mr. Uhler is giving a course of lectures on North American entomology, and Mr. Shaler another on the elevation of

continents. The attendance to these courses has been quite regular, and has shown a marked increase over former courses.

The arrangement of the specimens on exhibition has been slightly changed; to make room for the mounted specimens of mammals and birds sent by the Jardin des Plantes, the fossil reptiles have been removed to the galleries, and their place filled with stuffed specimens. The collection of insects has been packed away, as, owing to their exposure to light, they were rapidly fading, and hereafter only a small typical collection of specimens which can easily be replaced will be left on exhibition. The beginning of an ethnological collection, principally brought together from California and the Cape of Good Hope, has been placed in one of the cases by Mr. Glen, to call attention to this department, which is still in an imperfect condition. It is to be regretted that the number of exhibition rooms is not large enough to enable us to follow the plan originally laid out for the arrangement of the specimens; this must be postponed until additional room is supplied; the Museum thus loses much of its instructiveness, and this defect will become greater each year. The want of room may even compel us to place in the exhibition rooms specimens not properly prepared, simply on account of the accumulations in the work-rooms, which occupy so much of the space needed to take care of and handle new invoices. A general collection, intended for lecturing purposes, has been partially placed in the gallery of the lecture-room.

I would call the attention of the trustees to the unsafe condition of the cellar for storing the alcoholic collections. Owing to its dampness, the kegs in which the great bulk of the collection is packed become unfit for use in about three years. It requires constant watching to renew the leaky ones, and it is impossible to avoid occasional loss of specimens. The earthen jars and copper tanks thus far employed, with which it is intended eventually to replace the kegs, are found to work admirably, but the use of such jars would require a considerable outlay at first, and we are not yet able even to store new additions in them, although in course of time this would be the most economical mode of packing our alcoholic collections.

Not more than twenty-five cans containing alcohol were sent out from the Museum during the past year. Thirty were sent back, leaving about forty-eight individuals to whom cans for collecting have been sent, which they have not yet returned.

The thanks of the Museum are particularly due to the agents of the Pacific Mail Steam-ship Company, to their President, Mr. Allan McLane, to Mr. Hoadley, President of the Panama Railroad Company; to Messrs. Wells, Fargo & Co., Dabney & Cunningham, Samuel Stevens & Co., Henry C. Brooks & Co., James Bishop & Co., Loring & Shute, Burdett & Everett, Rufus Wills & Son, Alpheus Hardy, Isaac Taylor, James M. Barnard, P. L. Everett and George N. Lawrence, who have at various times forwarded, free of expense, extensive invoices of specimens. Captain James Anderson, of the Cunard steamers, has kindly continued to take charge of the packages for our English correspondents. We have to thank, also, the State Department at Washington for the kindness with which packages intended for the consuls of the United States in foreign countries have invariably been distributed.

We are under obligations to the following individuals for their interest in making collections for the Museum:—Messrs. Charles Hale, Henry Edwards; W. H. Dabney and Miss Olivia Dabney, for their continued exertions in our behalf in the Azores; Messrs. A. S. Peabody, Alfred A. Reed, Joseph Heco; Antonia de Lacerda and Mr. Henry Sawyer, for their South American contributions; Theodore Lyman, Thomas Owens, Michael Carroll, Dr. George B. Loring; Messrs. P. Choteau & Co., for assistance and specimens at various times; to Mr. F. C. Hill the Museum is indebted for a valuable series of living turtles from Louisiana; to Dr. Viele, for specimens from Colorado; to William H. Anthon, Jr., for specimens from Batavia. The Smithsonian Institution has made us several invoices of their duplicates of North American specimens. Mr. Leonard has sent us a few slabs of fossil tracks from the Connecticut River Valley. Capt. N. E. Atwood has, during the winter, kindly taken care of the head of the right whale left in Provincetown and superintended its shipment to Cambridge, where it now remains. Mr. Blanford, the Secretary of the Asiatic Society, and Mr. Whitney have laid us under great obligations for their exer-

tions in our behalf, and Dr. Walsh has sent us series of his original specimens.

Notwithstanding the general interest felt in the Museum, and the numerous additions we have received from private individuals, by far the largest additions to our stores have been received as exchanges. These have been continued on the most satisfactory footing with the Jardin des Plantes through Professors Milne Edwards and Duméril, to whom we have continued to send, during the past year, living specimens of our common North American animals. In this I have been greatly assisted by the zeal of Mr. J. G. Rich, of Maine. I have to thank, also, Mr. B. P. Mann, of Concord, and Mr. S. Jillson, of Feltonville, for the many living specimens they have furnished the Museum, as well as Mr. H. K. Moore and Mr. O. St. John. From the University Museum, of Copenhagen, through Professor Steenstrup, we have a valuable invoice of cetacean skeletons. From the Museum of Göttingen, through Professor Keferstein, reptiles from Australia. Messrs. E. L. Layard and W. Theobald have sent us valuable exchanges. Through Professors Gegenbaur and Haeckel we have obtained a collection of marine animals from the Mediterranean, German Ocean, and fishes from the Danube and Rhine. We have received Italian fossils for our duplicates from Professor Gastaldi, Messrs. Michelotti and Rigacci. Professor Poey has continued to send us Cuban fishes. Professors Krauss, Merian, Angelin, and Mr. Pickett, have sent us valuable exchanges of fossils. To the Chicago Academy of Natural Sciences we owe an important collection of Northern and Western birds. Mr. Henry Edwards has continued his valuable invoices. Dr. Kaup has sent us an extensive collection of insects in exchange for American species. Besides these more general exchanges, I have to mention those of the special departments with Don Rafael Arango, C. F. Angas, I. A. Lapham, Robert Swift, G. W. Tryon, M. Tervers, Prof. Opper, Dr. Newcomb, Barrande, and other minor exchanges, amounting, as will be seen by the special reports, to extensive additions.

Among the other additions, I must notice specially a very important collection made at Lake Titicaca and on the coast of Peru by Mr. E. G. Squier; the collections of Nova Scotia fossils by Mr. Hartt, and of Dr. Stimpson on the coast of New Jersey; of Mr. J. M. Nelson in the interior of Newfoundland,

which added several valuable skeletons to our stores; the collections of Mr. C. Cooke, from Zanzibar, which he brought home himself, having been compelled by ill-health to return to this country at the time when his appointment as United States Consul at Mozambique promised to enable him to spend further time in making large collections; a small collection of fossils made along the line of the Hannibal and St. Joseph Railroad, in Missouri, which we owe to the facilities granted by the directors of the company to Messrs. Ward, St. John, and myself. For the other contributions I would refer to the following special reports.

Report on the Vertebrates, by ALEX. AGASSIZ.

During the past year the collection of Birds and Mammals have been in charge of Messrs. Niles and Allen, the latter being engaged in cataloguing and separating duplicates. After his departure for Brazil, nothing has been done in this department except taking care of the new specimens received. Mr. Seeva had been at work during about six months preparing some of our skeletons for exhibition; he was, however, obliged to leave his work unfinished on his departure with the Brazilian expedition. All the mounted specimens received from the Jardin des Plantes have been placed on exhibition in the large cases of the public rooms. Among the most valuable receipts are the numerous specimens of embryos we continue to receive; the collections sent by Mr. Layard; a series of skeletons from Newfoundland, and the invoices of the Smithsonian Institution. The collection of Fishes and of Reptiles has been in charge of Mr. A. Agassiz, but with the exception of a few of our common species sent off in exchange, no time could be devoted to the arrangement or cataloguing of the specimens. The collection of Reptiles has been increased by an unusually large number of original specimens sent by Mr. Layard and Prof. A. Aug. Duméril, Prof. Keferstein and Mr. Theobald, and Mr. Roberts, from Macacos. The Fishes have also received similar additions of identified specimens, sent through Professors Gegenbaur and Haeckel. Among the donations the collections sent from

Shanghai by Captain Breck, and those of Mr. Squier, are specially to be noticed.

Our exchanges have added no less than 1,213 specimens of Fishes, of 178 species; 377 specimens of Reptiles, of 194 species; 660 specimens of Birds, of 579 species; and 150 Mammals, of 94 species; nearly all carefully labelled by reliable authorities.

We have to thank for donations the following persons:—

MAMMALS.

- ALLEN, J. A. 15 specimens, 9 species, Springfield.
 ARNOLD, J. G. Embryos.
 ATWOOD, N. E. 1 Porpoise, Provincetown.
 BOARDMAN, GEORGE A. 4 specimens, 4 species, Calais, Me.
 BOURGET, D. 12 specimens, 9 species, Rio Janeiro.
 CABOT, J. E. 1 specimen, Brookline.
 DAVIS, G. H. 1 specimen, Rio Janeiro.
 FRANCIS, E. 1 horse.
 JILLSON, S. 29 specimens, 13 species, Feltonville.
 HAWKSLEY, W. 1 specimen, Brookline.
 LORING, DR. GEORGE B. Embryos.
 MANN, B. P. 2 specimens, 2 species, Concord.
 MOORE, H. K. 2 specimens, 1 species, Malden.
 MUNN, HON. JOHN, and MICHAEL CARROLL. 1 Embryo, Newfoundland.
 PERKINS, A. T. 11 specimens, 10 species skulls.
 RICE, H. D. 2 dogs.
 ROBERTS, W. M. 7 specimens, 5 species, Brazil.
 RUSSELL, MRS. G. R. Elkhorns, Washington Territory.
 SHALER, N. S. 3 specimens, Cambridge.
 SMITH, S. I. 3 specimens, Norway, Me.
 SWIFT & Co. 1 Fox, Brazil.
 STILLMAN, S. 8 specimens, 5 species, Rome.
 THAYER EXPEDITION. 1 keg, Brazil.
 VIELE, Dr. 1 specimen, Colorado.

BIRDS.

- ABBOTT, C. V. 1 specimen, Boston.
 AGASSIZ, A. 6 specimens, Nahant.
 ALLEN, J. A. 69 specimens, Springfield, Mass.
 BOARDMAN, GEORGE A. 15 specimens, 13 species, Calais.
 BOURGET, D. 31 specimens, 15 species, Brazil.

- BURRILL, E. 1 specimen, Cambridge.
 DAVIS, G. H. 2 specimens, 2 species, Brazil.
 FELTON, C. C. 17 specimens, 10 species, Cambridge.
 FRANCIS, E. 1 specimen, Cambridge.
 JILLSON, S. 25 specimens, 15 species, Feltonville.
 MANN, B. P. 55 specimens, 23 species, Concord.
 PARKE, G. W. 1 specimen, Cambridge.
 ROBERTS, W. M. 3 specimens, 3 species, Brazil.
 SHAW, P. 4 specimens, Cambridge.
 SMITH, S. I. 29 specimens, 15 species, Norway, Me.
 SMITHSONIAN INSTITUTION. 362 specimens, 108 species, various localities.

- STILLMAN, S. 62 specimens, 36 species, Rome.
 THAYER EXPEDITION. 77 specimens, 30 species, Brazil.
 THAXTER, R. 1 specimen, Newtonville.
 UHLER, P. R. 3 specimens, 3 species, Maryland.

REPTILES.

- ALLEN, J. A. 12 specimens, 7 species, Springfield.
 ANTHON, H., Jr. 21 specimens, 14 species, Batavia.
 AUSTIN, E. R. 5 specimens, Michigan.
 BISHOP, J. & Co. 1 specimen, Pará.
 BOARDMAN, B. G. 4 specimens, 4 species, Port Hudson.
 BOURGET, D. 6 specimens, 3 species, Brazil.
 BROWN, Mrs. 1 specimen, Cuba.
 DAVIS, G. N. 7 specimens, 4 species, Brazil.
 DOWNES, Mr. 2 specimens, West Indies.
 EAMES, W. H. 5 specimens, 2 species, Cambridge.
 FOWLER, S. N. 6 specimens, 5 species, South Carolina.
 GARDNER, Mrs. F. 1 specimen, Liberia.
 GUNNING, W. D. 4 specimens, Michigan.
 HARTT, C. F. 7 specimens, 3 species, Nova Scotia.
 HEADE, J. M. 7 specimens, 4 species, Brazil.
 HILL, F. C. 30 specimens, 5 species, Louisiana.
 IVES, R. H. 1 specimen, Georgia.
 JILLSON, S. 15 specimens, 11 species, Massachusetts.
 MANN, B. P. 75 specimens, 14 species, Concord.
 MACKENZIE, M. 8 specimens, 3 species, Boston.
 MCARDLE, 1 specimen, Cambridge.
 NILES, W. H. 10 specimens, 3 species, Worthington.
 ROBBINS, Mr. 2 specimens, Southern Coast.
 ROBERTS, W. M. 73 specimens, 8 species, Brazil.
 STILLMAN, S. 25 specimens, 13 species, Rome.

- TENNEY, S. 1 specimen, Massachusetts.
 UHLER, P. R. 2 specimens, 2 species, Maryland.
 VIELE, Dr. 9 specimens, 8 species, Colorado.
 WILSON, W. W. 2 specimens, Hayti.

FISHES.

- AGASSIZ, A. 3 specimens, 3 species, Nahant.
 ALLEN, J. A. 6 specimens, 4 species, Springfield.
 BOURGET, D. 49 specimen, 15 species, Brazil.
 BRECK, Captain. 300 specimens, 35 species, Shanghai.
 BROWN, Mrs. 1 specimen, Cuba.
 DAVIS, GEORGE H., and J. M. HEADE, 17 specimens, 14 species,
 Brazil.
 HARDY, M. 2 specimens, 1 species, Andover.
 HARTT, C. F. 14 specimens, 5 species, Nova Scotia.
 HUGHES, GEORGE. 13 specimens, 1 species, Nova Scotia.
 HUNNEWELL, J. L. 7 specimens, 1 species, Pará.
 LEWIS & KENT. 60 specimens, 16 species, Chatham.
 LYMAN, T. 100 specimens, 5 species, Merrimack River.
 LOUSADA, Marquis de. 1 specimen, Swampscott.
 NEGUS, M. 1 specimen.
 REED, A. A. 3 specimens, 1 species, West Greenwich.
 ROBERTS, W. M. 30 specimens, 7 species, Brazil.
 SHALER, N. S. 1 specimen, Gloucester.
 SMITH, S. I. 25 specimens, 2 species, Norway.
 SHAW, Q. A. 1 specimen, Detroit.
 SQUIER, E. G. 60 specimens, 26 species, Peru,
 STILLMAN, S. 60 specimens, 15 species, Ostia.

WITH THE GRAY FUND

There were obtained 975 specimens of 180 species of Fishes; 37 specimens of 15 species of Reptiles; 376 specimens of Birds representing 87 species, and 420 specimens of 40 species of Mammals, from nine different individuals.

Besides the live stock of Birds, Mammals and Reptiles sent to the Jardin des Plantes, 83 specimens, representing 26 species, there were sent 6 collections of Vertebrates to as many institutions and individuals, amounting to 94 specimens and 84 species.

Report on the Articulata, by P. R. UHLER.

INSECTS.

Since the last Report, considerable work has been done in reducing the extensive collections of insects to a state of order and security, as well as in adding series of specimens required for exchange.

Having been sent to Hayti during the spring of the present year, to collect the insects, &c., of the south-west extremity of the island, I was enabled to bring together a pretty fair representation of the fauna of that region. On my return in June, it was thought desirable that I should proceed to Maryland, for the purpose of procuring specimens, to assist in conducting the exchanges during the present autumn. I succeeded in procuring by my own collecting, and by purchase, about 10,000 specimens, many of which were new to the Museum collection.

As fast as received at the Museum, the lots have been assorted into their respective sub-orders, and a series set aside for the faunal and systematic collections. Large numbers of boxes now contain the series so separated for the different collections, and would the space in the Museum permit, hundreds of these boxes could be at once placed on exhibition. Only a few boxes of Australian insects have, accordingly, been placed in one of the cases in the gallery. My absence from the Museum during a considerable part of the year, has prevented the final arrangement and mounting of the remainder of our dried specimens, but some progress has been made, notwithstanding.

The Myriapoda sent to Mr. Wood for determination, have been returned with their names appended.

The exchanges promise to be a fruitful source of enlargement to the collections, and the few returns, thus far made, have added many fine species.

The additions to the collections have not been so great as in 1864; but that extraordinary increase was due to the purchase of several large collections brought together by eminent entomologists.

The whole number of specimens added since the last report is 21,132, embracing 7,464 species. Of this number, 2,870

specimens were presented; 13,773 were purchased with the Gray Fund, and 4,489 received in exchange.

DONATIONS OF INSECTS.

AGASSIZ, A. 7 species, 10 specimens Lepidoptera; 3 species 9 specimens Coleoptera; 6 species, 59 specimens Orthoptera; 1 species, 1 specimen Myriapoda; 1 species, 2 specimens Arachnida, from Cambridge, Mass. Total, 18 species, 81 specimens.

AGASSIZ, L. 1 species, 1 specimen Lepidoptera; 1 species, 1 specimen Orthoptera; 2 species, 2 specimens, Hymenoptera; 5 species, 29 specimens Diptera, from Nahant, Mass. Total, 9 species, 33 specimens.

ALLEN, J. A. 38 species, 125 specimens Lepidoptera; 70 species, 397 specimens Coleoptera; 28 species, 168 specimens, Hymenoptera; 23 species, 101 specimens Diptera; 15 species, 51 specimens Hemiptera; 10 species, 18 specimens Orthoptera; 4 species, 4 specimens Neuroptera; 2 species, 3 specimens Myriapoda; 12 species, 65 specimens Arachnida, from Springfield, Mass. Total, 202 species, 932 specimens.

AUSTIN, E. P. 10 species, 30 specimens Coleoptera; 3 species, 15 specimens Myriapoda, from Oakland, County, Mich. Total, 13 species, 45 specimens.

BAUMHAUER, E., and FISHER, C. 42 species, 72 specimens Coleoptera, from Baltimore, Md.

BERENDT, Dr. C. H. 2 species, 2 specimens Coleoptera, from Tabasco, Mexico.

BOURGET, D. 2 species, 2 specimens Orthoptera, from Rio de Janeiro, Brazil.

BRIDGHAM, Mrs. S. W. 125 species, 232 specimens Lepidoptera, from New York.

BROWN, Mrs. 2 species, 5 specimens Arachnida; 1 species, 2 specimens Scorpions, from Cuba. Total, 3 species, 7 specimens.

CHAMBERLAINE, Mrs. A. P. 8 species, 8 specimens Coleoptera; 6 species, 7 specimens Orthoptera; 1 species, 1 specimen Hemiptera; 2 species, 3 specimens Myriapoda, from Shanghai, China.

CHAVANNES, Dr. A. 65 cocoons of *Saturnia cynthia*; 185 eggs, and 1 cocoon of *Saturnia yama-mai*, from Lausanne, France.

CHURCHILL, J. R. 1 species, 9 specimens Hemiptera, from Milton, Mass.

CRESSY, Dr. N. 6 species, 17 specimens Coleoptera; 1 species, 1 specimen Orthoptera, from Canaan, N. Y.

DAULTE, F. 1 specimen *Corydalis cornutus*, from Leavenworth, Kansas.

DAVIS, Mrs. G. N. 11 species, 32 specimens Lepidoptera in all stages; 8 species, 20 specimens Orthoptera; 11 species, 13 specimens

Coleoptera; 3 species, 3 specimens Diptera; 2 species, 5 specimens Neuroptera; 3 species, 3 specimens Myriapoda; 2 species, 2 specimens Arachnida, from Rio de Janeiro, Brazil. Total, 40 species, 78 specimens.

FOWLER, Rev. J. H. 11 species, 24 specimens Lepidoptera; 6 species, 6 specimens Coleoptera; 5 species, 8 specimens Hemiptera; 5 species, 7 specimens Orthoptera; 2 species, 3 specimens Hymenoptera; 1 species, 4 specimens Neuroptera; 2 species, 2 specimens Diptera, from Port Royal Island, S. C. Total, 32 species, 54 specimens.

FRANCIS, E. 26 females, and eggs, of *Anisopteryx vernata*; 1 specimen *Cicada canicularis*, from Cambridge, Mass.

HARTT, C. F. 1 species, 1 specimen Myriapoda, from Halifax, N. S.

HAXEL, P. 47 species, 88 specimens Coleoptera; 3 species, 4 specimens Hemiptera, from Quincy, Ill. Total, 50 species, 92 specimens.

HEADE, M. J. 4 species, 10 specimens Hemiptera; 2 species, 3 specimens Hymenoptera; 5 species, 7 specimens Orthoptera; 1 species, 1 specimen Arachnida, from Rio de Janeiro, Brazil. Total, 12 species, 21 specimens.

HILL, President T. 1 imago, and 1 larva of Lepidoptera, from Cambridge, Mass.

HOWELL, R. 1 specimen *Attacus luna*; 1 specimen *Corydal's cornutus*, from Tioga County, N. Y.

HUNNEWELL, J. L. 1 species, 2 specimens Myriapoda, from Para, Brazil.

LANGSTROTH, Rev. L. L. 1 species, 33 specimens Apis, from Oxford, Ohio; and 1 species, 1 specimen Apis, from China.

LECONTE, J. L. 3 specimens *Polyphylla variolosa*, from New Jersey.

LYMAN, T. 5 species, 5 specimens Coleoptera; 1 species, 1 specimen, Orthoptera; 1 species, 1 specimen Hemiptera; 1 pupa of Lepidoptera, from Petersburg, Va. Total, 8 species, 8 specimens.

MANN, B. P. 1 larva of Lepidoptera, from Cambridge, Mass.

MARCY, Prof. O. 3 species, 4 specimens Coleoptera; 1 species, 1 specimen Hymenoptera; 1 species, 1 specimen Diptera, from Evanston, Ill. Total, 5 species, 6 specimens.

MAYER, A. 4 species, 256 specimens Coleoptera; 1 species, 1 specimen Hymenoptera, from Neufchatel, Switzerland.

MCARDLE, P. 5 species, 6 specimens Coleoptera, from Cambridge, Mass.

NILES, W. S. 4 species, 4 specimens Lepidoptera, from Cambridge, Mass.

PUTNAM, W. H. A. 1 specimen *Callidea sexmaculata*, from Batavia, Java.

RICH, J. G. 2 species, 2 specimens Lepidoptera, from Upton, Me.

ROBERTS, W. M. 4 species, 5 specimens Coleoptera; 2 species, 3 specimens Orthoptera; 4 species, 10 specimens larvæ of Lepidoptera; 1 species, 1 specimen Myriapoda; 2 species, 2 specimens Arachnida, from Macacos, Brazil. Total, 13 species, 21 specimens.

SCUDDER, S. H. 8 varieties of *Chionobas semidea*, from White Mountains, N. H.

SHALER, N. S. 2 species, 2 specimens Lepidoptera; 1 species, 2 specimens Coleoptera, from Cambridge, Mass.

SHEDD, W. B. 3 species, 3 specimens larvæ of Lepidoptera; 1 species, 1 specimen Orthoptera; 1 species, 1 specimen Myriapoda, from Malden, Mass.; 3 species, 33 specimens cocoons of Lepidoptera, from Oberlin, Ohio. Total, 8 species, 38 specimens.

SHUTE, J. G. 2 nests, with adult and young of *Vespa*, from Woburn, Mass.; 1 Scorpion, from Arabia; 1 Scorpion, from Southern Europe.

SPRINGFIELD MUSEUM. 50 species, 430 specimens Coleoptera; 16 species, 87 specimens Hymenoptera; 8 species, 28 specimens Orthoptera; 6 species, 10 specimens Diptera; 8 species, 14 specimens Hemiptera, from Springfield, Mass. Total, 88 species, 569 specimens.

STILLMAN, S. 1 species, 1 specimen Lepidoptera; 1 species, 1 specimen Coleoptera; 1 species, 1 specimen Orthoptera, from Rome, Italy. Total, 3 species, 3 specimens.

TYLER, J. K. 1 species, 1 specimen Neuroptera, from Boston, Mass.

VIELE, Dr. 2 species, 5 specimens Coleoptera; 18 species, 29 specimens Orthoptera, from Colorado Territory. Total, 20 species, 34 specimens.

WALSH, B. D. 3 species, 4 specimens Lepidoptera; 7 species, 8 specimens Hymenoptera, and 12 species, 52 specimens nests of Cynipidæ; 3 species, 4 specimens Lepidoptera; 41 species, 69 specimens Neuroptera; 7 species, 7 specimens Diptera; 9 species, 11 specimens Hemiptera; 5 species, 6 specimens Coleoptera; 4 species, 7 specimens Orthoptera, from Rock Island, Ill. Total, 76 species, 112 specimens.

WENTWORTH, JAS. 1 specimen *Emesa brevipennis*, from Washington, D. C.

WILD, J. P. 12 species, 24 specimens Coleoptera, from Egg Harbor City, N. J.

WILSON, W. 1 species, 15 specimens Scorpions; 2 species, 3 specimens Arachnida; 1 species, 3 specimens Myriapoda, from Port au Prince, Hayti.

WRIGHT, C. 20 species, 30 specimens Coleoptera; 6 species, 14 specimens Orthoptera; 13 species, 45 specimens Hymenoptera; 8 species, 20 specimens Hemiptera; 13 species, 21 specimens Arachnida, from Washington, D. C.; 5 species, 114 specimens Coleoptera, from Cuba; 15 species, 25 specimens Lepidoptera, from Japan; 2 species, 2

specimens Lepidoptera, from Benin Islands; 2 species, 2 specimens Coleoptera; 1 species, 2 specimens Orthoptera, from China; 22 species 81 specimens Lepidoptera; 3 species, 34 specimens Coleoptera; 1 species, 2 specimens Neuroptera; 2 species, 3 specimens Orthoptera; 1 species, 1 specimen Hymenoptera, from Cuba. Total, 114 species, 396 specimens.

BY EXCHANGE.

Through this source we have added 4,489 specimens of 2,142 species from various parts of the world, obtained through seven different individuals and institutions.

PURCHASED WITH THE GRAY FUND.

By this means we have procured 13,773 specimens of 4,603 species from ten different individuals.

CRUSTACEA.

During the year just passed the additions to the collections, from all sources, have been 199 species, 2,157 specimens. Of this number, 533 specimens, embracing 71 species, were presented; 1,309 specimens, of 96 species, were obtained by the Gray Fund, and 315 specimens, of 32 species, were received in exchange.

PRESENTED.

- ALLEN, J. A. 1 species, 31 specimens, from Wayne County, N. Y.
 BOURGET, D. 6 species, 10 specimens, from Rio de Janeiro, Brazil.
 BRECK, Capt. 3 species, 71 specimens, from Shanghai, China.
 BROWN, R. 1 species, 1 specimen, from Staten Island, N. Y.
 HARTT, C. F. 2 species, 60 specimens, from Harborville, Bay of Fundy.
 HEADE, M. J. 4 species, 7 specimens, from Rio de Janeiro, Brazil.
 LYMAN, T. 1 species, 1 specimen, from Petersburg, Va.
 ROBERTS, W. M. 4 species, 4 specimens, from Macacos, Brazil.
 SQUIER, E. G. 1 species, 7 specimens, from Peru.
 STILLMAN, Mr. 4 species, 36 specimens, from Rome, Italy.
 THEOBALD, W., Jr. 41 species, 146 specimens, from Rangoon, E. I.
 UHLER, P. R. 1 species, 8 specimens, from Baltimore County, Md.
 VIELE, Dr. 1 species, 150 specimens, from Colorado Territory.
 WILSON, W. W. 1 species, 1 specimen, with no locality given.

ANNULATA.

The whole number of specimens added since last Report is 163, embracing 44 species. Of these 12 species, 14 specimens were presented; 8 species, 55 specimens received in exchange; and 24 species, 94 specimens procured with the Gray Fund.

PRESENTED.

AGASSIZ, A. 8 species, 8 specimens, from Nahant, Mass.

HARTT, C. F. 3 species, 5 specimens, from Halifax, N. S.; 1 species, 1 specimen, from Harborville, N. S.

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

Since our last Report much has been done in the way of increasing the collection of Mollusca, which is now in much better condition than at the same period last year. My absence from the country, however, with the expedition to Brazil, has prevented a considerable amount of work being done in mounting and arranging the collection; but this is less to be regretted at this time, since the cramped condition in which we find ourselves, for want of room to exhibit the specimens after being mounted, would have compelled the retention of the greater portion of them in the work-rooms, where they would not be seen by visitors to the Museum. The only important work done in this line since our last Report, has been the mounting of all our cypreae and ovulae, for which room was made in one of the cases in the exhibition rooms by displacing specimens already there, and they are now on exhibition, forming an interesting addition to our mounted specimens.

During the current year, the cabinet of shells belonging to Mr. Anthony, alluded to in our last year's Report, has been purchased, and is now in process of preparation, for being duly handed over to the Museum. The main collection has long been arranged, and would require but little labor before being ready for exhibition; but the large number of duplicates require, and are now undergoing, a thorough examination, in order to render them available in our foreign exchanges, where they will be particularly serviceable. The purchase of this collection will add about 5,000 species of terrestrial and fluvia-

tile shells to our collection, and but few of them will duplicate those previously in our possession.

Our other receipts have been unusually large during the current year, amounting, in the aggregate, to 2,616 species and 34,145 specimens; a number greater than ever before in any one year. Of these, 1,642 species and 13,297 specimens have been derived from our exchanges, and 748 species, 12,814 specimens have been added by donation, while only 226 species, comprising 8,034 specimens, have been acquired by purchase, a much smaller number from this source than usual.

Of the above, we note the following as having been received by donation from many friends of the Museum, and to whom our thanks are due for their valuable contributions.

DONATIONS OF MOLLUSCA.

- J. A. ALLEN, 20 species, 120 specimens.
 ALEXANDER AGASSIZ, 16 species, 421 specimens.
 J. G. ANTHONY, 49 species, 120 specimens.
 Captain BRECK, 1 species, 1 specimen.
 Captain BOUTELLE, 1 species, 1 specimen.
 Professor BACHE, 2 species, 2 specimens.
 D. BOURGET, 2 species, 6 specimens.
 Mrs. A. P. CHAMBERLAIN, (odd valves,) — specimens.
 Miss C. DABNEY, 5 species, 10 specimens.
 G. N. DAVIS, 2 species, 3 specimens.
 Mrs. J. M. FORBES, 1 species, 23 specimens.
 Captain HAMILTON, 6 species, 25 specimens.
 EDWARD HABICH, 3 species, 5 specimens.
 C. F. HART, 21 species, 2,554 specimens.
 LOVELAND & THAXTER, 5 species, 55 specimens.
 Captain MARSTON, 1 species, 1 specimen.
 B. P. MANN, 5 species, 72 specimens.
 Captain PUTNAM, 1 species, 2 specimens.
 O. H. ST. JOHN, 1 species, 323 specimens.
 S. STILLMAN, 16 species, 37 specimens.
 CHARLES WRIGHT, 477 species, 5,712 specimens.
 THAYER'S BRAZILIAN EXPEDITION, 113 species, 3,321 specimens.

Among these contributions, that of Mr. Charles Wright deserves particular notice, being not only large in the number of species and specimens, but valuable in other respects, and

adding very materially to our collection, in some genera in which we have hitherto been very deficient.

The Brazilian Expedition, so liberally provided for by one of our most constant benefactors, was naturally looked to as promising a large increase in this department, and I accompanied it with direct reference to a full collection of the mollusca in that region. A severe illness compelled my return at a time when my labors had scarcely commenced. A good collection of land and marine shells had been made, however, and a portion of the land shells were brought home, and enter into this Report; but all the marine shells and alcoholic specimens generally, were left for future shipment. The other members of the Expedition will not neglect the mollusca among the varied objects of their research, and we may still hope to receive a large accession from this source.

About the usual number of packages have been sent away during the current year, but much remains to be done in this line, to repay those who have so liberally furnished specimens. The consignments amount to 1,863 species and 3,781 specimens.

Report on the Radiates, by ALEXANDER AGASSIZ.

The additions to this part of the collection have not been numerous, as the collectors to whom we formerly owed the principal part of our additions have either returned home, or we have been obliged to discontinue their services for want of means. Owing to other more pressing duties in the Museum, but little work has been done in any of the classes. The general arrangement is, however, so far completed for the Radiates that this part of the collection is still in advance of nearly every other department. Mr. Niles has, during the past year, continued to give his attention to the arrangement of the collection of Crinoids purchased last year, which, when it becomes incorporated with the collection of Crinoids already in the Museum, will make it one of the most complete in the Museum. Among the additions I have to notice specially the collection sent by Professor Haeckel, in exchange, containing quite a number of animals usually considered too perishable to be sent any

distance, the greater part of which arrived in a perfect state of preservation.

Besides the donations enumerated below, the Museum has received by exchange 110 specimens of Echinoderms, representing 14 species; 121 specimens of Acalephs, 9 species; and 7 specimens, containing 2 species of Polyps, from three different persons or institutions. Among the collections purchased with the Gray Fund there were 55 specimens of Echinoderms, representing 16 species; 8 specimens of one species of Acaleph, and 25 specimens of 7 species of Polyps, obtained from three different individuals.

Seven collections of Radiates, principally recent and fossil Echinoderms, have been sent from the Museum to as many different institutions and individuals, amounting to 457 specimens, representing 388 species.

DONATIONS OF ECHINODERMS.

- AGASSIZ, A. 20 specimens, 2 species. Nahant.
 BOURGET, D. 14 specimens, 3 species. Rio Janeiro.
 FLETCHER, J. C. 2 specimens, 2 species. Brazil.
 HARTT, C. F. 60 specimens, 3 species. Halifax.
 SQUIER, E. G. 6 specimens, 3 species. Peru.
 STILLMAN, S. 15 specimens, 3 species. Ostia.
 TALLANT, Miss. 2 specimens, 2 specimens. Feejee Islands.

ACALEPHS.

- AGASSIZ, A. 1 specimen. Newport.
 BROWN, R. 2 specimens. Staten Island, N. Y.
 HARTT, C. F. 1 specimen. Halifax.
 GARDNER, GEORGE. 1 specimen. Sooloo Sea.

POLYPS.

- BOURGET, D. 1 specimen. Rio Janeiro.
 RUSSELL, J. 5 specimens, 4 species. Manilla.
 STILLMAN, S. 4 specimens, 2 species. Ostia.

Report on the Paleontological Collection, by N. S. SHALER.

The greater portion of the work done consisted in the distribution of the stores of materials, conformably to the plan which had been adopted for the arrangement of the Museum. The paleontological collection had been increasing for many years with great rapidity, without having been under the charge of any one person who could be held responsible for its condition. This resulted in much disorder in some portions of the collection, and, as a whole, it presented an unfavorable contrast with the other departments of the Museum. Much time has been given to the labor of overhauling, distributing and labeling specimens, and though a good deal remains to be done, we have advanced so far that little time will be required to complete this merely preliminary work. Besides this task of bringing the collections into a condition in which they can remain without danger until needed for scientific work, considerable progress has been made, in a general way, towards the reduction of the materials to the shape in which it is meant they shall finally be brought. The specimens have all been divided according to geological periods, and, in many cases, those of known fossil faunæ have likewise been separated, according to such natural divisions. No great effort has yet been made to carry our zoölogical division below the limits of orders, yet in many cases the minor groups have been tolerably well determined.

In accordance with the spirit of the whole work of the Museum, all other considerations have been sacrificed to the most important points of securing an accurate determination of the locality of each specimen, and in the arrangement of specimens to exhibit the phenomena of association as they occur in nature.

The work of cataloguing has been carried forward as rapidly as time would admit. In the Brachiopoda, where most of this work has been done, about 7,000 entries have been made, including about 65,000 specimens.

This concludes the list of Paleozoic forms which were in the Museum on the first of January, 1865, as well as all the Terebratulæ from the Jurassic beds. Catalogues of the Paleozoic Gasteropoda and Lamillibranchiata have been commenced, and with the aid of Mr. C. F. Hartt have been carried up to several

hundred numbers. A complete and valuable catalogue of the Cephalopoda, now on exhibition, embracing 1,600 entries, has been prepared by Mr. Hyatt. It is confidently hoped that the coming year will complete the catalogues now under way, as well as lay the foundations of similar work in other groups.

The Brachiopoda collected by the Anticosti expedition in 1861, have been published in the fourth number of the Bulletin, which has recently been issued. Thirty-five species are therein mentioned, including descriptions of twenty-four species not hitherto noticed. An account of the other species of fossils collected by that expedition will be given in future numbers of the Bulletin, which will render a large amount of valuable material available for exchange.

During the year, twenty-four exchanges, varying in number from fifteen to five hundred species, and comprising a total of 1,248 species, and 3,059 specimens, have been prepared for transmission to various correspondents. In return, we have received from nine individuals and institutions 848 species, including 3,880 specimens. Many of these forms have peculiar value, either from being typical specimens with original labels, or as coming from localities of special importance. The past year having been the first in which exchanges of fossils have been made, the number of shipments necessarily bears a large proportion to our returns. Nevertheless, the receipts from this source are sufficiently numerous and valuable to show how effective a means of increasing our collections it can be.

The most valuable single addition to stores was the collection of American Paleozoic fossils of the Rev. W. H. Barris, of Burlington, Iowa, presented by Mrs. G. R. Russell, which increased our collection of crinoids about 400 species, including over 3,000 specimens, and gave us from many portions of our American Paleozoic beds much valuable material for faunal collections and for exchange. The total number of specimens received by purchase amounted to 15,805, including 922 species. From donations, our receipts have not been very numerous, but of considerable value. A collection of over 100 species of selected fossils from the Silurian basin of Cincinnati, including about 1,000 specimens, was received from the assistant in charge of the department. Messrs. A. Agassiz, St. John and Ward

presented a valuable collection of carboniferous fossils from Missouri.

A detailed list of the persons to whom the acknowledgment of the obligation of the Museum is due, will be found at the end of this Report.

The total of species received amounts to 1,969, including 22,634 specimens.

Diligent effort is now making to carry further the systematic arrangement of the collection, and to advance the work of cataloguing and numbering the specimens, so that they will be readily accessible, and can be freely used for purposes of study and comparison. At the same time, the extension of our system of exchanges, which has already given such assurance of success, will remain a prominent aim in our labor.

DONATIONS OF FOSSILS.

ANTHONY, J. G., Assistant M. C. Z. 9 species, 160 specimens.

AGASSIZ, A., ST. JOHN, O. H., and THOS. WARD. 71 species, 1,469 specimens.

CORRY, O. W. 10 species, 19 specimens, Crawfordsville, Ind.

CRAVEN, J. S. Surgeon U. S. A. 1 species, 1 specimen, Fortress Monroe.

DODGE, Major, U. S. A. 2 species, 3 specimens, Petersburg, Va.

SCHAFFER, J. 6 species, 100 specimens, Cincinnati, Ohio.

SHUTE, JAMES. 1 specimen, 1 species, Collingwood, C. W.

SHALER, N. B., M. D. 1 specimen, 1 species.

SHALER, N. S., Assistant M. C. Z. 2 species, 7 specimens, New Jersey.

* SHALER, N. S., Assistant M. C. Z. 104 species, 1,337 specimens.

Report on the Library, by P. R. UHLER.

The increase of the Library during the year just passed has not been very considerable, but the additions have not been the less interesting.

Twenty-five volumes, and forty pamphlets, or parts, of various sizes, have been presented by the following societies and individuals: Boston Society of Natural History, Entomological Society of Stettin, Essex Institute, Görlitz Natural History Society, Imperial Museum, Paris; Natural History Society of

New Brunswick ; Nürnberg Natural History Society ; Palermo Natural History Society ; Smithsonian Institution ; Mr. A. Agassiz, Prof. L. Agassiz, Prof. G. J. Allman, Mr. J. Barrande, Dr. V. Bergsøe, Mr. E. Billings, Mr. R. B. Minturn, Prof. F. Poey, Dr. M. A. F. Prestel, Messrs. F. W. Putnam, and A. S. Packard, S. H. Scudder, Q. A. Shaw. Five volumes have been purchased from the Entomological Society of Philadelphia, and a map of Wisconsin was presented by Mr. I. A. Lapham.

[B.]

TRUSTEES OF THE MUSEUM OF COMPARATIVE ZOOLOGY.
1866.

THE GOVERNOR OF THE COMMONWEALTH,
ALEXANDER H. BULLOCK.

THE LIEUTENANT-GOVERNOR,
WILLIAM CLAFLIN.

THE PRESIDENT OF THE SENATE,
JOSEPH A. POND.

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES,
JAMES M. STONE.

THE SECRETARY OF THE BOARD OF EDUCATION,
JOSEPH WHITE.

THE CHIEF JUSTICE OF THE SUPREME JUDICIAL COURT,
GEORGE T. BIGELOW.

LOUIS AGASSIZ. WILLIAM GRAY.

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

OFFICERS OF THE MUSEUM OF COMPARATIVE ZOOLOGY FOR
1866.

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.*

GEORGE TICKNOR, LOUIS AGASSIZ, JACOB BIGELOW, GEORGE T. BIGELOW, *Committee on the Museum.*

ANNUAL REPORT

OF THE

TRUSTEES

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY,

AT HARVARD COLLEGE, IN CAMBRIDGE,

TOGETHER WITH

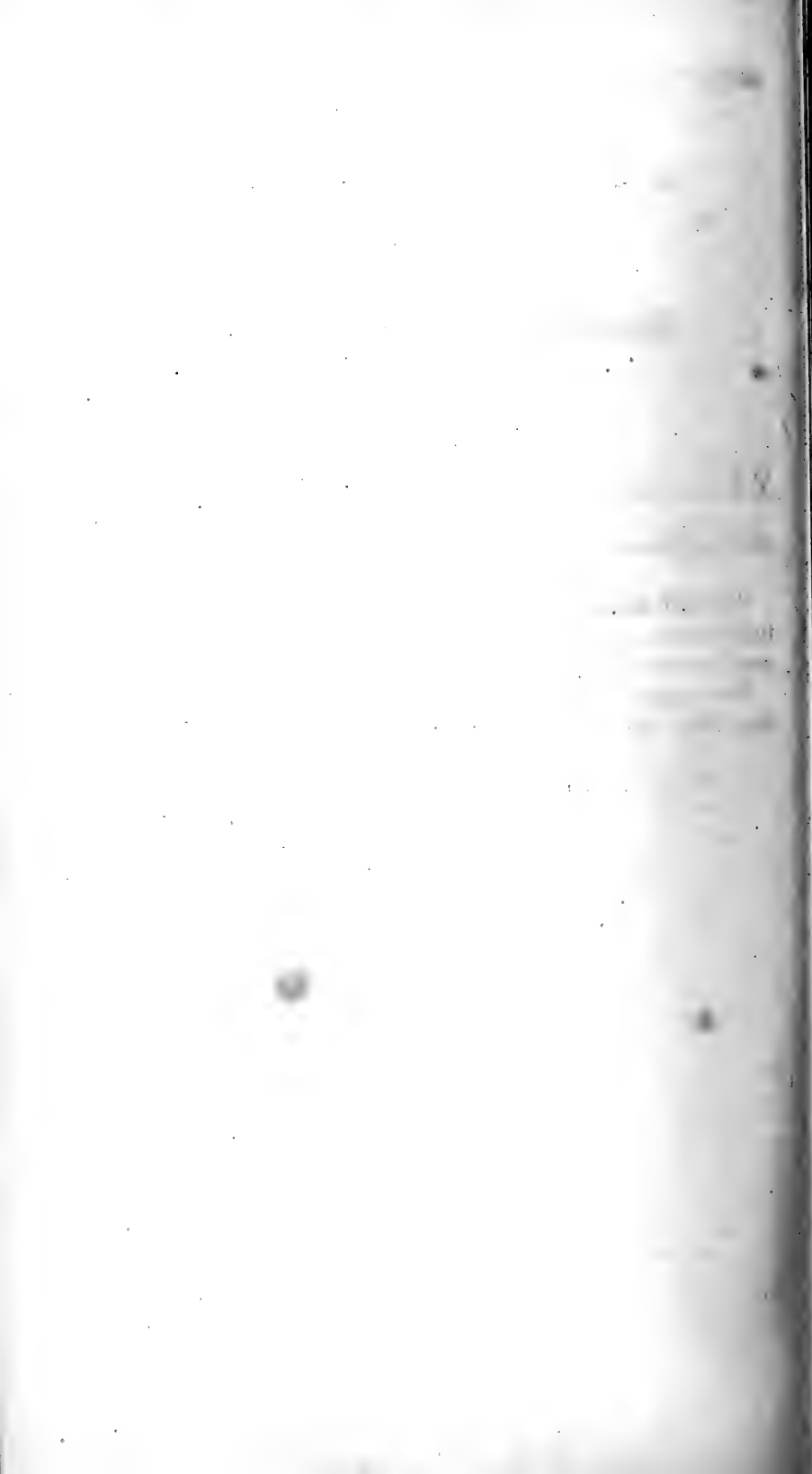
THE REPORT OF THE DIRECTOR,

1 8 6 6 .

BOSTON:

WRIGHT & POTTER, STATE PRINTERS,
No. 4 SPRING LANE.

1867.



Commonwealth of Massachusetts.

BOSTON, January 30, 1867.

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 1867.

For the Trustees,

WM. GRAY, *Secretary.*

[A .]

ANNUAL REPORT

Of the Director of the Museum of Comparative Zoölogy on resuming his duties in 1866.

By LOUIS AGASSIZ.

As the work of the Museum for the past year was conducted by the assistant in charge, A. Agassiz, I submit his report as a part of mine, referring to it, in connection with the reports of the other assistants, for an account of the active operations of the Museum during the closing academic year.

EIGHTH ANNUAL REPORT,

BY ALEXANDER AGASSIZ, *Assistant in Charge.*

The very large collections obtained by the Brazilian Expedition, so generously fitted out by Mr. Thayer, while they have added greatly to the value of the Museum, have necessarily impeded the regular work of the institution during the past year. The invoices arrived so frequently, and the mass of new material was so great, that the labor of all the assistants in the Museum was scarcely sufficient to keep pace with the influx of specimens. It was therefore necessary to interrupt, for a time, the ordinary preparations for exchanges. Fortunately we were not largely in arrears, and as none of our more recent exchanges have suffered any delays we are not indebted to other institutions for any considerable amount. The departments of conchology and entomology suffered less disturbance, and in spite of the numerous interruptions, the accompanying reports will show a degree of activity in that part of the work which compares favorably with that of previous years. The other departments, especially those of vertebrates and radiates, were, however, necessarily neglected, from the causes above stated. As the Museum had not the means of engaging additional aid to meet the unusual exigencies, the assistant in charge was obliged to devote his time almost exclusively to the care of the

immense alcoholic collections from Brazil, which required immediate attention to secure them against loss. Indeed, he would have been quite incompetent to the task single-handed, and has to thank Colonel Lyman who, during six weeks, worked with him several hours daily, as well as Mr. William James and Mr. Shaler, for their most efficient assistance. But for their co-operation it would have been impossible to put the bulk of the collections in safety before the beginning of warm weather, during which this kind of work is necessarily suspended. With their assistance no less than 323 kegs and barrels have been transferred to fresh kegs, with fresh alcohol, and 75 boxes of dry specimens assorted since the beginning of this year. Mr. Sceva also unpacked the collection he brought home himself, and Mr. Hartt did the same for the collections which arrived at the time of Professor Agassiz's return. This leaves still about sixty kegs and cans yet unpacked, and which, although received before the date of this Annual Report, cannot be numbered among the additions of this year, which stands unrivalled in the history of the Museum. An idea of the magnitude of our new stores can be formed from the fact that in the class of fishes alone no less than 50,000 specimens were actually counted, representing over 2,200 species, the majority of which, say 2,000, are probably new to science and to our collections. This estimate does not include the smaller specimens, less than two inches in length, which also number many thousands. All classes did not share in proportion, but the fishes and reptiles alone form additions which might be the basis of a large museum.

The different departments have remained in charge of the same assistants as during the past year; Messrs. Uhler, Anthony and Shaler having the care of the articulata, mollusca, and palæontology, while the remaining classes have been under the charge of A. Agassiz.

During the past year the second number of the Illustrated Catalogue, the North American Acalephæ, by Mr. Alexander Agassiz, has been published and distributed abroad, through the agency of the Smithsonian Institution. It has also been sent in this country to most of the principal libraries, societies and individuals whom the volume might interest. The distribution of the first number, among individuals and scientific societies, has already borne fruit in numerous additions to our

library sent in acknowledgment. If we can continue our publications with anything like a moderate regularity, we shall, no doubt, enlarge the circle of our usefulness and obtain valuable returns ourselves. In this connection I would state that arrangements have been made with the United States Coast Survey, through the courtesy of Professor Bache, to incorporate into the next number of the Illustrated Catalogue Professor Agassiz's Report on the Coral Reefs of Florida, originally prepared for the use of the Coast Survey. This report is accompanied with plates drawn by Mr. Sonrel, and as it illustrates most of our common North American corals, we can readily, by adding a few illustrations, publish an exhaustive catalogue of the polyps of the east coast of our continent. This latter part Colonel Lyman has undertaken to finish, and it is hoped that the third number of the Catalogue may be published near the close of the year 1867. This will probably exhaust the sum so generously placed at the disposal of the trustees by the legislature, and it is earnestly to be wished that hereafter some additional means may be provided to continue these catalogues.

The usual lectures on Zoölogy to the scientific students and others, were given by the assistant in charge during the first term of the past academic year. Mr. Shaler delivered the lectures on Geology in the second term. Three special students availed themselves of the privileges of the Museum during the year.

The cellar, owing to our large accessions, has now become so crowded that the space formerly devoted to unpacking is almost given up to storage; we shall soon come to the end of the few feet of available room left there and be obliged to encroach upon the exhibition and working rooms. The kegs containing our collections have been thoroughly overhauled and repainted and filled up, and the general condition of the alcoholic collection is as satisfactory as we can expect with our present facilities.

To accommodate the dry collections, floors have been laid across the galleries of the two eastern rooms, where lighter material may be stored until better arrangements can be made.

The Museum is indebted for facilities and assistance in forwarding specimens to their destination, to the State department

and Navy department at Washington ; to the Pacific Mail Steamship Company, who offered the hospitality of their fine steamer, the Colorado, to the Brazilian Expedition on its way out ; to Messrs. Wells, Fargo & Co. ; to Messrs. Bishop & Co., who have forwarded the whole of the Amazonian collection from Para to New York, free of all charges ; and to the Brazilian and North American Steamship Company for the free passage of members of the expedition, and for taking charge of all the collections which had accumulated at Rio. To Messrs. H. C. Brooks & Co., Messrs. C. W. Brooks & Co., Mr. A. V. Sartori, Mr. Martin, Messrs. Isaac Taylor & Co., for their interest in forwarding exchanges to and from New Zealand. To the Portuguese and Italian consuls at Boston and New York, to the Tudor Ice Company, Mr. George N. Davis of Rio Janeiro, and to the Smithsonian Institution for the distribution of our publications.

The library is principally indebted for additions to the Copenhagen Academy and to Professor Agassiz. But few new purchases have been made with the Gray fund, the income of the past year having defrayed a portion of the cost of the Konink collection. Casts of some of the larger fossils were obtained from Dr. Kaup and Prof. H. A. Ward of Rochester.

The Museum is indebted to the following individuals for their donations and for their interest in forwarding our objects. I mention here the larger collections only, or those of special interest ; the other donations will be found in their respective departments.

Beside the collections sent home by the Thayer Expedition, I would name the donations of Mr. Chas. Wright of Cuba, of Dr. Davie of New Zealand, of Dr. Duchassaing, Dr. Schramm, Dr. Fritz Muller, the invoice from the Smithsonian Institution, Mr. Jonathan Russell, and Dr. John L. Leconte. The exchanges have been continued as far as possible with the same institutions as before, and a correspondance of the same kind opened with several others. We have to mention especially the University Museum of Copenhagen, the Jardin des Plantes, where Professors Milne Edwards and Dumeril are aiding us in procuring by exchange invaluable additions to our stores. Professor Gastaldi, Dr. Kaup, Professor Panceri, Professor J. V. Barbosa du Bocage, Professors Keferstein and Haeckel, the Vienna Museum, through Dr. Redtenbacher, to whom the Mu-

seum owes valuable fishes from Spain and the Danube, and to the Colonial Museums of Melbourne, Sydney, Christchurch and Otajo, with whom, thanks to Professors McCoy, Krefft, Haast and Hector, we are now in constant relation. We have continued our invoices to Calcutta, through Mr. W. Theobald, Jr., and to the South African Museum from which Professor Layard has sent us valuable collections. I have to mention as exchanging with the Museum also, the Chicago Academy of Sciences, Professors Cocchi and Seguenza, and Messrs. Appelius, Rigacci, McAndrew, Morelet, Angas and Terver.

Large invoices have been sent for examination to several institutions. One most important object of the Museum is to stimulate original research, and for this purpose we are ready, whenever it is possible, to furnish materials for study, by forwarding to other investigators, such portions of our collections as are not yet arranged.

To this end our whole collection of Sturgeons was sent to Professor Dumeril at the Jardin des Plantes, our Sipunculoids to Professor Keferstein, and our magnificent collection of Holothurians, to Mr. Selenka, who has been making a special study of these animals in the Göttingen Museum under the direction of Professor Keferstein. To Dr. E. Cope of Philadelphia, and Mr. Gill of Washington, specimens have also been sent for a similar object. The Museum has also continued as far as possible the invoices of live stock to the Jardin des Plantes. Many specimens have been sent from the Brazilian Expedition, but unfortunately a great part were lost on the passage to Europe.

SPECIAL REPORT OF THE DIRECTOR.

On resuming now my position as Director of the Museum, I deem it proper to make some remarks concerning its present condition and prospects. And first allow me a few words upon my management of its affairs since its organization.

When the plan of a great Museum in connection with Harvard University was first suggested, nobody knew exactly what should be done and still less what could be done. I was intrusted with the duty of preparing a plan for its foundation, and yet there was no definite standard by which to measure its

extension and its aims. Under the circumstances, it seemed best to propose the erection of a small part of such a building as would be necessary for a great Museum, and to apply the larger part of our resources to the increase of the collections and the internal improvement of the institution. This policy was sanctioned by the Board of Trustees, and the consequence is that our building is now full to overflowing; part of the rooms which might have been made exhibition rooms, are for the present transformed into storerooms,—and by far the largest and most important portions of our collections are packed away in barrels and boxes,—rendering the use of specimens for study very laborious, nay, almost impossible, owing to the loss of time in finding what is wanted. In fact, the whole Museum is now rather a store-house, than a well arranged scientific collection.

Such a result may seem to show bad management, and might be fairly criticized, had our primary object been that of forming a museum for public exhibition and display. But the tacit understanding of all those concerned in its foundation, has been to aim at the building up of a scientific institution, which should rival the most extensive establishments of that kind in Europe. Viewed in that light, the immense accumulation of material now stored up in our building may be considered not only as a great scientific fortune fully realized and our own, but even as a source of ever increasing scientific wealth, if we succeed in preserving the whole and making it available for exchanges. At present, it is like an immense capital lying unused, and we lack the means to put it out at interest, to distribute our riches and make their value felt.

The difficulty inherent in the management of so large an estate with insufficient income, had suggested to me the propriety of resigning the trust into younger and more active hands; but I find that by so doing I could not change the existing state of things, and I therefore propose to retain my present duties and obligations in the Museum till better times come.

Permit me now, summarily, to state what are our chief possessions. In the present state of the collections, it would be hardly possible to give a just estimate of the number of species from the different classes of the animal kingdom contained in them, still less to enumerate the specimens. The collections

have increased so rapidly, that it has been impossible to carry forward the catalogue at the same rate. I have fostered certain branches of Natural History in our Museum to the disadvantage of others, and I have done this intentionally, as I think it a mistake for establishments of this kind to repeat each other. They should rather aim at filling each other's blank spaces, each one doing as far as possible what the other has left undone. Thus I have made no attempt to form a collection of birds which might compete with that of the Academy of Natural Sciences in Philadelphia, or with that of the Smithsonian Institution at Washington, or that of the Boston Natural History Society. It would have been an unwise expenditure of our means, and would not have added materially to the resources of naturalists in that department, already so amply provided for. Our Ornithological collection has therefore remained small, as is also that of Mammalia. Our collection of Reptiles, however, is probably the largest in the country, and may compare favorably with those of the Old World. Our collection of Fishes far outstrips any now existing. If the published estimates of those institutions can be taken as a safe guide, it exceeds those of the British Museum and the Jardin des Plantes taken together. We actually possess more than nine thousand species of this class of vertebrates, and so great a number of specimens as to afford material for original investigation for years to come. None but the practical naturalist know what a privilege it is to have an unlimited number of specimens for the comparative study of the structure of animals. With only one or two specimens at command, the student comes to the end of his resources with his problem half solved.

My acquaintance with Entomological and Malacological collections being less complete, does not enable me to make similar comparisons of our collections of Articulata and Mollusks with those of other museums. For information concerning those departments, I therefore refer to the special reports of Messrs. Uhler and Anthony, who have shown great ability and industry in bringing these collections into order.

Mr. Shaler has also been very active in arranging the fossils. It will however require many years and greatly increased means to classify and assort this part of our collections which has great scientific value. The appointment of another assist-

ant for the arrangement of the fossil Mollusks is especially desirable. It has not been possible for me as yet to put in order even the fossil fishes, notwithstanding my own familiarity with this class.

Our collection of Radiates constitutes one of the most remarkable features of our Museum. Taking into consideration the fossil as well as the living representatives, I believe no museum is richer in this type. Their arrangement is nearly complete, and had we room for a more complete exhibition of them they would add greatly to the interest and attraction of our public rooms.

In closing these remarks, it is hardly necessary for me to add that the material results of the scientific exploration of Brazil, from which I have lately returned, have been bodily incorporated in the Museum, and now form one of its most important possessions. This expedition, fitted out with the greatest liberality and foresight by Mr. Nathaniel Thayer, has provided our institution with a vast store of the most valuable specimens from all the classes of the animal kingdom. Allowed to take with me a corps of six assistants, already trained in the work of the Museum, and our party being also strengthened by the addition of six volunteer assistants, I was able to lay out a scheme for a thorough exploration of large tracts of country in Brazil, parts of which had not yet been visited by zoölogists. It is but justice to those who have accompanied me to state here what has been their share in the work of the expedition.

One of my principal objects during the whole journey was to secure accurate information concerning the geographical distribution of the aquatic animals throughout the regions we visited. Upon this subject we had little precise knowledge,—even the best known among the fishes, reptiles, &c., of the Brazilian waters being entered in our zoölogical records simply as living in Brazil, or more generally still as found in South America. As the distribution of species lies at the very foundation of the question of their origin, I have aimed at ascertaining as far as possible what are the areas and limits of their localization. To this end not a specimen has been brought home by our party without a special label attached to it, or to the packages containing a number of specimens, with the name

of the locality from which it was obtained inscribed upon it, and the name of the collector, as farther security for the accuracy of the statement.

With a view of comparing the inhabitants of the different points in the course of one and the same basin of fresh water, I sent out separate parties to explore the head waters of the Rio Doce, Rio Mucury, Rio Jequitinhonha, Rio das Velhas and Rio San Francisco, in the interior of Brazil, while others were examining their lower course along the Atlantic coast. The companies sent to the head waters of these streams consisted of Messrs. Orestes St. John, J. A. Allen, Thos. Ward and G. Sceva, while Messrs. Hartt and Copeland visited the sea-coast from Rio to Bahia, and made numerous excursions up the different streams which empty their waters along that coast.

At the time these parties started, Messrs. N. Dexter and S. V. R. Thayer were sent to make special collections in the neighborhood of Bahia. Here they were received with the greatest hospitality by Mr. Antonio de Lacerda, to whom, on this and many other occasions I was indebted, for the warmest interest and most efficient co-operation in all the affairs connected with the expedition. They afterwards joined me on my way up the coast, when, in company with Major Continho, I visited various stations along the shore, stopping at Pernambuco, Maceio, Parahyba, Natal, Ceara, Maranhon and Parà. Some of these places we visited twice, and the next year I made prolonged stays at Ceara and Parà on my return from the Amazons.

During the three months we passed in and about Rio, on first arriving, all the members of the expedition were engaged in collecting the natural products of the sea and adjoining country,—making excursions in various directions to obtain as complete a knowledge as possible of the characteristic fauna of the province of Rio de Janeiro,—following the Don Pedro Railroad, and making geological surveys along its route,—collecting fishes in the Rio Parahyba, and visiting the more accessible portions of the adjoining province of Minas Geraes. In these excursions Mr. Anthony was especially busy in collecting the land and fresh water Mollusks; and I was indebted to my friend Dr. Cotting for a collection of fresh water fishes from the vicinity of Petropolis. Messrs. Allen, Dexter and Thayer attended to the collections of mammalia and birds, and Messrs.

James and Ward to that of insects. In the meantime, Mr. Burkhardt was engaged in drawing from life all the fishes which could be obtained.

The party which I have already mentioned as starting together for the interior, Messrs. St. John, Allen, Ward and Sceva, divided their forces after a time. Mr. Sceva remained in the vicinity of Lagoa Santa, to seek for fossil remains in the regions made famous by the researches of Dr. Lund, and afterwards returned to the province of Rio de Janeiro, establishing himself at Canta-Gallo, where he made a large collection of skeletons. Mr. Ward extended his journey across the whole continent to Parà, passing from the middle course of the Rio San Francisco into the basin of the Tocantins, which he descended to the Amazons. Mr. St. John passed from the San Francisco into the basin of the Parahyba, which he followed as far as Theresia, whence he crossed to Caxias, followed the valley of Piauhy to Maranhaon on the coast, and finally joined me at Parà, where we had an opportunity of connecting our geological results, mine in the valley of the Amazons, his in the valley of the Piauhy, on the spot. Mr. Allen left his companions at the San Francisco, and returned across the country to Bahia, taking the collections under his charge. He devoted his attention chiefly to birds, of which he made a large alcoholic collection, besides preparing many skins. During this time Messrs. Hartt and Copeland undertook an entirely different exploration in the eastern portions of the provinces of Rio de Janeiro, Spiritu Santo, and the southern part of the province of Bahia. Their collections were very satisfactory, and Mr. Hartt's geological report was exceedingly novel and interesting. While these parties were engaged as above stated, I started for the Amazons with the other members of the expedition, viz., Messrs. W. James, N. Dexter, W. Hunnewell, S. V. R. Thayer, and J. Burkhardt. To these were added Major Coutinho, a young Brazilian officer belonging to the government corps of engineers, and detailed by the Emperor to accompany us. His assistance was invaluable to us throughout the journey, and he became my intimate associate in all my scientific undertakings in Brazil. We were also joined by Mr. Bourget, a French naturalist established in Rio, whose services I engaged as preparator during my residence in the region of the Amazons; and

at Parà, Senhor Pimenta Bueno directed one of the officers of the Amazonian Steamship Company, Mr. Talisman, to accompany us. Once in the waters of the great river, I divided my forces, in order to survey simultaneously various parts of this vast fresh water system, wishing to ascertain how far the distribution of its inhabitants was local, or whether the same species might be found at the same moment in different parts of the main stream and its tributaries. This precaution led to results which amazed me, though I was in part prepared for it by my knowledge of other aquatic faunæ. Not only did I find the number of species in these waters exceeding by thousands all former estimates, but I found their localization so precise and definite, that new combinations occurred at given intervals along the main stream, while every forest lake, and all the lesser water-courses, had their special faunæ. I neglected no opportunity of verifying the accuracy of my results, visiting the same regions at different seasons of the year, repeating my collections, that I might have the fullest means of comparison, and, as I have said, stationing my parties at considerable distances, in order that, by making simultaneous collections, we should ascertain what was the range of the species. All my young friends—and those I had with me on the Amazons were chiefly volunteer assistants—gave me most hearty and efficient co-operation. Besides rendering much important aid in the general work, and making special collecting excursions on the Rio Tapajos and the Rio Negro, Mr. Dexter prepared a very valuable collection of birds. In his voyage up the River Tapajos he was accompanied by Messrs. James and Talisman; on that of the Rio Negro, by Mr. Talisman alone. Mr. James, in company with Mr. Talisman, ascended the River Iça and the River Jutahy, and brought down very valuable additions to our fishes, while Mr. Bourget at the same time was employed in making collections in the River Javary and the Solimoens about Tabatinga. Besides these special excursions, all my assistants, including Mr. Thayer and Mr. Hunnewell, had their separate stations at different times, and made very important local collections. Messrs. James and Hunnewell at Obydos, Messrs. Thayer and Bourget at Cudajas, Mr. James at Manacapuru, Mr. Bourget at Santarem. To Mr. Hunnewell, beside his general assistance as a member of the working corps, I am

indebted for a series of photographic portraits of Indians, and of the various cross-breeds arising between Indians, whites and blacks, taken by him at Manaos. Mr. Thayer was also very successful in collecting at Serpa and at Lago Alexo. Although zoölogical research and the forming of collections for the Museum were the chief objects of my journey, I also made as complete a geological survey of the Valley of the Amazons as was possible under the circumstances. As my results in this direction do not, however, especially affect the interests of the Museum, I need enter into no details concerning them here. I should, however, add, that I made the largest collection ever brought together of palm woods and fruits, bringing away many complete stems of palm trees, or, where this was not possible, fragments large enough to show their structure, and preserving the fruits in alcohol. This is especially valuable in a Comparative Museum like ours, inasmuch as we seek to combine the past history of the organic world with its present condition, and there is no family of plants now existing so illustrative of the ancient forests as the palms.

In conclusion I would state, that this Brazilian Expedition, fitted out and sustained by individual generosity, was treated as a national undertaking, and welcomed by a national hospitality. From the moment of our landing in Rio de Janeiro, the government offered me every facility for my undertaking. Nor was this an empty civility. We found ourselves guests in every public conveyance, and our large collections were constantly transported free of freight. On our arrival at Parà, the Amazonian Steamship Company, through their agent, Mr. Pimenta Bueno, to whom my companions and myself were constantly indebted for the warmest hospitality and the most efficient aid, placed a fine steamer, furnished with everything needed by the whole party, at my disposition for one month. Returning somewhat later from the Solimoens or Upper Amazons, I found a steamer of war awaiting me at the mouth of the Rio Negro, which had been sent up by order of the Emperor for my use during the remainder of my stay in the waters of the Amazons. Nothing could exceed the courtesy of the commander and officers, or the hospitality with which we were treated during the many weeks we passed on board the

“Ibiculy.” Nor was this all; canoes and men were provided for me whenever I required them, and wherever I arrived, I found that directions had been given to the local authorities to furnish me with whatever I required for my scientific objects. This generosity was the more striking, since it was offered at a time when, on account of the war, the government required all its resources. With such facilities, it is not strange that we should have made larger collections than have ever been got together in the same time before. I cannot close without expressing my gratitude for the liberality of our own countrymen towards the Expedition. From the moment when the Pacific Mail Steam-ship Company offered us, through the courtesy of their President, Mr. Allen McLane, the hospitality of their magnificent ship, the Colorado, to the moment when, at the invitation of Mr. Garrison, we returned as guests on board the vessels of the Brazilian North American Steamship Company, we received the most cordial and ready aid from American merchants at the different ports, in forwarding our large collections. Especially am I indebted to Mr. James Bond, our consul at Parà, and agent for the house of James Bishop & Company, to Messrs. Hitch and Rollins, of the house of Henry Foster & Company at Pernambuco, and also to Messrs. Wells, Fargo & Company, in New York.

With all these accumulated treasures safely under our roof, my first duty is to make every possible exertion for their preservation, till we shall have the means to work them up, to classify them systematically, and to render them equally accessible for special scientific investigation, and for the gratification and improvement of the casual visitors who daily come to the Museum. Such a final arrangement must necessarily be the work of time, and demands large expenditure, for which there is as yet no provision. To give room merely for the exhibition of the collections now stored in our working rooms, attics and cellars, (or for such partial exposition of them as would fairly illustrate their scientific value and significance,) we should be obliged to complete the northern wing of the Museum, of which the present building represents only two-fifths. This can hardly be done under one hundred thousand dollars, and it is, after all, but a small part of the work. The identification of specimens, their division and proper distribution, in short the

scientific research needed to make this institution what I have hoped to make it, a centre of original investigation and intellectual progress, would occupy twice as many assistants as are now engaged in, the Museum during five or six years. The salaries of such assistants, even if paid but very moderately, together with the necessary outlay in glass jars, alcohol and other material means essential to such work, would no doubt involve the expenditure of another hundred thousand dollars. The present resources of the Museum are barely sufficient to carry on its regular, active operations in the most meagre way. They do not suffice at all for the exigencies arising from its growth and increase. This statement may seem to make large and unreasonable demands upon the future; yet I trust the time is coming when, after the calls upon the nation for the final consolidation of her restored unity are answered, the thoughtful and far-sighted may still find the means to do for the arts of peace, and for the culture of the people, something commensurate with the increase of our material prosperity, wealth and power. Especially do I hope this for Massachusetts, whose intellectual strength is and has always been her proudest possession. By this, rather than as a great commercial centre, or as a rich agricultural State, does she hold her distinguished place in the republic, and therefore I believe it will be her wisest, as well as her noblest policy, to foster her institutions of learning. I speak not especially for that in which I am personally interested, but for all. If I am ambitious for our Museum at Cambridge, it is only that it should aim at a high order of intellectual work, and in so far do its share in raising the standard of a liberal culture. If some are inclined to criticize the costliness of such establishments, I can only answer, that it is with museums as with all living things; what has vitality must grow. When museums cease to grow, and consequently to demand ever-increasing means, their usefulness is on the decline.

Report on the Vertebrates, by ALEX. AGASSIZ.

Nothing of special importance has been done for the Vertebrates, besides the general preservation of the collection, except to finish the cataloguing of the collection of Sharks and Skates,

begun by Prof. Agassiz, before his departure for Brazil. A few exchanges were made of some of our more common Mammals, Birds, Reptiles and Fishes; but the care of the Brazilian collection of Fishes, demanded so much time that little else could be done, besides attending to it. A considerable number of skeletons of Birds and Mammals have been received through our exchanges, and as soon as assistants can be obtained, we shall have as duplicates, numerous species of Birds, Mammals and Reptiles to dispose of as Skeletons for our exchanges from the Brazilian collections.

The following donations were received:—

MAMMALS.

GULICK, REV. J. T. 2 Bats, Japan.

Thayer Expedition.

Rio de Janeiro, to wit, 60 specimens, 29 species. Dexter, Allen and James.

Para, 3 specimens, 3 species. Agassiz and Bourget.

Porto de Moz, 2 specimens. Agassiz and Bourget.

Tajapuru, 2 specimens. Agassiz and Bourget.

Gurupa, 4 specimens, 2 species. Agassiz and Bourget.

José Assu, 2 specimens. Agassiz and Bourget.

Ueranduba, 2 specimens. Major Coutinho.

Jutahy, 2 specimens. James and Talisman.

Manacapuru, 1 specimen. James.

Tabatinga, 1 specimen. Bourget.

Cudajas, 3 specimens, 2 species. S. V. R. Thayer and Bourget.

Teffé, 3 Mantecs. L. Agassiz.

Teffé, 1 Dolphin. L. Agassiz.

Teffé, 7 specimens, 5 species. L. Agassiz.

Bahia, 10 specimens, 5 species. A. de Lacerda.

Rio Negro, 12 specimens, 1 species. N. Dexter.

Maues, 6 specimens, 4 species. L. Agassiz.

Amazons, 8 specimens, 6 species. Expedition.

Lagoa Santa, 14 specimens, 14 species. G. Sceva.

Rio des Velhas and Rio San Francisco, 3 specimens. J. A. Allen and St. John.

Silva and Lake Saraca, 3 specimens, 3 species. S. V. R. Thayer.

Rio Puty, 1 specimen. St. John.

Cameta, 5 specimens, 5 species. Major Coutinho.

Obydos, 4 specimens, 4 species. James and Hunnewell.

Santarem, 1 specimen. Bourget.

Exchange.—Three Received.

- KAUP, Dr. 4 specimens, 4 species.
 THEOBALD, W., Jr. 12 specimens, 10 species.
 Total received, 182 specimens, and about 75 species.

Sent in Exchange.

- KAUP, Dr. 13 species.
 HAAST, Dr. 15 species.
 SALMIN, C. L. 1 species.

BIRDS.

- DAVIE, W. P. 1 Apteryx, New Zealand.
 EAMES, JAMES M. 1 Sand-Hill Crane.
 SLOCUM, W. H. 1 Sand-Hill Crane.

Thayer Expedition.

- Masseio, 4 specimens, 3 species. Hartt and Copeland.
 Rio and vicinity, 300 specimens, 127 species. Members of the Expedition.
 Lagoa Santa, 9 specimens, 8 species. G. Sceva.
 Amazons Valley, 216 specimens, 88 species. N. Dexter.
 Maues, 4 specimens, 2 species. L. Agassiz.
 Rio Negro, 3 specimens, 3 species. N. Dexter.
 Bahia, 75 specimens, 20 species. A. de Lacerda.
 Teffé, 22 specimens, 22 species. L. Agassiz.
 Lago Alexo, 3 specimens, 3 species. S. V. R. Thayer.
 Manaus, 105 specimens, 30 species. L. Agassiz.
 Cudajas, 10 specimens, 10 species. S. V. R. Thayer and Bourget.
 Manacapuru, 3 specimens, 3 species. W. James.
 Ueranduba, 1 specimen, 1 species. Major Coutinho.
 Tapajos, 50 specimens, 20 species. Dexter and James.
 Lago de Maximo, 17 specimens, 10 species. L. Agassiz.
 Montalegre, 1 specimen, 1 species. L. Agassiz.
 Lake José Assu, 4 specimens, 4 species. L. Agassiz.
 Rio das Velhas and San Francisco, 21 specimens, 18 species and 40 eggs. Allen and St. John.
 Tajapuru, 4 specimens, 4 species. L. Agassiz.
 Porto de Moz, 7 specimens, 2 species. L. Agassiz.
 Pará, 7 specimens, 7 species. L. Agassiz and D. Bourget.
 Campos, 45 specimens, 20 species. Hartt and Copeland.
 Juiz de Fora, 75 specimens, 45 species. Agassiz and Whitaker.
 Sao Paulo, 93 specimens, 32 species. Hartt and Copeland.
 Sao Fidelio, 25 specimens, 10 species. Hartt and Copeland.

St. Thomas, W. I., 20 specimens, 15 species. 201 specimens eggs.
J. A. Allen.

Brazil, 24 specimens, 10 species. Dr. Milcher.

Santarem, 3 specimens, 3 species. Agassiz and Bourget.

Obydos, 10 specimens, 10 species. James and Hunnewell.

Jatuarana, 6 specimens, 4 species. M. Naves.

Rio Puty, 20 specimens, 10 species. St. John.

San Goncallo, 100 specimens, 25 species. St. John.

Cameta, 100 specimens, 40 species. St. John.

Silva and Lake Saraca, 2 specimens, 2 species. S. V. R. Thayer.

Total by donations, 1,462 specimens, about 350 species.

Exchanges Received.

HAAST, D. J. 70 species, New Zealand.

KAUP, Dr. 23 specimens, 20 species, East Indies, principally.

DAVIS, W. M. 27 specimens, 14 species, N. Jersey.

Total for exchange, 120 specimens, 104 species.

Total received, 1,582 specimens, about 450 species, Birds.

Sent in Exchange.

HAAST, Dr. 4 specimens, 3 species.

KAUP, D. 5 specimens, 4 species.

Total, 9 specimens, 7 species.

REPTILES.

With the exception of a single Snake presented by the Rev. J. T. Gulich, from Japan, the donations were confined to the Thayer Expedition. Specimens from this expedition were received from the following localities:—

Iça; W. James and Talisman. 3 specimens, 2 species.

Jutahy; W. James and Talisman. 2 specimens, 1 species.

Ueranduba; Major Coutinho. 4 specimens, 2 species.

Manaos; L. Agassiz and Bourget. 27 specimens, 16 species.

Lago de Maximo; L. Agassiz. 6 specimens.

Montalegre; L. Agassiz. 6 specimens.

Tapajos; Dexter and James. 12 specimens.

Villa Bella; L. Agassiz. 1 specimen.

Cudajas; Thayer and Bourget. 101 specimens, 7 species.

Santarem; D. Bourget. 134 specimens, 36 species.

Serpa; L. Agassiz. 2 specimens, 2 species.

José Assu; L. Agassiz. 20 specimens, 9 species.

Ceará; L. Agassiz. 2 specimens.

- Porto de Moz; L. Agassiz. 2 specimens.
 Maues; L. Agassiz. 33 specimens, 4 species.
 Rio Negro; N. Dexter. 250 specimens, 2 species.
 Amazons; Unknown donor. 2 specimens.
 Bahia; A. de Lacerda. 39 specimens, 23 species.
 Teffé; L. Agassiz. 64 specimens, 27 species.
 Fonteboa; L. Agassiz. 2 specimens.
 Tonantins; L. Agassiz. 6 specimens, 2 species.
 Sao Paolo; L. Agassiz. 6 specimens, 3 species.
 Tabatinga; D. Bourget. 9 specimens, 5 species.
 Rio Parahyba; Agassiz and Whitaker. 20 specimens, 10 species.
 Manacapuru; W. James. 13 specimens, 3 species.
 Coary; S. V. R. Thayer and Bourget. 2 specimens.
 Pará; Agassiz and Bourget. 30 specimens, 20 species.
 Rio das Velhas; Allen and St. John. 117 specimens, 16 species.
 Mendez; Hartt and Copeland. 230 specimens, 17 species.
 Juiz de Fora; Agassiz and Whitaker. 24 specimens, 6 species.
 Campos; Hartt and Copeland. 30 specimens, 2 species.
 Muriahé; Hartt and Copeland. 1 specimen.
 Sao Fidelio; Hartt and Copeland. 14 specimens, 2 species.
 Rio de Janeiro; Expedition. 130 specimens, 43 species.
 Silva and Lake Saraca; S. V. R. Thayer. 15 specimens, 5 species.
 Rio Preto; St. John. 30 specimens, 10 species.
 San Goncallo; St. John. 75 specimens, 20 species.
 Rio Puty; St. John. 10 specimens, 5 species.
 Obydos; James and Hunnewell. 7 specimens, 7 species.
 Jatuarana; M. Naves. 13 specimens, 5 species.
 Obydos; Col. Bentos. 28 specimens, 14 species.

Received in Exchange.

- ECKER, Prof. AL. 50 specimens, 12 species, So. Europe.
 MÜLLER, Dr. FERD. 25 specimens, 17 species, Australia.
 THEOBALD, W., Jr. 20 specimens, 12 species, Calcutta.

Sent in Exchange.

- ECKER, Prof. AL. 50 specimens, 4 species.
 HAMBURG ZOÖLOGICAL GARDENS. 57 specimens, 8 species.

FISHES.

Donations.

His Majesty the Emperor DOM PEDRO II. A collection of about 100 species and 1,300 specimens, from his fazenda of Santa Cruz.

BRADBURY, Capt. and F. BILLINGS. 1 specimen *Orthagoriscus*, San Francisco.

GULICK, Rev. J. T. 5 specimens, 3 species, Kanagawa.

MÜLLER, Dr. FERD. 22 specimens, 11 species, Melbourne.

Thayer Expedition.

Rio Quendu; Bourget. 20 specimens, 5 species.

Rio Janeiro; L. Agassiz. 5,547 specimens, 317 species.

Maues; L. Agassiz. 354 specimens, 100 species.

Bahia; A. de Lacerda, Dexter and James. 800 specimens, 85 species.

Teffé; L. Agassiz. 3,670 specimens, 200 species.

Fonteboa; L. Agassiz. 250 specimens, 17 species.

Javary; Bourget. 1,500 specimens, 61 species.

San Paolo; W. James. 70 specimens, 20 species.

Tonantins; L. Agassiz. 500 specimens, 120 species.

Lago Alexo; S. V. R. Thayer. 570 specimens, 140 species.

Rio Negro; N. Dexter. 100 specimens, 20 species.

Cudajas; S. V. R. Thayer and Bourget. 1,152 specimens, 60 species.

Tabatinga; Bourget. 1,500 specimens, 70 species.

Rio Parahyba do Sul; Agassiz and Whitaker. 550 specimens, 75 species.

Manacapuru; W. James. 1,263 specimens, 78 species.

Iça; W. James and Talisman. 2,000 specimens, 60 species.

Coary; S. V. R. Thayer and Bourget. 1,800 specimens, 54 species.

Curupira; Major Coutinho. 200 specimens, 24 species.

José Fernandez; Major Coutinho. 170 specimens, 20 species.

Jutahy; James and Talisman. 750 specimens, 175 species.

Lake Hyanuary; L. Agassiz, Major Coutinho, Senhor Honorio and M. Naves. 5,600 specimens, nearly 300 species.

Ueranduba; Maj. Coutinho. 350 specimens, 30 species.

Manaos; L. Agassiz and Bourget. 250 specimens, 40 species.

Lago Maximo; L. Agassiz. 1,500 specimens, 120 species.

Montalegre; L. Agassiz. 300 specimens, 22 species.

Obydos; James, Hunnewell and Agassiz. 1,050 specimens, 100 species.

Tapajos; Dexter and James. 150 specimens, 20 species.

Santarem; Bourget. 300 specimens, 40 species.

Villa Bella; L. Agassiz. 1,000 specimens, 80 species.

Serpa; L. Agassiz and S. V. R. Thayer. 3,200 specimens, 220 species.

José Assu; L. Agassiz. 550 specimens, 55 species.

Tajapurú; L. Agassiz. 550 specimens, 100 species.

- Gurapa; L. Agassiz. 450 specimens, 65 species.
 Porto de Moz; L. Agassiz and Sr. Vinhas. 600 specimens, 100 species.
 Pará; Agassiz, Bourget, Thayer, Dexter and Dr. Couto de Magalhaes. 2,000 specimens, 150 species.
 Maranhao; Agassiz and Bourget. 300 specimens, 30 species.
 Ceará; Agassiz and Bourget. 30 specimens, 5 species.
 Pernambuco; Agassiz and Bourget. 800 specimens, 40 species.
 Cachueira; Allen and St. John. 100 specimens, 20 species.
 Rio San Francisco; Allen and St. John. 80 specimens, 10 species.
 Rio das Velhas; Allen and St. John. 400 specimens, 30 species.
 Campos; Hartt and Copeland. 250 specimens, 28 species.
 Itabapua; Hartt and Copeland. 200 specimens, 40 species.
 Rio Parahyba; Hartt and Copeland. 200 specimens, 20 species.
 Rio Grande do Sul; Albuquerque. 350 specimens, 35 species.
 Sambaia; Bourget. 450 specimens, 45 species.
 Santarem; Bourget. 1,500 specimens, 150 species.
 Obydos; Col. Bentos. 3,000 specimens, 200 species.
 Jatuarana; M. Naves. 500 specimens, 70 species.
 Xingu Cascade; M. Vinhas. 500 specimens, 100 species.
 Rio Trombetas; James and Hunnewell. 300 specimens, 70 species.
 Rio Branco; Dexter and Talisman. 70 specimens, 15 species.
 Rio Negro; Dexter and Talisman. 75 specimens, 25 species.
 Rio Puty; St. John. 700 specimens, 60 species.
 San Goncallo; St. John. 150 specimens, 20 species.
 Rio Preto; St. John. 300 specimens, 50 species.
 Cameta; St. John. 195 specimens, 14 species.
 Silva and Lake Saraca; S. V. R. Thayer. 500 specimens, 120 species.
 Arary. 30 specimens, 20 species.

Exchanges Received.

- MÜLLER, DR. FERD. 22 specimens, 11 species, Melbourne.
 THEOBALD, W. JR. 350 specimens, 42 species, Arakan Hills, East Indies.
 Vienna Museum, Dr. Redtenbacher. 76 specimens, 34 species, Spain, Danube, Canary Islands.
 Making total received of over 50,000 specimens and about 2,200 species.

Sent in Exchange.

- Lisbonne Museum, Dr. Barbosa. 26 specimens, 9 species.
 Chicago Museum. 25 specimens, 8 species.

- Dumeril, Prof. 4 specimens, 2 species.
Gegenbaur, Prof. 1 specimen, 1 species.
Haeckel, Prof. 62 specimens, 18 species.
Naples Museum, Prof. Panceri. 22 specimens, 9 species.
Salmin, C. L. 14 specimens, 3 species.
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Report on the Articulata, by P. R. UHLER.

INSECTS.

During the past year the collections of insects have been duly cared for and every opportunity has been embraced to add new and desirable species, so that we can speak with confidence of the ever-increasing value of these collections as time advances.

It has been a special object with me to increase the duplicate series, so that perfect specimens and full series of the insects of this country could be employed in our exchanges. I have accordingly succeeded in bringing together, by my own collecting and through the kindness of friends, large numbers of fine specimens, which have been pinned, expanded and made ready for use.

In developing our already extensive collections, it became necessary to establish a full, general, systematic collection of types, to be ready for reference in determining the species to be sent abroad. With this view, I have determined and verified the identifications of a large number of North American Coleoptera, the names of which can now be depended upon for accuracy. We are also indebted to the kindness of Dr. John L. LeConte for the identification of many small and difficult species. Many foreign species of Lepidoptera, belonging to our collections, have also been identified through the favor of Mr. Tryon Reakirt, of Philadelphia. In the meantime, many domestic and foreign insects of the other sub-orders have been determined, and for this purpose I spent a few weeks in comparing our specimens with the collections of named species in Philadelphia.

The additions to the collections of insects since the last report have been mainly derived from the expedition to Brazil, so liberally provided for by Mr. Thayer. The number of species is less than was recorded during the preceding year, but the

number of specimens is greater. The whole number of specimens added since the last report is 22,601, embracing 5,040 species. Of this number, 16,159 specimens were presented, 2,896 received in exchange, and 3,546 procured with the Gray Fund.

Donations of Insects.

AGASSIZ, A. 3 species, 3 specimens, from Beverly, Mass.; 1 species, 4 specimens, from Brookline, Mass.; 28 species, 47 specimens, from Cambridge, Mass.; 19 species, 96 specimens, from Houghton, Mich., and Pottsville, Pa.

ATKINSON, F. 3 species, 6 specimens, from Cambridge, Mass.

AUSTIN, H. 15 species, 30 specimens, from Batavia, Java.

CHAMBERLAINE, Mrs. A. P. 30 species, 128 specimens, from China.

DAVIS, H. 5 species, 148 specimens, from McGregor, Iowa.

DAVIS, W. M. 1 species, 20 specimens, from Phillipsburg, N. J.

EDWARDS, W. H. 83 species, 243 specimens, from Manilla.

HIGGINSON, H. L. 15 species, 30 specimens, from Olive, Ohio.

JILSON, S. 41 species, 90 specimens, from Feltonville, Mass.

LECONTE, Dr. J. L. 92 species, 205 specimens, from the U. S.

LEWIS, Dr. S. 204 species, 1,946 specimens, from Ohio.

LYMAN, Col. T. 8 species, 23 specimens, from Brookline, Mass.

MANN, B. P. 2 species, 28 specimens, from Labrador.

MERRILL, J. 6 species, 10 specimens, from Mount Desert, Me.

MORRIS, Rev. J. G. 1 species, 1 specimen, from Baltimore, Md.

MÜLLER, Dr. F. 1 species, 100 specimens, from St. Catherine, Brazil; 3 species, 3 specimens, from Australia.

SHUTE, J. G. 1 species, 24 specimens, from Woburn, Mass.

Thayer Expedition.

Members of the Expedition generally. 4 species, 58 specimens, from Manaos; 2 species, 3 specimens, from Rio dos Macacos; 17 species, 32 specimens, from Lago Alexo.

AGASSIZ, Prof. L. 10 species, 74 specimens, from Rio de Janeiro; 54 species, 98 specimens, from Pernambuco; 4 species, 41 specimens, from Hyanuary; 6 species, 19 specimens, from Villa Bella; 2 species, 10 specimens, from Porto do Moz; 6 species, 8 specimens, from Petropolis; 1 species, 45 specimens, from Juis de Fora; 1 species, 1 specimen, from Montalegre.

AGASSIZ, Prof. L., and others. 31 species, 285 specimens, from Manaos; 40 species, 180 specimens, from Teffé; 2 species, 2 specimens, from Parahyba do Norte; 256 species, 448 specimens, from Para; 16 species, 38 specimens, from Pernambuco; 17 species, 97 specimens, from Santarem.

ALLEN and ST. JOHN. 3 species, 260 specimens, from the Rio San Francisco.

BOURGET, D. 25 species, 63 specimens, from Tabatinga; 11 species, 117 specimens, from Javary; 3 species, 4 specimens, from Santarem.

BOURGET, D., and others. 282 species, 1,899 specimens, from Teffé.

CASTRO, Dr. 8 species, 9 specimens, from Para.

DEXTER and JAMES. 14 species, 355 specimens, from Tapajos River.

EMPEROR OF BRAZIL, through D. Bourget. 4 species, 105 specimens, from Santa Cruz.

HARTT, C. F. 9 species, 294 specimens, from Santa Anna Station, Don Pedro Railroad.

HARTT and COPELAND. 8 species, 81 specimens, from Victoria; 1 species, 5 specimens, from Guarapary; 1 species, 1 specimen, from Corcovado; 155 species, 911 specimens, from Rio de Janeiro; 1 species, 30 specimens, from San Domingo; 1 species, 6 specimens, from Muriáhe; 10 species, 136 specimens, from Campos; 8 species, 271 specimens, from San Fidelio; 1 species, 105 specimens, from Mendez; 22 species, 174 specimens, from Philadelphia, Bahia; 1 species, 6 specimens, from Guarapary; 1 species, 1 specimen, from Rio Doce; 1 species, 10 specimens, from Carre Secca; 2 species, 3 specimens, from São Mathéos; 2 species, 12 specimens, from Porto Seguro.

HARTT, COPELAND and ALLEN. 68 species, 322 specimens, from Mendez.

JAMES, W. 24 species, 444 specimens, from Tajapurú.

JAMES and HUNNEWELL. 9 species, 9 specimens, from Manacapurú; 23 species, 560 specimens, from Obidos.

JAMES and TALISMAN. 11 species, 12 specimens, from Içá River; 1 specimen, 1 species, from Jutahy.

LACERDA, A., and others. 2 species, 7 specimens, from Bahia.

SCEVA, G. 48 species, 115 specimens, from Lagoa Santa.

ST. JOHN, O. H. 14 species, 224 specimens, from Barra do Piahy; 2 species, 113 specimens, from San Gonçallo; 1 species, 1 specimen, from Jatuarana; 7 species, 10 specimens, from Puty, Piahy.

ST. JOHN, WARD and DEXTER. 21 species, 100 specimens, from Rodeio.

TEUSCHER, Dr. 890 species, 3,023 specimens, from Canta Gallo.

THAYER, S. V. R., and BOURGET. 7 species, 507 specimens, from Cudajas.

THEOBALD, W., Jr. 1 species, 2 specimens, from Calcutta.

UHLER, P. R. 39 species, 180 specimens, from Fresh Pond; 36 species, 108 specimens, from Readville, Mass.; 22 species, 69 specimens, from Milton, Mass.; 17 species, 22 specimens, from Fredericksburg,

Va.; 32 species, 68 specimens, from Andover, Mass.; 12 species, 34 specimens, from Chelsea Beach.

WRIGHT, C. 141 species, 746 specimens, from Cuba.

By Exchange.

Through this source we have added 2,896 specimens of 1,003 species, from various parts of the world, obtained through fifteen different individuals and institutions.

The Gray Fund.

Has procured 3,546 specimens of 1,004 species, through six individuals.

CRUSTACEA.

During the past year the additions from all sources have amounted to 4,974 specimens of 257 species. The greater part of these were procured by the Thayer Expedition. From this source alone 4,518 specimens were derived. The exchanges have added 270 specimens of 46 species.

Presented.

FORBES, R. B. 1 species, 3 specimens, Loc?

MACK, Dr. D., Jr. 6 species, 14 specimens, from Washington Territory; 1 species, 1 specimen, from Coronal, Chili.

Thayer Expedition.

1 species, 40 specimens, from the Atlantic Ocean; 1 species, 26 specimens, from Tonantins; 1 species, 1 specimen, from Lago Alexo; 1 species, 1 specimen, from Lago Maximo; 3 species, 5 specimen, from Rio dos Macacos; 4 species, 106 specimens, from Pernambuco; 8 species, 116 specimens, from Maranhao.

AGASSIZ, Prof. L., and others. 5 species, 12 species, from Rio de Janeiro; 2 species, 25 specimens, from Masseio; 1 species, 1 specimen, from Manaos; 3 species, 66 specimens, from Villa Bella; 5 species, 11 specimens, from Parahyba do Norte; 1 species, 3 specimens, from Gurupa; 1 species, 1 specimen, from Montalegre; 3 species, 513 specimens, from Para.

BOURGET, D., and others. 3 species, 3 specimens, from Cudajas; 5 species, 28 specimens, from Tabatinga; 1 species, 7 specimens, from Manacapuru; 4 species, 57 specimens, from Tefé; 3 species, 4 specimens, from Coary; 1 species, 1 specimen, from Javary; 2 species, 43 specimens, from Santarem; 9 species, 24 specimens, from Santa Cruz.

HARTT and COPELAND. 1 species, 1 specimen, from San Paulo; 28 species, 321 specimens, from Rio de Janeiro; 6 species, 27 specimens, from Para; 1 species, 44 specimens, from the Atlantic Ocean; 5 species, 164 specimens, from Bahia; 1 species, 1 specimen, from San Fidelio; 10 species, 94 specimens, from Victoria; 9 species, 256 specimens, from Itabapuana; 9 species, 123 specimens, from Porto Seguro; 1 species, 1 specimen, from Guarapary; 1 species, 1 specimen, from Campos; 6 species, 36 specimens, from Ilha do Santa Anna; 4 species, 7 specimens, from Rio Doce; 1 species, 16 specimens, from Barra Secca.

JAMES and HUNNEWELL. 4 species, 18 specimens, from Obidos; 1 species, 3 specimens, from Cameta; 2 species, 88 specimens, from Tajapuru.

ST. JOHN and ALLEN. 2 species, 1,094 specimens, from Hyanuary; 1 species, 7 specimens, from Ceara; 2 species, 13 specimens, from Rio Puty.

THAYER, S. V. R. 1 species, 217 specimens, from Silva, Lago Saraca.

THEOBALD, W., Jr. 6 species, 25 specimens, from Calcutta.

ANNULATA.

The whole number of Worms added since the last report embraces 408 specimens of 88 species. Of this number, 259 specimens were presented, 94 purchased and 55 specimens obtained in exchange.

The Sipunculoids, formerly catalogued by Mr. A. Agassiz, were sent by him for identification to Professor Keferstein, of Göttingen, who was studying that group of worms. They are now on their way back to the Museum, having been labelled and identified by comparison with the extensive collections of Sipunculoids sent to Göttingen by all the larger museums.

Presented.

AGASSIZ, A. 8 species, 8 specimens, from Nahant.

ANGAS, G. F. 1 species, 2 specimens, from New South Wales.

HARTT, C. F. 1 species, 1 specimen, from Bay of Fundy; 3 species, 5 specimens, from Halifax.

Thayer Expedition.

8 species, 182 specimens, from Rio de Janeiro; 1 species, 3 specimens, from Javary; 1 species, 1 specimen, from Cudajas; 1 species, 2 specimens, from Mendez; 1 species, 1 specimen, from Bahia; 1 species, 1 specimen, from Madeira River; 1 species, 1 specimen, from Para;

1 species, 1 specimen, from the Gulf Stream ; 1 species, 2 specimens, from Tajapuru.

HARTT and COPELAND. 1 species, 1 specimen, from Victoria ; 8 species, 20 specimens, from Ilha do Santa Anna.

ST. JOHN and ALLEN. 1 species, 3 specimens, from the Rio San Francisco.

By Exchange.

In Insects we have continued the former exchanges, and a larger number of individuals and institutions have entered into correspondence with us than in former years. From fifteen different institutions and individuals we have added to our collections, in this manner, nearly 3,000 specimens and over one thousand species. Returns have been sent to ten different institutions and individuals, the number of specimens sent away amounting to about 900 specimens, representing four hundred species.

There have been purchased from the GRAY FUND over one thousand species, numbering more than 3,500 specimens.

For the Crustacea and Annulata the exchanges and the Gray Fund have added only a very limited number of specimens, viz.: 270 specimens of Crustacea, of 46 species, and 160 specimens of Annulata, of 33 species.

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

The Assistant Curator of Conchology, in rendering his Annual Statement of the condition of his department, would call attention to the unusual activity which has prevailed therein since the date of his last report. This has been owing to a variety of causes, prominent among which may be mentioned the reception of large and numerous contributions from our Brazilian expedition, which, coming as they did, mostly in alcohol, required more than usual care and attention to place them in a safe condition. They have added, however, 374 species and 22,836 specimens to our collection which are of the most desirable character, not only for our own collection, but also for our foreign correspondents.

During the current year our exchanges have yielded us 1,659 species and 51,208 specimens, which is an increase over the number derived last year from the same source, the number of specimens being nearly fourfold the present year. Upon

this source of increase we are confident we must mainly rely in future years, and our large stock of desirable duplicates, numbering nearly 200,000 specimens, will supply the means for extensive exchanges for a long period.

Our receipts by donation have been smaller than usual, and were derived from five persons only, as follows:—

JONATHAN RUSSELL, 280 species, 1,396 specimens;

Lieut. DAVID MACK, 52 species, 1,015 specimens;

H. HIGGINSON, 4 species, 472 specimens;

Dr. MÖLCHER, 4 species, 8 specimens;

HUGH CUMING, 32 species, 110 specimens;

in all 372 species and 3,001 specimens only. Many of these were, however, of rare beauty and value, and our thanks are due to all for their generous kindness.

Mr. Russell's donation may be mentioned as not only large, but the specimens were also of uncommon beauty and very perfect. The death of Mr. Cuming, whose collection stands unrivalled for its extent and perfection, prevented a larger contribution to our Museum. The few species laid aside for us were kindly forwarded by his executors, and proved a highly valuable accession.

By the Gray Fund we have only added 39 species, 903 specimens, which were received from Japan.

Our aggregate receipts during the past year through the ordinary channels of exchange with twenty-four individuals and institutions will, therefore, appear to be 2,444 species and 77,948 specimens; but in addition thereto we can now state that since our last report, Mr. Anthony's collection, then in process of preparation for being delivered to the Museum, has been completed, and the number of species ascertained to be 5,153, while the specimens number 101,309, a more minute account of which may be found in the book prepared for the purpose, in which every species is registered and the number of specimens of each stated.

Our consignments have been more numerous than usual during the past year, forty-nine packages having been sent away to thirty-three individuals and institutions, containing 4,787 species and 12,905 specimens, being nearly treble our last year's work in this line.

Since our last report much other work has been done in this department, principally in the direction of identifying and arranging the marine portion of our conchological collection, which has hitherto remained in much confusion. As fast as identified they have been removed to the room devoted mainly to conchology and placed in the cases for exhibition, and are fully ready for being mounted on tablets, and are in proper order for being duly catalogued, two very desirable objects which we hope to see accomplished before our next report. During this work we have found a great hindrance in the want of the necessary books in our library to enable us to identify with precision the objects intrusted to our care, and on this account many of the univalves and most of the bivalves remain undetermined.

Most of our duplicate shells have been assorted and arranged so as to be readily accessible for our exchanges, and are so numerous and well adapted to foreign exchanges that we may rely upon this source of supply with perfect confidence for many years in the increase of our general collection.

The preparation of so many exchanges, and the correspondence necessarily involved in such labors, has also occupied much of our time and attention, and, as a general result, we may state that the collection is in a much more satisfactory condition than at any previous period.

Report on the Radiates, by ALEX. AGASSIZ.

The additions to the Radiates have been much more important than during the past year, and several of the invoices quite valuable. I would mention particularly the Corals from St. Thomas, and the Echinoderms from Guadaloupe and from Brazil, which we owe to Dr. Duhassaing, Dr. Fritz Müller, Dr. Schramm, and the Thayer Expedition.

Eight collections of Radiates were sent off during the past year, containing over 675 specimens, and representing about 350 species.

Donations were received from the following sources:—

ECHINODERMS.

- ANGAS, J. T. 27 specimens, 8 species. S. E. Australia.
 MACK, Dr. D. J. 3 specimens, 3 species. Nieah Bay, W. I.

Thayer Expedition.

- Rio Janeiro. L. Agassiz and Dr. Nägeli. 700 specimens, 14 species.
 Maranhao. L. Agassiz. 100 specimens, 3 species.
 Armacao. Hartt and Copeland. 20 specimens, 3 species.
 Victoria. Hartt and Copeland. 70 specimens, 4 species.
 Campos. Hartt and Copeland. 34 specimens, 5 species.
 Mendez. Hartt and Copeland. 3 specimens, 1 species.
 Guarapary. Hartt and Copeland. 40 specimens, 4 species.
 St. Thomas. J. A. Allen. 4 specimens, 1 species.

In Exchange.

- MÜLLER, Dr. FRITZ. Santa Catharina. 64 specimens, 7 species.
 THEOBALD, W., Jr. Calcutta. 7 specimens, 4 species.
 SCHRAMM, DR. Guadaloupe. 2 specimens, 2 species.
 Total, about 1,013 specimens, about 57 species.

Sent in Exchange.

- HAECKEL, Prof. E. 109 specimens, 33 species.
 SHUMAN, Dr. B. S. 136 specimens, 48 species.
 TENNEY, L. 85 specimens, 35 species.

POLYPS.

By Donations.

- MACK, Dr. D., Jr. 1 species. Nieah Bay, W. I.
 MANN, HORACE. 1 species. Sandwich Islands.
 MÜLLER, Dr. FRITZ. 4 species. Santa Catharina.

Thayer Expedition.

- Masseio. 5 species. Hartt and Copeland.
 Victoria. 6 species. Hartt and Copeland.
 Guarapary. 70 species. Hartt and Copeland.
 Armaçao. 5 species. Hartt and Copeland.
 Campos. 2 species. Hartt and Copeland.
 Rio Janeiro. 3 species. J. A. Allen.
 St. Thomas. 33 species, and about 600 specimens.

In Exchange.

- DUCHASSAING, Dr. 45 species, 177 specimens. W. Indies.
 THEOBALD, W., Jr. 3 specimens. Calcutta.

Sent in Exchange.

- Chicago Academy, 45 species.
 Copenhagen Museum, 194 species.
 Haeckel, Prof. E. 61 species.
 Keferstein, Dr. W. 65 species.
 Shuman, Dr. B. S. 5 species.

ACALEPHS.

- Dr. F. MÜLLER. 4 species. Santa Catharina.
Thayer Expedition. 6 species. Rio de Janeiro.

Report on the Department of Paleontology, by N. S. SHALER.

During the past year it has been necessary for the Assistant in this department to give a considerable portion of his time to the work of caring for the collections recently received in the Museum. This has reduced the time which could be given to the task of carrying forward the general arrangement of the fossil collection, and the preparation of exchanges. Acting under the general instructions of the Curator, a plan of operations in the arrangement of the fossils has been devised, an outline of which may properly be included in this Report.

The immediate object to be attained in this arrangement is the division of the collection in such a manner that the specimens may be most available for the prosecution of investigations, securing at the same time the amplest security against the displacement of labels and the loss of other evidence bearing on the history of the materials. The secondary objects are the preparation of lists which will exhibit at a glance the localities, formations and species represented in our collections and guide the student to the spot where they are to be found, together with other lists designed to show to our correspondents the materials which we can furnish in exchange.

In accordance with these objects it has been thought best to institute three main lines of division in the specimens of each class of the animal kingdom of which we have fossil remains, dividing them according to their zoölogical classification, their distribution in time or geological succession and their distribution in space or faunal limitation. In this division by the

zoölogical affinities, there has been no effort to do more than follow the most acceptable of the existing systems.

In the stratigraphical division, grouping has in the main only been carried so far as to bring together those forms belonging to each great group of formations, making only ten divisions of the whole geological section. This incomplete separation has been rendered necessary by the difficulty of determining the precise synchronism of fossils from widely separated points. In dividing the specimens so as to correspond to the distribution in space or faunal arrangement, a different plan has been followed from that adopted in the two divisions above referred to; while with them only general results were aimed at, in this division it has been deemed best to carry the separation as far as possible. Constant effort is made to keep all the specimens of each species from any locality together, so that the important questions connected with the distribution of forms may be determinable from the specimens. Where fossil faunæ have been recognized, the different localities have been grouped under that head; where the ancient limitations were not readily determinable, the most convenient geographical divisions have been adopted.

Lists are being prepared which will show in their alphabetical order the names of the localities on each continent from which we have specimens. In preparing these lists the localities of each set of formations such as the Tertiaries or Cretaceous series constitute separate lists. Where known, the precise position of the beds at the locality is given, also the name of the collector, or if many, that of the best known and most accurate of them, as authority for the occurrence of certain beds at such a point. Where the locality is not well known the latitude and longitude of the point will, if possible, be given.

In the class of Gasteropoda, the lists above referred to are nearly complete. It will give some idea of the magnitude of our collections that from the tertiary beds of Europe alone we have over five hundred localities represented in this class.

It is a part of the plan to have for each class of which large numbers of forms are found fossil, a series of maps representing the development of the great formations on all of the Continental masses, each map having affixed to it numbers corresponding to the numbers placed against the localities in the

corresponding catalogue, and to the tray in which the specimens are contained.

This system of records and divisions will, when fully carried into effect, enable the investigator to perceive not only the means in the stores with which to prosecute certain work, but by the aid of the corresponding numbers, to find at once the materials he requires. The same system of maps and lists will serve to guide the officers of the Museum in their efforts to make the collections as complete as possible, by showing those points from which collections are needed.

Eighteen exchanges, including a total of about 1,400 lots of specimens, all labelled, have been forwarded in exchange to the correspondents of the Museum. In addition to this, about an equal quantity of specimens have been prepared for exchange by division into sets, and only require packing and cataloguing to fit them for use.

There has been received from exchange, nine lots of specimens, comprising a total of over 600 distinct species, and about 2,500 specimens.

From the Thayer Expedition, collected in South America:—
Minerals, 1,000 specimens. Fossils about 25 species, 800 specimens.

By donation we have acquired 140 species, 500 specimens.

The thanks of the Museum are due to the following donors of specimens:—

HARTT, C. F., Student Museum C. Z. 26 species, 200 specimens
Taconic Fossils.

NATURAL HISTORY SOCIETY, of New Brunswick, per C. F. Hartt,
30 species, 200 specimens Devonian plants.

NILSEN, Mr. 1 specimen Carb. Fossil from Pennsylvania.

SEALER, Assistant, M. C. Z. 15 species, 100 specimens. Drift Fossils.

UHLER P. R., Assistant, M. C. Z. and UHLER, G. W. 15 species.
30 specimens, Fossil Plants.

Report on the Library, by P. R. UHLER.

The increase of the Library during the past year has exceeded that of the year preceding, mainly due to the liberality of friends of the Museum. It would be a great satisfaction to be able to

record a still further increase, and it is to be hoped that by means of the exchange of the publications of the Museum, (which have already been sent to prominent institutions and individuals, both at home and abroad,) this desirable result may be realized. The Library is yet very deficient in the transactions of most of the learned societies abroad, many of which are indispensable in the work of identifying the species in the Museum.

One hundred and seven volumes, and sixty-four pamphlets, or parts, of various sizes, have been presented by the following societies and individuals: Acad. Real. Scienc. de Lisboa, Boston Soc. Nat. History, Chicago Acad. Nat. Sciences, Entomological Society of Philadelphia, Essex Institute, Salem, Kais. Königl. Zool. Botan. Gesellschaft, Vienna, Lyceum of Nat. History, New York, Nat. Hist. Soc. of New Brunswick, Oberhessische Gesell. Giessen, Real. Instit. di Palermo, Smithsonian Institution, St. Louis Acad. Nat. Sci., University of Copenhagen, Verein für Naturk. Nassau, Mr. A. Agassiz, Prof. L. Agassiz, Mr. J. G. Anthony, Mr. J. M. Barnard, Mr. E. Billings, T. Bland, Prof. J. D. Dana, Editors of Nashville Journal of Medicine, Dr. G. Krefft, E. S. Morse, Hon. Isaac Newton, Dr. A. S. Packard, Jr., Prof. F. Poey, Messrs. T. Reakirt, S. H. Scudder, J. B. Trembly, H. Trimoulet, President James Walker, and Profs. Winchell and Marcy. Three volumes have been purchased from the Entom. Soc. of Philadelphia, and from Mr. G. W. Tryon, Jr.

[B.]

TRUSTEES OF THE MUSEUM OF COMPARATIVE ZOOLOGY.

1867.

THE GOVERNOR OF THE COMMONWEALTH,

ALEXANDER H. BULLOCK.

THE LIEUTENANT-GOVERNOR,

WILLIAM CLAFLIN.

THE PRESIDENT OF THE SENATE,

JOSEPH A. POND.

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES,

JAMES M. STONE.

THE SECRETARY OF THE BOARD OF EDUCATION,

JOSEPH WHITE.

THE CHIEF JUSTICE OF THE SUPREME JUDICIAL COURT,

GEORGE T. BIGELOW.

LOUIS AGASSIZ.

WILLIAM GRAY.

JACOB BIGELOW.

NATHANIEL THAYER.

JAMES WALKER.

SAMUEL HOOPER.

GEORGE TICKNOR.

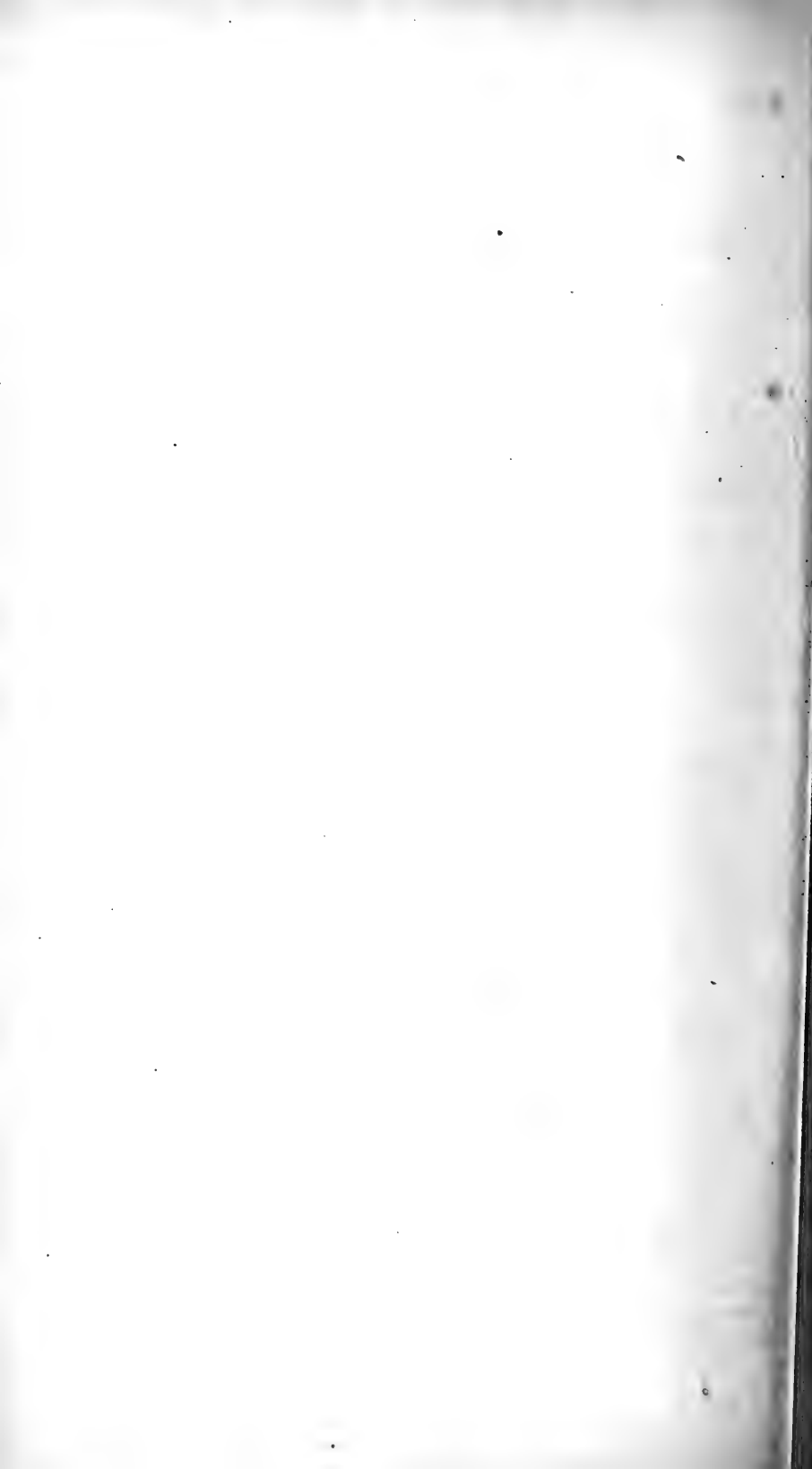
JAMES LAWRENCE.

THEODORE LYMAN.

OFFICERS OF THE MUSEUM OF COMPARATIVE ZOOLOGY FOR

1867.

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*.GEORGE TICKNOR, LOUIS AGASSIZ, JACOB BIGELOW, GEORGE T. BIGELOW, *Committee on the Museum*.



ANNUAL REPORT

OF THE

TRUSTEES

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY,

AT HARVARD COLLEGE, IN CAMBRIDGE,

TOGETHER WITH THE

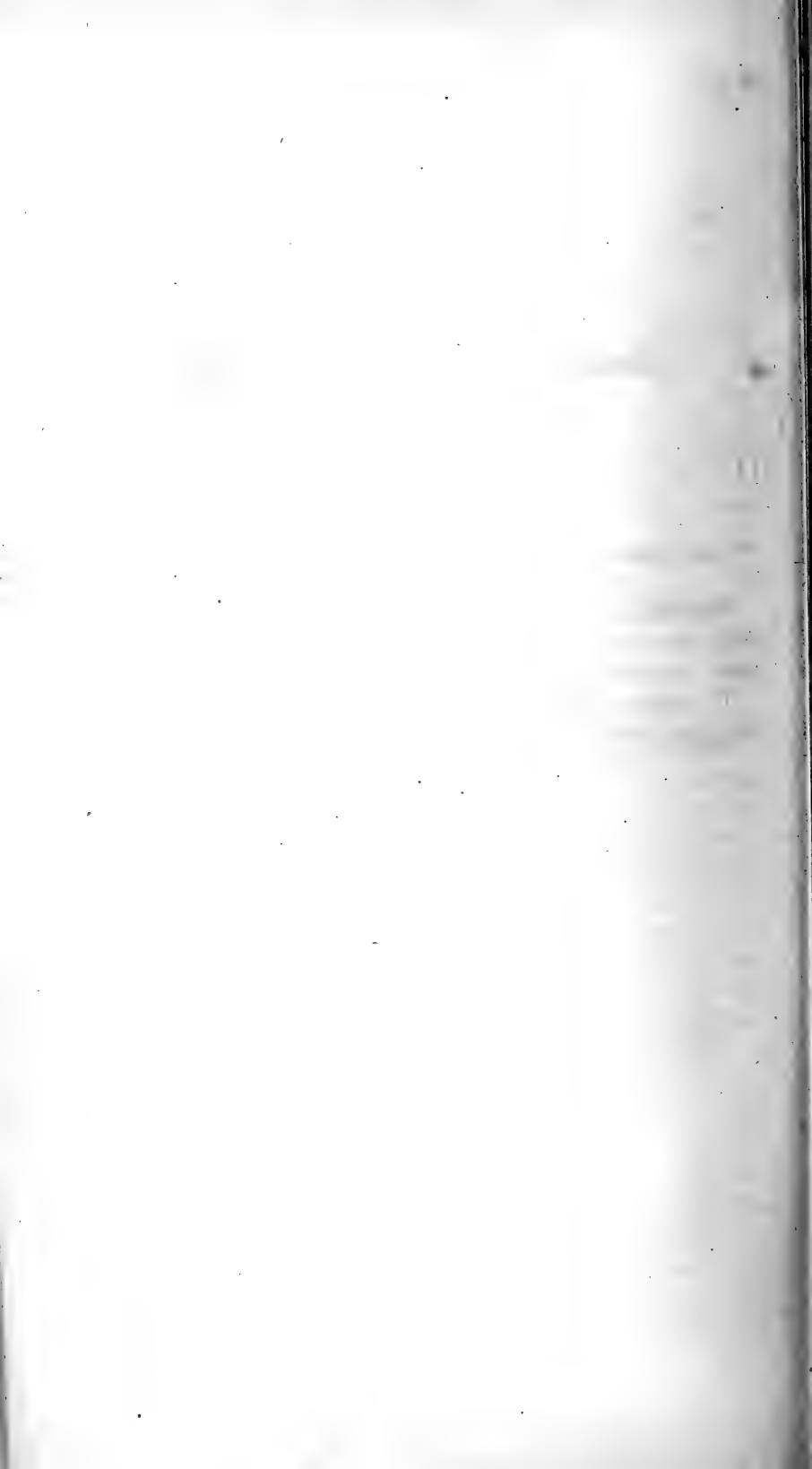
REPORT OF THE DIRECTOR,

1867.

BOSTON:

WRIGHT & POTTER, STATE PRINTERS,
No. 4 SPRING LANE.

1868.



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 large number 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 Cretaceous 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*.

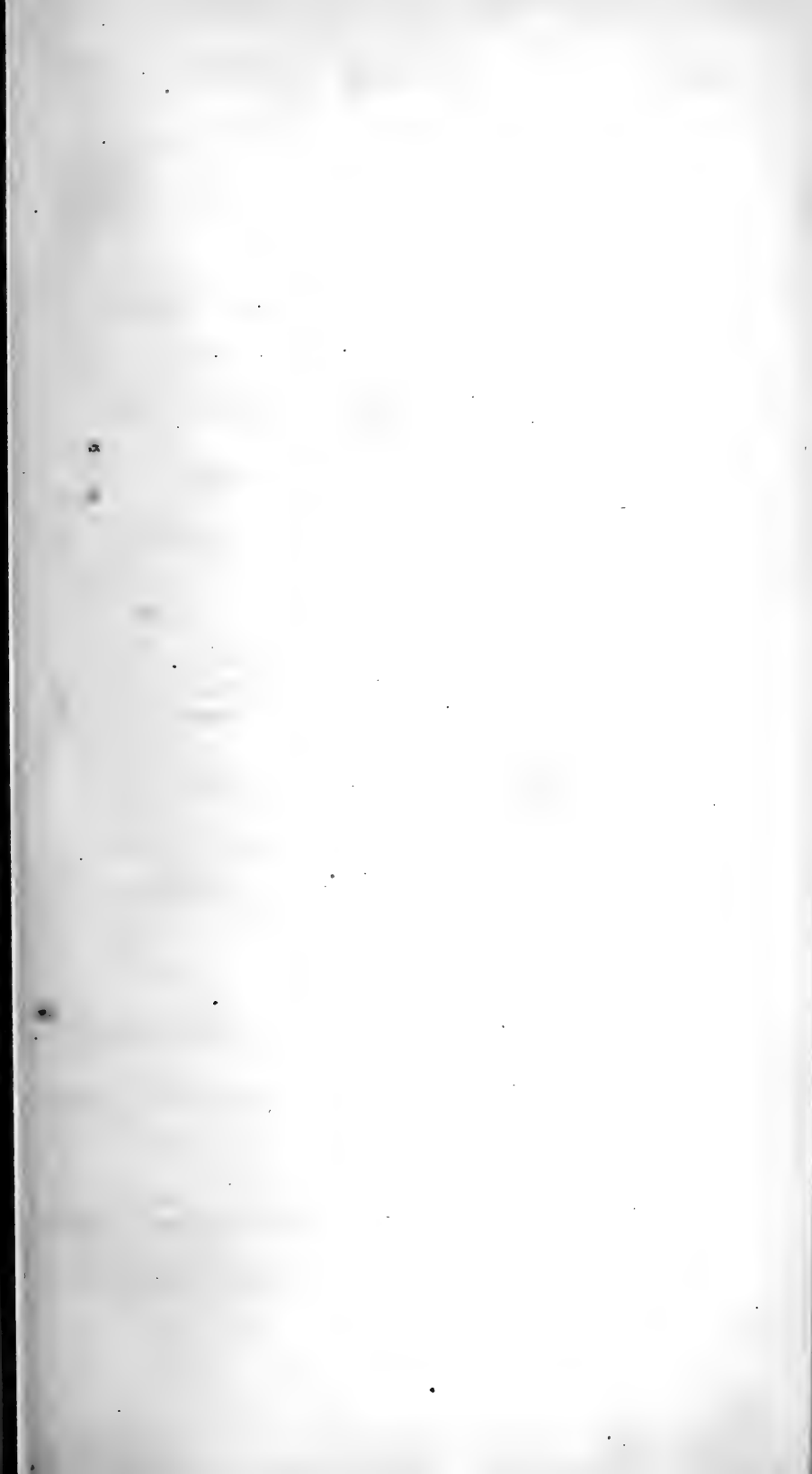
WILLIAM GRAY, *Secretary*.

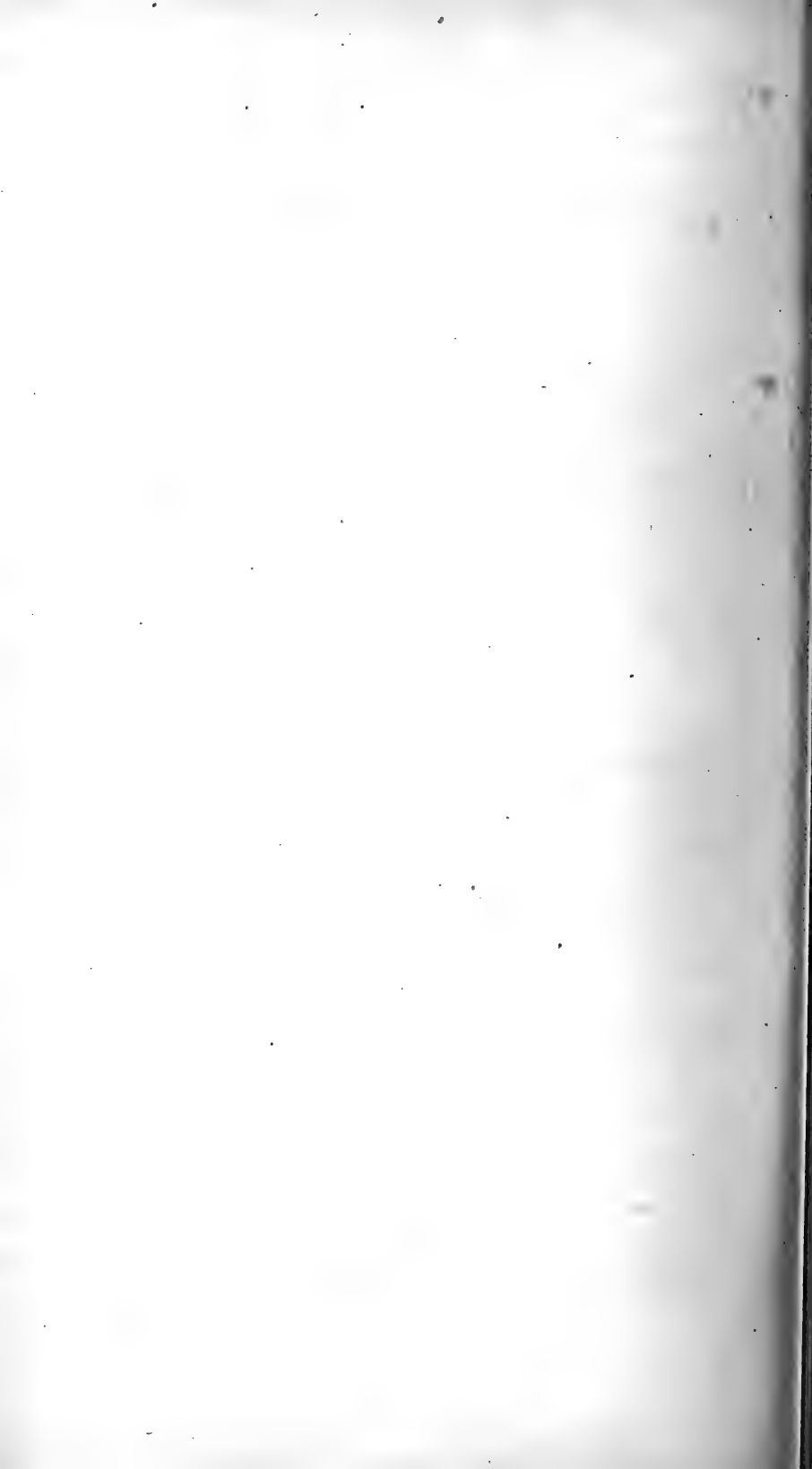
THEODORE LYMAN, *Treasurer*.

LOUIS AGASSIZ, *Director of the Museum*.

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

GEORGE TICKNOR, LOUIS AGASSIZ, JACOB BIGELOW, REUBEN A. CHAPMAN, *Committee on the Museum*.





ANNUAL REPORT

OF THE

TRUSTEES

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY,

AT HARVARD COLLEGE, IN CAMBRIDGE,

TOGETHER WITH

THE REPORT OF THE DIRECTOR,

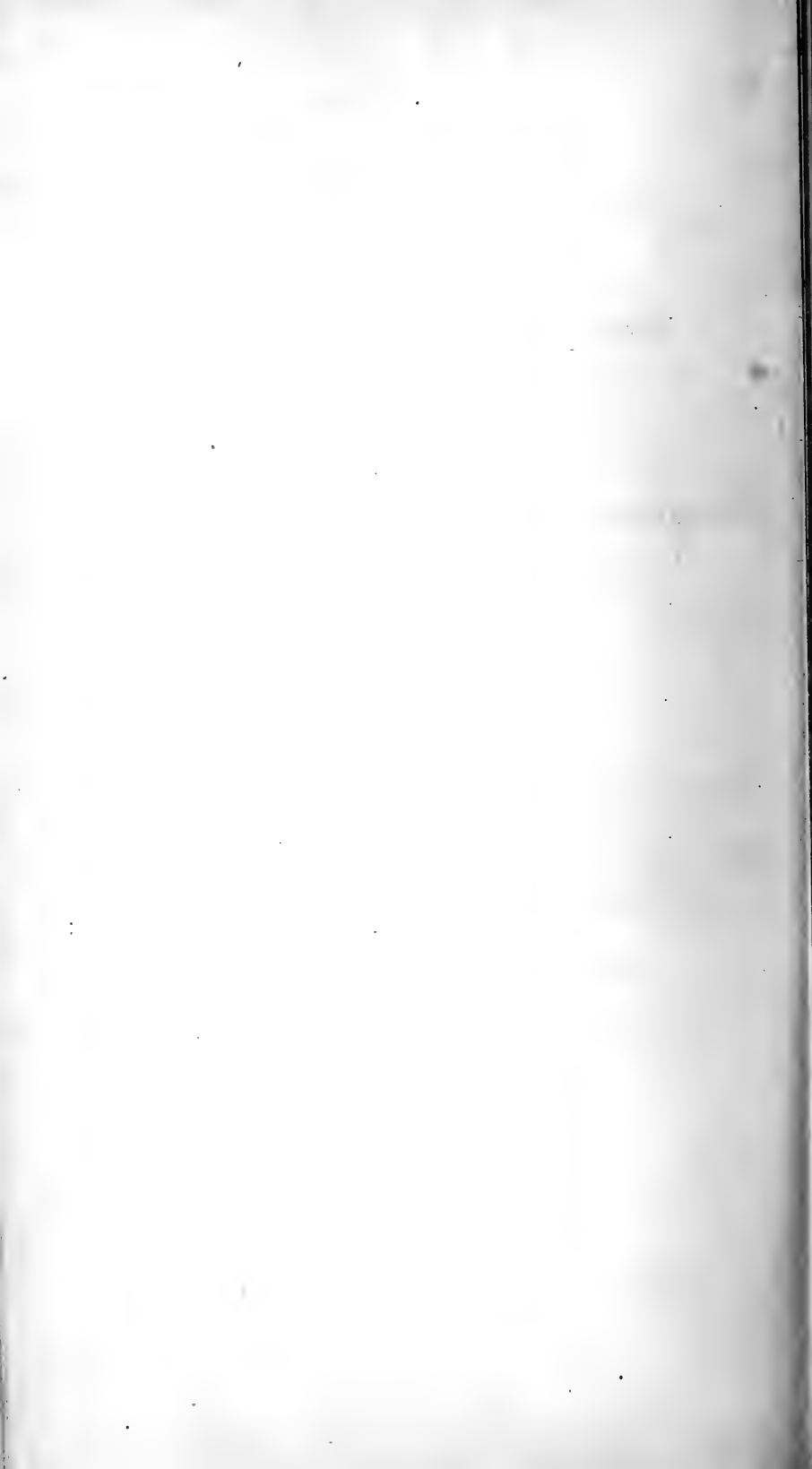
1868.

BOSTON:

WRIGHT & POTTER, STATE PRINTERS,

79 MILK STREET, (CORNER OF FEDERAL.)

1869.



Commonwealth of Massachusetts.

BOSTON, January 27, 1869.

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 marked [B] contains a list of the Trustees, their officers and committees, for 1869.

The past year has been distinguished by a grant of the legislature of \$75,000, payable in three annual instalments, conditioned on the raising by subscription, of like sums.

The first \$25,000 has been obtained, and the corresponding \$25,000 has been received from the State.

The Trustees propose to devote the money thus obtained from the State to an enlargement of the Museum building.

For the Trustees,

THEODORE LYMAN,

Secretary, pro tem.

[A.]

REPORT OF THE DIRECTOR
OF THE
MUSEUM OF COMPARATIVE ZOÖLOGY.
FOR THE YEAR 1868.

This year has been a memorable one in the history of our institution. When I prepared my report for the year 1867, it was under the depressing conviction that unless a large sum could be promptly obtained, the labor of years would be made of no avail, and the value of the materials collected in the Museum so impaired for want of the means essential to their preservation, that they would become in a great degree useless. By the intelligent liberality of the legislature, who took this matter into earnest and thoughtful consideration, and the generous co-operation of individuals, this danger is averted. I have never felt so hopeful of the future of the institution which has so long been my care as now. With the prospect for the next three years of an income large enough to secure the aid of competent assistants in the different departments, we shall be able to put our immense collections in complete order, and to enlarge the building sufficiently to exhibit all our specimens in their true relations. I hope that in three years any intelligent observer will be able to say that a mere walk through our Museum teaches him something of the geographical distribution of animals, of their history in past ages, of the laws controlling their growth as they now exist, and of their mutual affinities; in short, that the whole will be so combined as to illustrate all that science has thus far deciphered of the plan of creation. This is my hope, and it is shared by the efficient

corps of assistants on whose co-operation I largely depend for its fulfilment. All the efforts of the officers of the Museum now tend toward such an arrangement of the collections as will render their exhibition advantageous and prompt. For a long time all those engaged with me have, at the sacrifice of their personal advantage, and with the most praiseworthy zeal and abnegation, devoted their time to labors rather manual than intellectual, yet of a kind which, from their very nature, require a trained workman,—one who has an extensive familiarity with objects of natural history. It is the misfortune of naturalists that so little of the distasteful and purely manual work connected with their studies can be performed by more ignorant assistants. In the laboratory, the investigator must be his own servant. My associates in the task of organizing the Museum have shrunk from no sacrifice of this kind.

When the whole collection is so arranged that any specimen required for investigation can be reached with ease, and without loss of time, we shall all be rewarded by the comparative facility for original research. I may add, that this is an advantage by which, according to the policy adopted by our institution, not only our small corps of investigators, but all students of natural history throughout the scientific world, will profit. This assertion is justified by the readiness with which specimens have been sent out from the Museum wherever they were wanted by any one engaged in original researches whose scientific character made him worthy of our confidence. Assistance of this kind has been given whenever it has been in our power to afford it. I only lament that the bulk of our materials, so heaped together for want of room as to make them often inaccessible, and the very limited number of assistants in past years, so that there were not hands enough to put up the special collections to be sent abroad, have prevented us from exercising this liberality so largely, and with such promptness, as we hope to do hereafter.

At the last meeting of the Board of Trustees, a vote was passed devoting the \$75,000 granted to the Museum by the legislature of 1868, to the extension of the present building. While I rejoice in the prospect of this new building, as affording the means for a complete exhibition of the specimens now stored in our cellars and attics, and encumbering every room of

the present edifice, I yet can hardly look forward to the time when we shall be in possession of it, without shrinking from the grandeur of our undertaking. The past history of our science rises before me with its lessons. Thinking men, in every part of the world, have been stimulated to grapple with the infinite variety of problems connected with the countless animals scattered without apparent order throughout sea and land. They have been led to discover the affinities of various degrees and different kinds, which bind together this host of living beings. The past has yielded up its secrets, and has shown them that the animals now peopling the earth are but the successors of countless populations which have preceded them, and whose remains are buried in the crust of our globe. Farther study has revealed relations between the animals of past time and those now living, and between the law of succession in the former and the laws of growth and distribution in the latter, so intimate and comprehensive that this labyrinth of organic life assumes the character of a connected history, which opens before us with greater clearness in proportion as our knowledge increases. But when the museums of the Old World were founded, these relations were not even suspected. The collections of natural history gathered at immense expense in the great centres of human civilization, were accumulated mainly as an evidence of man's knowledge and skill in exhibiting to the best advantage not only the animals, but products and curiosities of all sorts, from various parts of the world. While we admire and emulate the industry and perseverance of the men who collected these materials, and did in the best way the work which it was possible to do in their time for science, we have no longer the right to build museums after this fashion. The originality and vigor of one generation become the subservience and indolence of the next, if we do but repeat the work of our predecessors. They prepared the ground for us by accumulating the materials for extensive comparison and research. They presented the problem; we ought to be ready with the solution. If I mistake not, the great object of our museums should be to exhibit the whole animal kingdom as a manifestation of the Supreme Intellect. Scientific investigation in our day should be inspired by a purpose as animating to the general sympathy as was the religious zeal which built the cathedral of

Cologne or the basilica of St. Peter's. The time is past when men expressed their deepest convictions by these wonderful and beautiful religious edifices; but it is my hope to see, with the progress of intellectual culture, a structure arise among us which may be a temple of the revelations written in the material universe. If this be so, our buildings for such an object can never be too comprehensive, for they are to embrace the infinite work of Infinite Wisdom. They can never be too costly, so far as cost secures permanence and solidity, for they are to contain the most instructive documents of Omnipotence.

From the earliest organization of the Museum I have had three great objects in view. First, to express in material forms the present state of our knowledge of the animal kingdom; second, to make it a centre of original research, where men who were engaged in studying the problems connected with natural history should find all they needed for comparative investigation; thirdly,—and this last object has been by no means less prominent than the two others, but, if possible, has engrossed my thoughts more,—to make it an educational institution; to give it a wide-spread influence upon the study, the love and the knowledge of nature throughout the country. I have wished—and I think the time is fast approaching when I shall be able to make this wish more completely a reality than it has hitherto been—to have the most various and extensive practical instruction in natural history going on there under the personal direction of the officers of the Museum in the different laboratories, and at the same time to have courses of lectures of a more general character, and open to all, upon natural history in its various aspects, geology, palæontology, general and special zoölogy, embryology, comparative anatomy, &c.

I have labored under many obstacles in the carrying out of this scheme. Often, for want of means to pay salaries, the assistants have been so few, and their knowledge so immature, that it was impossible to organize any extensive scheme of instruction. Often, too, we have been so overwhelmed by the amount of labor to be performed by some three or four men, that I have hesitated to diminish the working force of the Museum for a less pressing, though not less important aim. Nevertheless, ever since the Museum has been in existence, two

annual courses of lectures have been delivered there by myself, except when illness or necessary absence have occasionally interrupted them; while from time to time other courses, and very valuable ones, have been given by the gentlemen connected with the Museum. We have always had, also, a certain number of students pursuing special studies in the laboratories. This has been well, as far as it went; but the case is now very different. With very able men as assistants; with a distribution of labor which makes the work of the Museum itself easier, it is now possible to arrange a very complete system of general and special instruction. The programme for the current year embraces seven courses of lectures, and practical instruction, covering nearly the whole range of natural history. We hope to make it more comprehensive in proportion as some of those mature investigators who can act both as scientific assistants and as lecturers are drawn into our ranks.

During the past winter, the lectures have consisted of an able course from Mr. Perry, on the geology of Lake Champlain, including a description of the geological formation of Vermont, and especially a critical discussion of the controversy concerning the Taconic system. Mr. Shaler has also given a full and interesting course on palæontology, illustrating chiefly the gradation of organized beings throughout the series of geological formations. I have myself given a course on the natural history of Radiates. Of the latter I would say a few words. Since it may not be in my power to publish for some time the results upon which this course was founded, I wish to submit them summarily here, though they do not perhaps properly belong in this very general report of the Museum affairs. The object of this course was to show the strict homology pervading the structure of all Radiates, including the Echinoderms as well as the Polyps and Acalephs, or the so-called Cœlenterata. This identity of structure being proved, the division of the Radiates into two distinct types, now adopted by most zoölogists, becomes unnatural. The argument rests upon facts, for it can be clearly shown that the chambers of the Polyps, separated by their radiating partitions, are homologically identical with the radiating tubes of the Acalephs, and with the ambulacral system of the Echinoderms. These three classes form, structurally speaking, one and the same type. Moreover, these

homologies are circumscribed within the type of Radiates, and can by no means be extended beyond it; so that it may be said that the structure of Radiates is *sui generis* incompatible with the idea of any genetic relation between that and any other type of the animal kingdom. I also showed that the embryonic growth of all these animals is conformable, even the seemingly bi-lateral symmetry of the larval form of the Echinoderms, upon which Müller insisted so tenaciously, being as truly a radiate structure in its typical character as the Spatangoids, which also seem bi-lateral. I also compared the succession of this type in time with the growth of its present representatives in their embryonic condition, and carried out this illustration especially for the Crinoids; showing that in its successive transformations the Comatula passes through stages which, from their resemblance to the full grown Crinoids of earlier ages, I designated as the Cistidian, the Pentremitian, the Platyerinian, the Pentacrinian, and the Comatuline stages of growth. These phases of development coincide with the order of succession of the types of the same name in the geological ages. It was farther shown that even the Ophiurans, the Asterians and the Echinoids have also their Crinoidal stages of growth, while their earliest embryonic forms recall in like manner the Polyps and Acalephs. Beside these courses of lectures Dr. Hagen has been training a few special students in entomology, and I have directed the private exercises in other departments.

As in the preceding year, Mr. Allen has had general charge of the Mammalia and Birds, and, as may be seen from his special report, he has greatly improved the condition of the collections entrusted to him. But the work is too extensive for one person, and I hope to divide it during the present year.

The collection of Reptiles has not been placed under the care of a special assistant during the past year. It is in a safe state of preservation, and for the distribution of specimens into separate jars, according to their species, I have thought it best to await the return of the numerous specimens entrusted to Professor Cope for identification. For the Batrachians, however, this task of division and distribution is already begun, and is going on under the charge of my son, Alexander Agassiz.

As usual, I have had the collection of Fishes under my special care, and, though an immense amount of work has been bestowed upon their arrangement, not by myself alone, but also by Dr. Stäheli, Mr. Bliss, and Mr. Lockwood, under my direction, yet it seems as if the task grew, instead of diminishing under our hands. The specimens contained in thirty-nine kegs and barrels have been put up in glass jars, and distributed according to their species. Dr. Stäheli has revised some 10,000 jars, containing the work of former years, and yet not half the collection has undergone more than a preliminary arrangement. I have, however, begun monographic examinations of the Goniodonts, the Characines and the Gymnonotes, and Mr. Bliss has also made a beginning with the Chromids; while Mr. Lockwood has been assisting me in the arrangement of the Characines, and Dr. Stäheli assorting the species contained in barrels. This work will be continued during the present year, with additional aids, and I have some hope of being able to complete the distribution of the whole collection in glass jars, though at this moment there remain three hundred and sixteen barrels of fishes unarranged in the store room.

Mr. Theodore Lyman, who has charge of the fisheries of the State, has added to our collections in this department an invaluable series of young fishes; especially of the family of Salmonidæ and Clupeoids. These specimens have been bred artificially in different parts of the country, and the value of the gift is greatly increased by minute information concerning their age, the conditions of their growth, &c. As often as possible, the specimens have been brought alive to the Museum, and have been drawn and painted from the life by Mr. Paul Roetter. We may in course of time have ample materials for a comparative embryological history of these families. I have already communicated to the National Academy some of my observations upon the early stages of growth of the salmon, and Mr. Lyman is now engaged upon a comparative study of the different species of salmon living in our waters.

The collection of Articulates has been not only overhauled in all its parts, but Dr. Hagen has completed a monograph of the North American Astaci, and has carried forward the general arrangement of the insects, which are put up according to the plan proposed by himself, and which I have sanctioned the

more readily, as it includes the simultaneous exhibition of the larval condition of these animals, as well as their perfect state.

Mr. Anthony has been constantly busy this year, as during so many previous ones, in the arrangement of the living shells, and has brought this part of our collections nearer to its final order than any other in the Museum. More than 17,000 tablets are now ready for systematic arrangement and for exhibition as soon as the new building is completed. The separation of a special systematic collection and of faunal collections, determined according to an investigation of their range of distribution, and not, as is so often the case, based only upon a consideration of the physical character of the country in which they occur, has been fully carried out, and may in future serve as a guide for the arrangement of other types. And yet a very important part of the work remains to be done. The species are labelled according to the names under which they were first described, and this was done with the view of securing authentic identification.

It will require a vast amount of research in the ultimate arrangement, to ascertain what are the generic relations of each and all of these species, as also to determine the family affinities of the genera. The combination of the families into natural orders is hardly begun. Mr. Blake is now engaged in drawing the characteristic features of the soft parts of our fresh water mollusks, with a view to illustrate the systematic collection.

Messrs. Theodore Lyman and Alexander Agassiz share the work upon the final arrangement of the Radiates. The exploration of the deep-sea fauna of the Gulf Stream, undertaken by Mr. Pourtales at the direction of the superintendent of the coast survey, has brought to light an unexpected number of new species. The results of this valuable investigation were given by Mr. Pourtales in the last two numbers of the Museum Bulletin.

The institution is indebted to Professor Peirce for the presentation of all the specimens collected during these explorations, the duplicates of which will be distributed to other institutions as soon as they are completely assorted.

The fossils have been entrusted to the care of three different assistants. Mr. Shaler has had general charge of the whole

collection, but has given his special attention to the arrangement of the bivalve shells. Mr. Perry has had charge of the tertiary fossils in general, but has been especially occupied with the arrangement of the Gasteropods. Mr. Lesquereux has been engaged upon the fossil plants. The reports of these gentlemen have left me little to add concerning the condition of these collections. I have to lament my inability thus far to provide for the arrangement of the fossil vertebrates, but I hope to remedy this deficiency in the course of the present year. I regret the neglect of these collections the more deeply because they contain a considerable number of rare and valuable specimens. The magnificent series of *Dinornis*, for instance, which the Museum owes to the liberality of Dr. Haast, will be one of its greatest ornaments, whenever these specimens can be mounted.

Report on the Fossil Plants of the Museum of Comparative Zoölogy, by L. LESQUEREUX.

The work done this year to increase, arrange and improve the collections of fossil plants of the Museum is scarcely important enough to furnish materials for a report. But as it is essential, not only to mark the progress of the collections, but also to indicate the means of increasing them, and of rendering those already acquired more useful, and therefore more valuable, it is proper to say a few words of the actual state of the department of botanical palæontology, by reporting what has been done in it this year, and what should have been done under more favorable circumstances.

The report of the past year mentions, § 11, page 15, a number of specimens still in boxes in the magazine, which, from want of place, had not been exhibited, and which were still undetermined. The examination of these specimens has been completed this year, and all have been provided with labels bearing specific names, together with the names of the donors or former proprietors of the specimens, and indications of the localities whence they were obtained. At the same time, they have been assorted according to the age of the formations to which they belong.

Some of these specimens are valuable in themselves, as representing rare or new species; some others, like those obtained from Messrs. Lyell, Bronn and Marcou, and which mostly compose this collection, have a historical value, and are precious as mementoes of some of the most celebrated geologists of our time.

The distribution of these specimens according to the formations to which they are referable, and to their original proprietors, is as follows:—

Tertiary, Bronn's collection,	. . .	92 specimens.
“ Duval's “	. . .	47 “
Cretaceous, Bronn's “	. . .	35 “
Lias (of Virginia, by Mr. Wheeler,)	. . .	30 “
Carboniferous, Bronn's collection,	. . .	82 “
“ mostly from Lyell's collection,	. . .	123 “
Devonian and Silurian, Marcou's “	. . .	20 “
Specimens of coal and lignite, Bronn's collection,	25 “
Specimens of fossil wood, 4 of them polished, Bronn's collection,	18 “
		472
Total amount of specimens,	. . .	472

It was surmised in the former report that the Museum could this year obtain a large supply of specimens from Morris and Mazon Creek, Illinois, two contiguous localities, with strata identical in geological horizon and lithological characters, and which have become justly celebrated for the beauty of the specimens of fossil plants which they have furnished to science. But the want of place for the exhibition of large specimens prevented our spending money or making special exertions for increasing the collections of fossil plants. The only acquisition made for this department of the Museum, therefore, has been that of a lot of one hundred specimens in concretions, representing fossil plants from Mazon Creek, with twenty other specimens from the same place, representing the remains of animals of the coal measures, especially Crustacea. These, presented to the Museum by the curator, together with two specimens of wings of insects from the carboniferous measures

of Arkansas, are among the rarest fossil remains of that epoch. Another lot of sixty specimens of fossil plants was obtained by the curator in Rhode Island, some from the black shales exposed along the beach at Newport, and the largest number from the anthracite bed worked ten miles north of Newport, at Mount Hope coal mines.

The same opportunity is still offered to the Museum of purchasing at a low price a fine collection of fossil plants at Newport, from the carboniferous measures of Rhode Island, and another at Morris, essentially composed of specimens in concretions from Mazon Creek. Both these collections would be already a valuable acquisition for the Museum, if it were merely on account of the beauty and rarity of the remains of plants which they contain. But the fossil plants of these localities are, by their nature and their number, intimately connected with scientific questions of importance, which they may help to elucidate. For example, Morris and Mazon Creek have furnished till now, by their fossil remains, the largest number of species of plants found at the same place, and therefore they represent, far better than any other local flora, the vegetation of the carboniferous epoch, and its true character. For this reason, this fossil flora of Morris is a reliable point of comparison for the fossil plants of other deposits, considered either in their geographical or their stratigraphical distribution. A number of specimens are found in ferruginous concretions, in which even the most delicate species or organs of plants are preserved; and it would seem, from the riches of this flora, that we know as yet only that part of the vegetation of the coal epoch which is represented by hard, woody vegetables, while the more delicate ones have been totally destroyed by maceration. This supposition is confirmed by the number of small animals, Crustacea, Insects, Saurians, &c., whose remains, never found till now in the coal measures, are tolerably numerous in the concretions of Mazon Creek. At Newport, or in Rhode Island generally, where a number of remarkable species of plants have been discovered, which have not been found elsewhere in our American carboniferous measures, the vegetable remains are more or less deformed by metamorphism, either elongated or contracted in various ways. These remains show evidently the action of heat on the shales, and on the carbona-

ceous matter, while softened by maceration, or rather exhibit the transition of the vegetable from its natural state to a plastic one before its hardening by heat and mineralization. The peculiar dimorphism of the fossil plants of Rhode Island has not been observed elsewhere, not even in the anthracite basin of Pennsylvania.

The most important part of the work which, according to the directions of Professor Agassiz, should have been begun this year in the Museum, has been left nearly untouched, for reasons stated below. In the former report, (1867, page 15, § 12,) allusion has been made to the immense and most valuable collection of palms, fern-trees, and other species of equatorial plants, carefully selected as most appropriate materials for the comparative anatomy of the fossil floras of divers formations, and brought from Brazil to the Museum by its director. To fulfil the plan suggested, and to give to these specimens their real value, it is necessary to prepare them as models or samples for comparison, by making sections in various planes of direction, in order to show their internal structure, and displaying some of the surfaces under a high polish, while in others thin, transparent lamellæ should be cut and adjusted under glass for microscopical examination, &c., &c. Such a work demands the greatest care, not only in the selection and in the preparation of the specimens, but also in their arrangement, in order that every part destined to anatomical comparison, either as a whole organ or as a part of it, can be easily found and referred to its proper species and place, without possibility of a mistake. In attempting to begin the purposed work of preparation, it became evident—

1. That we had not yet in the Museum instruments which could be employed for that kind of work, without endangering the value of the specimens; and

2. That it was impossible to obtain sufficient room to have all the specimens conveniently disposed for a preliminary examination. For it is important, before beginning the anatomy of various species, to have under view all the specimens by which they are represented, in order to first exactly determine them, and afterward to select for preparations the parts or organs most appropriate to the end. As the Brazilian specimens are mostly of great size,—some of them whole trees, with leaves

and fruits still attached to them,—this preliminary examination cannot be made in the limited space left in a garret already full of heaped materials of various kinds. Moreover, these botanical specimens are all now properly packed, and in that state their displacement cannot endanger any part of them, while, once out of the bundles, some essential organs or valuable parts may be easily detached and lost by removal. Still another consideration prevented the beginning of this important work now. Some of the trees already obtained by the Museum, and others which it may be convenient to obtain hereafter, should be preserved whole, as much, at least, as it is possible, for comparison of size, of external character, the bark, mode of attachment of the leaves, of the fruits, &c., &c. Of course, these large trunks cannot be piled up in the Museum. They should be distributed around a special room, and left standing between rows of cases, or disposed in such a way that they may serve for ornaments, as well as for objects of instruction. Such a distribution can be made only on a carefully devised plan, and when the dimensions of the places destined for the specimens are known.

These reasons, I hope, will serve as a sufficient excuse for the postponement of a work which I consider of great importance if it can be properly conducted, and will account also for the short duration of my co-operation at the Museum this year.

Report on the Library, by REV. J. B. TERRY.

On looking over the Library, I find myself unable, for the present, to report upon its condition in full. I shall accordingly confine myself to a few incidental points.

After Mr. Uhler ceased to act as Librarian, and previously to my taking charge of the Museum collection of books, considerable time elapsed. As no one had special care of the Library during this interval, books were of course somewhat misplaced and interchanged. It was consequently my first aim and effort to restore all such volumes to their proper position, so far as this could be learned from the several alcove catalogues. This work was carried on by slow degrees, as opportu-

nities from time to time favored, and odd moments of leisure rendered the task feasible.

Soon learning by experience the great difficulty of finding many works needful for reference in the prosecution of my investigations, and that thus the valuable treasures of the Library were not so available as they might else and as they ought to be, I devoted myself for some time outside of the usual hours of Museum duty, to the dry and thankless task of supplying the deficiency. Taking the printed catalogue of De Koninck, I designated in the margin, opposite to the title of each work, by means of numerals, both the alcove and the shelf of every volume, monograph and pamphlet, the permanent place of which was already determined. Having done this much, I ceased my labors in this direction, as I did not wish to enter the alcove and shelf of volumes, the permanent places of which in the Library were still unsettled. This catalogue indicates the position of about four-fifths of the works belonging to the De Koninck Library.

Since that time, Dr. Stäheli has been busily engaged, when his other duties would allow, in pushing the arrangement further, in marking the number of the alcove and shelf of each work, so far as already determined, on the cards of the topical catalogue, and at the same time in noting missing volumes and all such defects as he might observe in the books composing the several departments of the Library. This work being still unfinished, a satisfactory statement in regard to the Library as a whole is out of the question. I hope, however, to be able, in the next annual report, to give a detailed account of its condition, of such defects as may then exist, and of many deficiencies supplied by additions made during the year.

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

At the close of my last year's labors, I received from the Director of the Museum the following letter of instructions:—

“Thanks to your industry, the arrangement of the shells in the Museum is already so far advanced, that I wish henceforth you should make the identification of our specimens with original specimens of the species described by American conchologists the chief

object of your efforts. It is of the utmost importance that a reference to our collections should in future afford naturalists the means of recognizing all the species which have been described in this country, not only by your cotemporaries, but also by your predecessors.

“You know how difficult it has become to identify some of the species described by Say and Rafinesque, and unless proper care is taken in time to secure what remains of the tradition of the earlier American conchologists, the task may become hopeless.

“Therefore I would urge that you make a beginning at once. To this end I would advise you to make an excursion to Philadelphia as soon as convenient, and you can ascertain that you may receive there the necessary aid in your work. I have already once examined the remnant of Rafinesque’s collection, in the possession of the late Charles A. Poulson, but I wish you would go over the same ground, and not limit yourself, as I did, to the Naiades, but try to identify the other shells described by him. Next to this, I wish you would compare all the specimens of Say, Barnes and Ward that may be preserved in the Academy of Natural Sciences. Mr. Binney, whose father was a correspondent of those gentlemen, may assist you in identifying some of their species, of which there may not be authentic specimens in your own collection. At the same time you should identify all the species of Dr. Binney which are in his son’s possession.

“The next most important step would be the comparison of all the species described by Mr. Isaac Lea with those of the Museum. No naturalist in America has described and figured so large a number of species of shells as Mr. Lea. By his untiring industry and perseverance he has brought to light an astounding variety of fresh-water mollusks from our extensive river system, entirely unsuspected before; in fact, no one has made larger contributions to our knowledge of the American Naiades. It is therefore of paramount importance that we should obtain, at any reasonable cost, authentic specimens of all his species, whenever we have not ourselves specimens which can be identified with his.

“This is a very extensive and laborious task, and I do not suppose that you can accomplish the whole during one visit to Philadelphia; but you may get through with one family, say the *Melaniæ*, the arrangement of which you have lately completed in the Museum, and make arrangements with him to return to Philadelphia and complete the comparison whenever it may suit him to assist you in the investigation. As we have land and fresh-water shells in large quantities from localities from which Mr. Lea may

have none, you will propose to him exchanges on the most liberal terms for whatever he has that is wanting in our Museum.

“While in Philadelphia, make it also your business to visit the Academy of Natural Sciences, and identify there whatever original specimens may be in their museum. Do not neglect to interest Mr. Tryon in your work. He cannot fail to see the advantages that will accrue to Conchology from your errand, and as editor of the Conchological Journal, assist you as far as he can. Try to obtain from him, also, original specimens of all the species he has himself described, or descriptions of which are contained in his journal.

“I shall want you also to visit other cities in which valuable collections exist, especially New York, that you may do the same work there for the collections of various collectors in that city; and afterwards Amherst College, to compare the specimens described by Adams; and then Chicago, to see the originals of Stimpson's species; not forgetting Albany, which has been so fortunate as to secure Dr. Gould's collection; but with regard to these I shall write you more fully when the proper time comes.”

In conformity with the foregoing instructions, I made a journey to New York and Philadelphia, which occupied several weeks, and during that period examined more or less in detail the several collections alluded to, gaining thereby much useful information connected with my department. This visit, however, could only be considered a preliminary one, several visits being required to fully carry out all the suggestions contained in the instructions. It was made, moreover, at a time of the year when short days and cloudy weather formed strong impediments to a critical examination of species, and a subsequent visit, which was arranged to take place last May, was prevented by sickness. The plan, however, has not been abandoned, but will continue to be borne in mind and steadily pursued to completion.

In order to be prepared to carry out these instructions properly, much time has been devoted to mounting shells already on hand, by which means we have attained a better knowledge of our collection and of our wants. The number of tablets thus mounted is already very large, amounting to over 17,000 at the present time, and will be greatly increased during the coming year.

While laboring in this direction, less attention has been paid to our exchanges and other means of increasing the collection than formerly, and we have consequently less to report than usual in this department. The whole number of packages received during the past year has been 30, containing 1,523 species and 21,394 specimens from 26 persons.

Some of these packages have contained shells of unusual interest, deserving more than a passing notice. Among these we may mention two parcels received from W. G. Binney, Esq., one of them containing the type shells used by him in his own publications, and the other the specimens which his father referred to while writing his costly and valuable work on the "Terrestrial Air-breathing Mollusks of the United States." These type specimens, with the author's labels, are of more than ordinary interest, advancing as they do one of the special objects we have in view, viz., the procuring of undoubted representatives of all described forms of mollusks. In this way only may we hope to avoid one of the greatest obstacles the present generation of naturalists labor under in determining species, it being now impossible in many cases to know what an author really described, for want of authentic types of his species.

Another contributor, Mr. Geale, of London, has sent us 92 species of *Cypræa*, carefully labelled, from Mr. Cumings' collection, a collection unrivalled for beauty and perfection of specimens and accuracy of labels.

One of the most important additions made to our collection of mollusks during the past year has been by purchase from Mr. T. Bland, of New York, of his large and carefully labelled collection of North American land shells, the result of many years of patient labor on his part, and embracing 260 species and 2,494 specimens. The well known accuracy of Mr. Bland in this department, which has been a specialty with him for a lifetime, renders this collection one of no ordinary value, and it may well form, as we trust it will, the basis of a formal arrangement of the shells of North America, which has long been one of the prominent desiderata of our Museum.

The remaining specimens received during the year from various sources have been mainly derived from our exchanges. Nevertheless we have not failed to be remembered by our con-

stant friend and contributor Mr. Charles Wright, who has laid us under great obligations by a fine invoice of desirable Cuban shells, and our Thayer Expedition must also be credited with a small but valuable contribution of 35 species and 1,039 specimens of Brazilian land shells. Thus from twenty-six sources we have derived 1,523 species and 21,394 specimens as the result of our year's labors in this department, while our consignments have only been to seven persons, amounting to 443 species and 867 specimens.

We may add that during the past year we have had the pleasure of aiding, as far as we could, Mr. William G. Binney in his undertaking to edit the new edition of the late Dr. Gould's Report on the Invertebratæ of Massachusetts, and have furnished for that purpose a large number of our best specimens of New England mollusca, in order that new figures might be drawn to replace the lost plates of the first edition. In this connection we may remark that it seemed to us peculiarly fitting that this enterprise, ordered by the State, should be aided in every possible way by a State institution like our own, and we have cheerfully rendered every assistance in our power.

Report on the Mammals, by J. A. ALLEN:

Since the last announcement of the additions to this department, there have been added 369 specimens, representing 168 species, one-half of them through our exchanges, and about one-fourth each by donation and purchase. The most important additions have been a fine collection of skins from Australia, from Professor McCoy; a large invoice of European mammals, including a number of very fine specimens mounted, from Professor William Schimper; a fine lot of skulls from East India, from W. Theobald, Jr.; and an invoice from South Africa, from Professor Layard. These collections have all been added by exchanges. Some very desirable lots have also been added by purchase.

Except the cataloguing of the skins, which we have recently completed, little has been done in this department beyond the

necessary work of taking care of the invoices received, and attending to the general safety of the collections.

By Donation.

AGASSIZ, L. 2 skins (fresh) and 1 skull of *Antilocarpa Americana*, and 1 skull of black-tailed deer from Laramie Plains.

ALLEN, J. A. 1 *Lorex Cooperi* from Wayne Co., N. Y.; 3 specimens, 1 species of *Vespertilio*, from Ogle Co., Ill.; fossil tooth, (*Cervidae* sp.), Redfield, Dallas Co., Ia.; 34 skins, 9 species; 30 specimens, 6 species in alcohol; 11 skulls, 7 species, from various localities in Massachusetts.

CARROLL, MICHAEL. 2 skeletons of seals; 1 skeleton and 1 skin of Caribou, from Newfoundland.

EAMES, H. H. 1 living *Jaculus hudsonius*, from Cambridge.

GOODNOW, E. 6 specimens, 1 species, from Cambridge.

HARTT, C. F., and COPELAND, C. (*Thayer Expedition*.) 1 human skull and 1 Capivara, from Spiritu Santo.

MAYNARD, C. J. 7 specimens, 6 species, skins, from Newtonville, Mass.

By Exchange.

BABCOCK, A. L. 5 specimens, 3 species, shrews and moles, in alcohol, from Sherborn, Mass.

BENNETT, C. W. 1 *Scalops aquaticus* skin, from Holyoke, Mass.

EDWARDS, Prof. H. MILNE. (*Jardin des Plantes*.) 9 specimens, 8 species.

LAYARD, E. L. (*South African Museum*.) 18 specimens, 17 species, from South Africa; 1 specimen from Japan.

MUSEUM COPENHAGUE. 1 skeleton of Cetacean.

MCCOY, Prof. C. 33 specimens skins, from Melbourne, Australia.

SCHIMPER, Prof. WM. 38 species, 76 specimens, skins, including quite a number mounted, from Germany.

THEOBALD, W., Jr. 15 species, 30 specimens, skulls and bones, from East India.

By Purchase.

Eighty-three skins, and fourteen mounted specimens, representing twenty-seven species, nearly one-half of which were from Iowa and Illinois, and the remainder from Massachusetts.

Report on the Birds, by J. A. ALLEN.

The additions to the ornithological department since the last detailed report of receipts, have been very considerable, amounting in the aggregate to above two thousand one hundred skins, representing about five hundred and fifty species, including nearly three hundred mounted specimens, eighty-seven adult birds, and nearly three hundred embryos, in alcohol, five hundred and fifty-four dry eggs, and skeletons and parts of skeletons of about forty species.

Though the additions have been chiefly from North America, as shown in the subjoined schedule, and largely from New England, the foreign invoices received, mostly through exchanges with other museums and individuals, have contributed above one-fourth of the skins, and fully four hundred species. Among the donations, a collection of more than one hundred finely prepared skins of Brazilian birds, the gift of the Emperor of Brazil, is especially worthy of notice. Among the additions accruing from our exchanges, nearly complete skeletons of four species of *Dinornis*, the latter from Dr. Haast, of Christ-church, New Zealand, and from the same gentlemen, and through Professors Layard, McCoy, Kaup and Schimper, large invoices of skins from New Zealand, South Africa, Melbourne, the East Indies and Europe, are also deserving of particular mention. The invoice of Professor Schimper embraces a large series of very finely mounted European birds, representing nearly one hundred species. The domestic receipts include a fine lot of nearly one hundred and fifty mounted specimens of New England birds, selected with special reference to completing a faunal collection of this region for exhibition, and which contains many varieties.

In order not only to increase the stock of duplicates for exchanges, but to bring together large series of specimens of a considerable number of species from a single locality, for the purpose of affording means for the investigation of the amount and character of individual variation, it was decided early in the year to collect extensively Massachusetts birds, and in following out the plan, some thirteen hundred specimens have been added during the past season. In carrying on this work, we were most fortunate to secure the assistance of Mr. C. J. Maynard, of Newtonville, whose enthusiastic co-operation has

been of great value. What should be particularly noted in reference to these additions, is the fact that detailed measurements of each specimen were carefully made before skinning, and the sex determined in all cases by actual dissection. Of a few species, above fifty specimens of each have been collected. Such series show the exceptionable character of many distinctions commonly considered to be trustworthy guides in determining species, and not unfrequently present specimens differing so widely from each other, that if they came from remote localities, few ornithologists would hesitate to consider them as representing distinct species.

The work on the collections has been mainly confined to the skins. The cataloguing and arrangement of these have been continued, and a considerable number of duplicates set aside for exchanges, some of which have been packed, and are awaiting shipment. With the exception of very recent additions, all the American and European specimens are now catalogued, and the North American have been carefully identified. The arrangement of them into faunal and systematic series is also considerably advanced. In connection with the faunal arrangement of the collection, a special investigation of the Geographical Distribution of the Birds of North America has been commenced. To facilitate the collection of data concerning this subject, the subjoined circular has been issued, and extensively distributed among American ornithologists. Responses from a considerable number of observers have already been received, in which they have promised their co-operation. A few have also made valuable contributions of facts, among which we will here only mention a full list of the birds of the vicinity of Havana, Cuba, with annotations, from Dr. Gundlach.

During the year, the whole collection of embryos, preserved in alcohol, numbering above thirteen hundred lots and three thousand specimens, has been systematically arranged in the cellar, and the cataloguing of the same completed. More than two hundred mounted specimens of birds have been added to the collection on exhibition, while many more are stored in the bird-room for lack of space in the public rooms.

In conclusion, we may add that, through the great number of specimens accumulated from one locality now possessed by the Museum, we are provided with an amount of material

necessary for the successful investigation of many points bearing on the character of species, far exceeding that of any other Museum. It is still desirable, however, to considerably increase the number of specimens of the Grallæ and Anatidæ, and some other of the aquatic species, since of these we have but few specimens to spare for exchanges. It is hoped that this deficiency may be supplied during the ensuing year.

By Donation.

AGASSIZ, L. 1 *Falco peregrinus*, from Cambridge, Mass.

ALLEN, J. A. 76 specimens, 27 species, skins; 60 specimens, 20 species, in alcohol; 205 specimens, 17 species, eggs and young birds, in alcohol; 418 specimens, 15 species, dry eggs, from various localities in Massachusetts.

BABCOCK, A. L. 2 specimens, 2 species, skins, from Massachusetts.

BLISS, RICHARD, JR. 1 skin of *Butes borealis*, and 2 specimens, 2 species, in alcohol, from Ogdensburg, N. Y.

EMPEROR OF BRAZIL. 108 specimens, 67 species, skins, from Brazil.

GOODNOW, E. 13 specimens, 8 species, fresh, from Cambridge.

HARRISS, E. D., Cambridge. 2 young domestic pigeons.

JILLSON, S. 4 specimens, 4 species, from different foreign localities.

KNOWLTON, W. J. 1 live Carolina Rail, from Rockport, Mass.

LINCLIN, CHARLES. 1 *Pelionetta perspicillata*, from Buffalo, N. Y.

LOCKWOOD, S., JR. 2 specimens, 2 species, from Fallsburg, N. Y.

MAYNARD, C. J. 67 specimens, 19 species, eggs and young birds, in alcohol, chiefly from Newtonville, Mass.

SUPERINTENDENT OF THE MOUNT AUBURN CEMETERY. 1 swan, fresh.

PERRY, Rev. J. B. 1 nest, and 2 eggs, from Burlington, Vt.

ROETTER, J. 10 specimens, 6 species, from Cambridge.

SMITHSONIAN INSTITUTION. 182 specimens, 58 species, chiefly from Arctic America.

THAYER EXPEDITION. HARTT, C. F. and COPELAND, C. 1 skeleton, from Spiritu Santo, Brazil.

By Exchange.

BENNETT, C. W. 6 specimens, 5 species, skins, from Holyoke, Mass.

EDWARDS, Prof. H. MILNE. (*Jardin des Plantes*.) 1 ostrich, and 1 cassowary, mounted, and 1 skeleton of cassowary.

HAAST, Dr. J., Christ-church, New Zealand. Skeletons, some of them sufficiently perfect to be mounted, of 4 species of *Dinornis*, (*D. crassus*, *D. elephantopus*, *D. dodiformis*, *D. casuarius*.) Also 50 specimens, 36 species of skins, from New Zealand.

KAUP, Dr. (*Museum of Darmstadt*.) 26 specimens, 23 species, chiefly from Celebes, Timor and Molucca.

LAYARD, Prof. E. L. (*South African Museum*.) 82 specimens, 66 species, from South Africa; 9 specimens, 7 species, from India, and 1 specimen from Australia, skins. Also 134 specimens, 59 species, dry eggs, from South Africa.

MCCOY, Prof. FREDERIC. (*Victoria Museum, Melbourne*.) 119 specimens, skins, from Melbourne.

SCHIMPER, Prof. WM. (*Museum of Strasburg*.) 178 specimens, 106 species, skins, the greater part finely mounted, chiefly from Germany.

By Purchase.

1,023 specimens, 124 species, skins; 146 mounted specimens, 80 species; 35 sternums, 31 species; and 12 skulls, 9 species; all from Eastern Massachusetts. Also 80 specimens, 35 species, skins, from Iowa and Illinois. Also 1 dodo, from Mauritius, (through Mr. Mellers, U. S. Consul at Mauritius.)

NOTE.

Circular in reference to obtaining data concerning the distribution of North American birds in the breeding season.

All naturalists are aware that the Geographical Distribution of animals and plants is a subject of great and general interest, and that its investigation is at present greatly retarded by the small number of facts on record. This is more particularly the case in reference to Birds, inasmuch as their range in the breeding season, which is by far the most essential, is less known than their general range, including their migratory journeys. The present Circular is issued by the Museum of Comparative Zoölogy, with the hope that, through the general co-operation of Ornithologists, such facts may be collected as will furnish much additional information relating to the distribution of the North American species at this season.

While complete lists of the species occurring in many localities is extremely desirable,—with full notes in reference to the times of their migrations, seasons of occurrence, time of nesting, and relative abundance,—partial lists, even embracing only the more com-

mon species observed during the breeding season, would be of great value. However few the facts, they will be very gratefully received.

The recipient of this is accordingly respectfully solicited to contribute such facts on the subject as he may have at command, transmitting them as directed below. Full credit will be given to each observer in the Annual Reports of the Museum, and finally, in working up the observations thus collected, his name will be given as a guaranty of their authenticity.

A series of specimens of the birds of any locality in the Southern and Western parts of the Continent, with or without their nests and eggs, with the date and place of collecting carefully noted and appended, would be thankfully received, and, if so desired by the collector, after careful examination, will be returned to him properly labelled.

Communications or packages should be addressed to J. A. ALLEN, care of Prof. LOUIS AGASSIZ, Museum of Comparative Zoölogy, Cambridge, Mass.

L. AGASSIZ.

MUSEUM OF COMPARATIVE ZOÖLOGY, }
CAMBRIDGE, MASS., June 4, 1868. }

Report on the Collection of Articulata, by Dr. H. HAGEN.

I arrived in Cambridge October 12th, 1867, having come to this country in order to take charge of the collection of Articulates in the Museum of Comparative Zoölogy, and especially to re-arrange the entomological collection. Prof. Agassiz desired me before beginning the work to draw up a detailed written plan, containing my views on the subject and explaining the method of arrangement which I thought best.

This plan being generally adopted, I began with the class of Crustacea, postponing my work upon the Insects, because it was very important that the new boxes and cabinets intended to contain them, should be made by a first-rate workman, and they could not be ready for some months to come. The first lot arrived in August, 1868.

The numerous objects received from Mr. Thayer's expedition had for some time occupied all working hands; the importance of putting them in safety being generally recognized. On this account it had been impossible to give more attention to the collection of articulata than was absolutely necessary to keep

them in good preservation. In the exhibition rooms there were about 500 species of crustacea, mostly determined by Messrs. Dana, W. Stimpson and others; all the rest had been stored for some years on the cellar shelves in kegs or glass jars. During the first three months I was occupied in cleaning, separating, and unpacking these jars. In this time, with the exception of some kegs containing mostly duplicates, the whole collection was assorted in 4,300 glass jars; these jars were filled with new alcohol and placed on provisional shelves put up for the purpose in the library and adjoining rooms ready for scientific purposes. The following months I was engaged in a general revision of the whole collection, nearly three-quarters of which consisted of Brachyura and Macrura, now arranged in families and genera. Some families are even farther revised, especially the Stomatopods, as well as some genera of the Brachyura and Pagurina. The very valuable collection of the American Astaci is monographically finished and now in the way of publication. An estimate made upon this careful revision shows the collection to contain more than 2,000 species, a considerable number when we remember that according to the most recent computation of the species of crustacea thus far known they do not exceed 5,500 species.

Meanwhile I formed a small but valuable collection of the family of Pseudo-scorpions, hitherto neglected in the study of the American fauna. By the help of Messrs. Francis Sanborn, Cresson, Packard, Burgess, Mann and others, I was able to bring together a collection of species from all the recognized genera of these interesting animals, hitherto unknown on this side of the water, with the exception of two species described by Mr. Say. Mr. Menge, of Danzig, Prussia, to whom we owe the best monographs of this family, was so kind as to present the Museum with a full set of his types. A monograph of this small family containing a complete synopsis of all described species, with drawings of all American species, is nearly ready for publication.

In the succeeding months the Insects, Myriapods and Arachnids in alcohol were revised, cleaned, and partly separated, and repacked in new alcohol. Mr. Burgess has had the kindness to revise, determine, and catalogue the North American Myria-

Pods. Mr. B. P. Mann partly revised the North American Lepidoptera in alcohol.

The arrival of the new insect boxes, enabled me to begin my work upon the entomological collections of dry specimens in November. The plan adopted for this portion of the articulate collection, is intended especially to fulfil the following conditions. 1. The whole collection is to be put up in such a way as to be secured as far as possible against the attacks of obnoxious and destructive insects, and adapted at the same time, for scientific purposes and study. The collection should be made a standard collection for all time, remarkable for its mode of preservation, remarkable for its systematic arrangement, remarkable as far as possible for its correct identification of species. It should always be a safe and useful guide for every entomologist, especially for every American entomologist who desires to determine his doubtful species; and, in short, it should form, in the highest sense, a national collection. To attain this end, the boxes and cabinets are ordered of the best quality and pattern. After careful consideration, we have adopted the fashion of cases used for the same purpose in the Berlin Museum, and approved after an experience of sixty years. A detailed description of the form of the boxes and cabinets, with certain improvements upon the original model, will perhaps be of interest hereafter. I may add that I have never seen insect boxes better made, than those furnished from Grant & Mann's factory, for the use of the Cambridge Museum.

2. The arrangement and ordering of the collection should agree in every respect with the comprehensive plan adopted by Prof. Agassiz, for all collections belonging to the Cambridge Museum. This plan, though easily understood for the other classes, may require some explanation as applied to the insects, because on account of the immense number of species, exceeding many times those of all other animals together, this class might seem to require some peculiar mode of treatment. The formation of the following collections is decided upon:—

1. A systematic general collection, serving as a dictionary for science and students.

2. A systematic collection for North American insects, intended especially for American entomologists and their purposes, and including typical specimens as much as possible.

3. Typical collections to be separately preserved, like the Melsheimer and Ziegler collections, now belonging to the Museum.

4. Faunal collections, agreeing with the general plan adopted by Prof. Agassiz for the other classes of animals, in the greatest possible extension of perfection.

5. A collection representing the metamorphoses and all different stages of the species, including their houses, cases, cocoons, &c.

6. A biological collection, containing all the obnoxious or useful insects, their products, their manner of working and feeding, as well as specimens of the artificial products derived from them; or the latter might be separated, as forming an economical collection by itself.

7. An anatomical collection, including microscopical preparations, and following the order of the different systems of organs through the whole class.

8. A palæontological collection, including insects contained in amber and in copal.

9. A physiological collection, containing monstrosities, hermaphrodites, and all objects belonging to this class of facts.

10. Since most of these collections require to be kept as much excluded from light and air as possible, there will be a collection for public exhibition, containing species remarkable for their beauty, or as being either useful or obnoxious; besides, a collection representing types of families, and genera for entomological students. The other collections will always be accessible on special application, or for purposes of study.

Of course, so comprehensive a plan cannot be accomplished under many years, nor without powerful support. To carry it on, requires ample means and able assistance. The collection, taking into account the time spent and the way in which it was gathered, is no doubt considerable. It consists of nearly 1,300 boxes, some very full and nearly 4,000 alcoholic bottles; one-half containing lepidoptera, one-third coleoptera, the rest the other orders. The fauna of North America and Europe are prominent. Micros are mostly wanting. The fauna of Brazil is, for Rio and the vicinity, very rich; for Para and other parts of the sea-shore, considerable.

From Africa, Zanzibar is very well represented; from Asia,

Japan, China and Burmah; from Australia, Melbourne. Other localities are more or less represented.

The first step is to secure the safety of the present collection in the new boxes; the second, to separate them as well as possible; the third, to enlarge the collections in such a way, as to fulfil as far as may be, the plan proposed.

To accomplish this purpose, I have begun to bring together the lepidoptera for the systematic and faunal collection, while Mr. Burgess has been doing the same work for the North American lepidoptera. Nearly 300 boxes are filled, and all the lepidoptera except the valuable European collections, are arranged.

Mr. B. P. Mann has commenced the same work for the North American coleoptera, especially with the view of putting in safety the valuable collections determined and arranged by Mr. Uhler, and partly revised by Mr. LeConte.

I have also begun the arrangement of the larvæ, pupa, &c., for the collection representing the metamorphoses of insects. They are arranged in glass tubes, in alcohol, and then placed like the insects themselves, in well closed boxes, insuring their perfect safety. This arrangement is made upon a peculiar plan, facilitating the study of the objects and permitting a better view and more ready comparison than is usual.

This is the beginning. Hard work, the sympathy and aid of all entomological students, and a liberal pecuniary support, are needed if the large and comprehensive scientific plan adopted, is to be fulfilled. I am sure that it will be!

Report on the Tertiary Gasteropods, by REV. J. B. PERRY.

During the year just drawing to a close, my attention has been mainly confined to the Museum collections belonging to the Tertiary era. In reporting upon the investigations begun, and the progress thus far made, it may be well that I refer at the start, to the collections themselves, and to the condition in which I found them on assuming the position of assistant in the department of Palæontology.

The Tertiary fossils of the Museum consist of several important Tertiary collections brought together in one building—the

old Harvard collection, and the large gatherings made by individuals, in some cases during a lifetime of palæontological activity. Among these may be mentioned the extensive collections of Professor Agassiz, which having been for many years in process of accumulation, were presented in 1851; those of Professor Bronn, of Duval, and of Boucault, which were purchased in 1859; and the entire gatherings of De Koninck, and portions of those made by Carl Meyer, Eichwald, Hörnes, Michelotti, Bellardi, Appelius, Rigacci, Rouault, Tarbé, Krantz, Lyell, and many others, which were secured by purchase, exchange, or donation.

These various assemblages of Tertiary organic remains had been unpacked and placed in drawers previously to my connection with them. Considerable work had been also expended at an early day on the Plants, on the Radiates, on the Brachiopods, and the Cephalopoda. Of the remainder, the larger part was deposited in a single room, while a portion, by no means small, was scattered through the building. They were all safely stored, though all were not in equally good condition. Of these specimens, some were undistributed; others were placed together, apparently at hap-hazard, and certainly without system; while there were still others which had been partially arranged; that is, they were arranged so far as they could be said to have any arrangement, according to five or six different methods. In given instances, specimens in greater or less number had been disposed in small groups. These groups, however, were never found complete; they occurred, for the most part, in isolated conditions, there often being twenty, thirty, or even forty separate and different parcels, more or less alike, scattered through the various collections. In other instances, specimens had been thrown together, to some extent, according to countries, collocation being the main thought apparent, and this never carried out with rigorous exactness. In yet other instances, an effort to group the specimens was evident, a series of drawers being found to hold fossils from many different regions, a single drawer containing sometimes two or three groups, usually six or eight, often a dozen or twenty, and occasionally species from almost every branch in the animal kingdom.

Again, the specimens having come from a great number of collectors, of course bore the names given by various different

palæontologists, species widely unlike being designated as if they belonged to the same genus, and those agreeing in their generic characters, being referred to distinct genera. Under these circumstances, as is not surprising, fossils intimately related were often widely separated, even when there was an attempted arrangement, while those not at all closely allied, were arbitrarily placed in juxtaposition from a mechanical following of names — a result naturally to be expected in the first efforts to classify diverse objects. In this endeavor to arrange specimens systematically, as should be added, the work had been seldom, perhaps never, pushed so far, as to appear in the grouping of species according to their natural affinities; so, again, older specimens were frequently found mingled with the Tertiary, especially those of the Cretaceous era, there having been a failure to discriminate closely between those of the Mesozoic and those of the Cainozoic age. The same was likewise true of the Post-Tertiary fossils, the line of demarcation between them and the Tertiary not having been critically regarded, as was not indeed to be expected in the earlier stages of the work.

Once more: it became apparent that Tertiary specimens were to a considerable extent, scattered all through the building, some being here, a few more there, and others in additional corners, occasionally by themselves, though often mingled with fossils of various ages. It also became evident that there had been, in some instances, a mixing of fossils from different localities — a result scarcely to be avoided in the repeated removals of so many collections, consisting of such a vast number of specimens. To a very large extent, these specimens were in small pasteboard trays, accompanied by original labels — labels which give great value to the specimens, as being the determinations of such men as Bronn, Duval, De Koninck, Meyer, Eichwald, Hörnes, Michelotti, Bellardi, and others. In most instances they were accompanied by a sort of semi-duplicate labels, consisting of portions of the original labels, respecting which there was no question, with the designation of the collection to which the specimens respectively belonged, and occasionally of the year of purchase or exchange.

Such is substantially the state in which I found the Tertiary collections of the Museum — a state almost inseparable from the mode in which the specimens have been brought together,

and the aims which heretofore have been largely prominent. These specimens, as should be borne in mind, have been in process of collecting for more than twenty years. They have come from a vast variety of sources, under an almost endless multiplicity of forms, often in small numbers, and received at a great number of different times; so they have been packed away, not as the Director might have wished, but as the storage rooms would best allow, — the primary design being the accumulation of valuable materials, in as large amount as possible, for subsequent investigation and arrangement. Accordingly, the occasional mixing of specimens from different localities is a result, even when there is the utmost care, necessarily incident to the unpacking of large quantities of fossils from various localities, and the repeated handling of them on other occasions. At the same time, it is evident that such a condition of things renders a vast amount of labor imperative. A partial mingling of specimens, for instance, necessitates a deal of comparison, of examination of kindred groups, of study of minute points, characteristics of particular localities, if a restoration ever be effected, and even then leaves every such specimen destitute of that fixed certainty which is so important in all strictly scientific investigations, and in order to really trustworthy conclusions.

It is, therefore, clear that these several collections, while remaining in the condition referred to, kindred specimens being so widely separated and the same species being designated by such a variety of labels, could be made, only to a very small extent, available for the purposes of instruction and of advanced studies, or of intelligent comparison and of exchange. In order to become both theoretically and practically useful, they must be brought together in a systematic way, consolidated in consonance with a fixed plan, and so worked up that each species should have its appropriate place, as determined by its affinities, and receive its designation accordingly. And this, as is evident, must involve an immense amount of work, both on the specimens themselves, and in the consultation and comparison of authorities in respect to classification, synonymy, and the nomenclature to be adopted in each specific case. Without all these labors, and more than these, it was plainly impossible to have a single grand collection so arranged throughout according to both the affinities and the analogies of nature, as to be the

harmonious representation of the animal kingdom during the Tertiary age, — so disposed as to stand in becoming relation to the forms of an earlier day, no less than to those of the existing era, — with all the parts in such a way designated, as to give due credit to every previous collector, observer, and collaborator in this broad field of inquiry.

It was consequently natural for me to feel, in undertaking the systematic arrangement of the Tertiary fossils of the Museum, that I had a great task before me. I accordingly began at once to prepare for it by a more thorough study than had before been in my power, of the several branches of the animal kingdom, and especially by a more exhaustive and minute investigation of the Tertiary, as well in all the manifold phases embraced in itself, as in its relations alike to the past and to the present. Entering immediately upon the practical work to be done in the Museum, I found myself in due time separating all the zoölogical remains of the Cainozoic age into grand groups or parcels, according to the several branches and classes to which they respectively belong. At the suggestion of the Director, I took up, at the very start, the *Pleurotoma*, a group of *Gasteropods*, as a special study. Bringing this group of fossils together by slow degrees, and devoting myself to a minute investigation of them as they appear in a fossil state, and in their relations to their living representatives, I gradually from this group as a centre, worked my way outward in different directions, as occasion offered. Advancing in this manner, I proceeded to separate the entire assemblage of tertiary *Gasteropods* into kindred groups of about the same equivalence, as *Murex*, *Fusus*, *Cerithium*, and the like, according to their zoölogical affinities. This work has been diligently prosecuted, and is largely accomplished.

In addition to this, I have also been over these several different groups, one after another, aiming to bring together in small specific circles, all the individuals in each larger section, according to their specific affinities. Having done this roughly for the entire division of *Gasteropodous Mollusks*, I have in several large groups taken up every specimen, examined it closely, and thus endeavored by critical study, to bring into its appropriate specific circle, each individual according to its natural and characteristic features, as indicated by the object itself. This

has prepared the way for another process, which has been carried on to a considerable extent in a number of large groups; viz., that of bringing together all the species, and arranging them in distinct generic circles; that is, in circles of species determined by generic affinities, or according to their kinds; all this being done in the light derived from the study of the fossils themselves. And this has suggested, and if the truth of nature be carried out, it necessitates an additional step equally important with the preceding; to wit, the disposing of these several genera in more comprehensive groups, holding intimate or remote relations to each other, according to their sub-family or family likenesses and differences. Still another step contemplated and all along kept in mind, but in respect to which I have as yet done little in the practical arranging of the collections I am investigating, is such a co-ordination of these several large groups, as shall cause them to stand in due and proper relation to each other, as making up the various great divisions composing the class to which they respectively belong.

In connection with, yet in addition to, this work on the specimens themselves, there has been a large amount of labor expended in the examination and comparison, as well of the earlier names, figures and descriptions of species, as of those now prevalent, and for the most part to be met with in recent publications. This is necessary, in order that what has been heretofore done by palæontologists may be definitely known, and so the way made clear for intelligent advancement. It is also desirable, in order that every species which has been accurately named and figured, may be determined and designated with strict historic fidelity; and that thus such specific groups as have not yet been properly worked up, may be in due time accurately arranged, named and described, as truth and the exigencies of each case shall dictate. In this direction a large amount of preliminary work has been done, and the result briefly noted, — a work which has necessitated the ransacking of many musty tomes, some of them long out of print, in English, French, German and Italian; for original documents have been in all cases consulted, so far as practicable, in connection with more recent authorities.

There is another important aim involved in the work under consideration, — an aim, which as suggested by the Director of

the Museum, has been constantly borne in mind, and actually carried into execution as rapidly as the advancement in the arrangement of species has allowed. Reference is made to the selection of specimens from this large mass of material, as it receives systematic consolidation, for three Museum collections.

First of all, with a view to the formation of a grand *systematic collection*, choice has been carefully made of a type-specimen — intended to be the best single representative to be found — in each specific group. In all cases, so far as possible, these type-examples are authentic specimens selected from the collections of the palæontologists who described the species, great pains having been taken to secure such specimens. The purpose of this assemblage of representative individuals is the presentation to the eye, by actual examples, of the true scientific relations of the animal kingdom, viewed as a systematic whole, so far as they are already recognized, or may from time to time come to be known, and to just the extent the additions to the Museum will warrant. Of course, in this collection, which is designed to be a sort of world in miniature, every species of which the institution possesses an authentic example, will be represented.

In the second place, specimens are in process of selection, from each specific group, for a grand *faunal collection*. With the design of making this assemblage as complete as possible, specimens are chosen in sufficient number to show all individual and specific characteristics — the relations of sex, with the various other points, both of agreement and of variation — as well as to illustrate whatever peculiarities have been noticed, or may come to light in the process of investigation. At the same time, this collection is intended, as its name implies, to demonstrate by positive ocular evidence, the geographical limitation and distribution of each species, so far as its actual extension is indicated, or shall come hereafter to be indicated, by the materials at the disposal of the Museum. Of course, this assemblage of specimens, as progress is made in its formation, naturally divides itself in various more or less distinct partitions, according to the regions, basins, or zoological provinces to which the species respectively belong; while these as readily subdivide themselves into sections answering to the different chronologic horizons which they severally represent. In making up this

collection, the utmost care is taken to select those specimens alone, in respect to which there is no doubt whatever as to geological horizon and geographical position.

In the third place, specimens are in process of selection from all the different specific groups, a single one from each locality, intended to make up a grand *chronologic collection*. The design of this last assemblage of fossils, is the visible representation of what I have been wont to term life-periods. In other words, it is the actual exhibition of the vertical extension or geologic duration of each species in every locality, of which the Museum has, or may come to have, specimens; and so of the succession in time, both of species and of all the different divisions of the animal kingdom. The indication of succession, with other closely allied points, being the prominent purpose of this collection, ordinary specimens are used; while sometimes in the lack of them, or, if the species be rare and the fossils of great value, simple tablets, appropriately labelled, with references both to the systematic and to the faunal collection, will be for a while employed. This, however, will only be the case until the deficiency can be supplied by the reception of a larger amount of material; for it is desirable that each collection be as full of instruction as possible, without detracting from its predominant aim.

As this work has gone on, two results have come to light, each of which is deserving of notice. I refer to the completeness and deficiency of the Tertiary collections belonging to the institution. In my study of these organic remains, the richness of the Museum stores has become more and more evident, surpassing in some instances even the highest expectations entertained in regard to them. As an instance of this amplitude and fulness, I may cite the consolidated collection of fossil *Pleurotoma*,—a group, the specimens of which have been for the most part brought together and pretty thoroughly worked up, though many details yet remain unexecuted. In this group alone, the Tertiary species belonging to the Museum, and in most instances represented by a fair number of individuals, probably exceed 450; while the whole number cited by S. P. Woodward, of the British Museum, is 300. The *Cerithium* group, the systematic arrangement of which is considerably, though by no means so far advanced, seems to be equally large. Many other groups,

in the arrangement of which no small progress has been already made, such as the *Voluta*, *Pyrula*, *Fusus*, *Murex*, and the like, are very well represented in the Museum collections.

But the study of these fossil remains has also revealed deficiencies in various directions. Some groups, as we might naturally expect, are much less richly represented than others. So there are localities famous for their Tertiary fossils, of which the Museum has only a meagre supply of specimens. These and other like defects, as it is hoped, will constantly become less as time advances. In connection with this point, it may be proper for me to say that there have been lately received in this department about 300 specimens, comprising some twenty species, from Mr. J. G. Anthony's collection. While making a vacation gathering of Palæozoic fossils last summer, I was able to add about 200 specimens of fossil seeds and fruits, from the Pleiocene beds of Brandon, Vt.; likewise, upward of 900 specimens, consisting of about a dozen species, from the Pleistocene formations of western Vermont and of Montreal. During the past year nothing has been done in the way of making exchanges of Tertiary fossils, it being the aim, first of all, to get the Museum collections into a well organized condition. And I am happy in being able to say, that this work is now so far advanced, as to render it proper to turn attention in this direction. Indeed, the reference to existing deficiencies was made in the hope that it will lead to a system of active and more extensive exchanges, which must prove at once advantageous to others, and beneficial to the institution.

This reference to exchanges suggests an additional point, which may receive a moment's notice. In making up the three Museum collections, a considerable amount of unemployed material is in process of gradual elimination, which may hereafter serve for purposes of study and illustration, of donation and exchange. This unused material naturally divides itself into two parts. The first portion consists of such specimens as have been mixed, either accidentally or in process of moving — in fact, of all those specimens which are eliminated because of some doubt which may be entertained, either as regards their locality, their geologic horizon, or any other point impairing their scientific worth. Specimens of this kind, though their value in one direction be diminished, are still of great use; and

they are all preserved, and will be put to good service, either as objects on which students may be engaged in learning to note likenesses and to discriminate differences, or as material for the making of sections illustrative of the interior structure of fossil remains. The other portion of this material, steadily increasing as the Museum collections advance, and in respect to which there is no question, is laid aside and will be faithfully reserved for purposes of donation and exchange. Although this be a subordinate and incidental feature of the work that is going on, it is yet one of no small importance as respects the permanent usefulness and interest of the institution in advancing the aims of science. This surplus material being worked up, in many cases with as much thoroughness as that reserved for the use of the Museum, is coming to be greatly enhanced in value, as well in a pecuniary, as in a scientific point of view; and it is believed that, as judiciously employed, it will in the end contribute not a little to the prosperity, because it is calculated to add so much to the usefulness abroad, and to the efficiency at home of this cosmopolitan school for the training of naturalists.

In what has been said, I have had primary and exclusive reference to the systematic arrangement of the Tertiary collections of the Museum. Substantially, the same remarks might be made in regard to the rich assemblages of Mesozoic and Palæozoic fossils in the possession of the institution. Indeed, essentially the same principles are applicable, and, as I infer, are to be carried out in the entire department of Palæontology, as well as in the several other departments, of course receiving modifications as exigencies may vary, but everywhere pervaded by singleness of purpose, and brought to bear in the light of one all-controlling idea. It is the aim of the Director to build up a Museum, in the proper scientific sense of the term — a Museum in which the whole animal kingdom shall be represented, both under its existing relations, and as it was in the past, the vast assemblage of specimens being so arranged as to exhibit, in one picture, distribution in space as it has appeared from age to age; in another, succession in time; and in a third, a systematic view, at once of the affinities and of the diversities of all recognized animal forms, — a Museum which shall stand as a transcript of the world of animated existence, everywhere revealing the thoughts of a Supreme Intelligence, working out under

an endless multiplicity of structures, a primal and all-pervading unity of design, — thus a Museum which shall stand as a monument of all that is yet known of the living forms which have peopled our globe, on the one hand suggesting the true philosophy of nature, and on the other, teaching its history by a manifold variety of well-selected examples.

In closing this Report, I desire to say that in the little I have done, I have all along received kindly counsel and valuable suggestions from Professor Agassiz; and that I have been able in all points cordially to sympathize, and, as I trust, in some actively to co-operate with him in his various plans and efforts to advance the interests of the Museum.

Report on the Collection of Fossil Remains in general, by N. S. SHALER.

The assistant in Palæontology has to report a resumption of the work upon the collections under his charge, which had been interrupted by two years' absence from duty in the Museum. During this time he has had the opportunity of visiting about fifty of the principal museums of Europe, of carefully examining the various matters connected with their administration, and of obtaining much information which may in the future be made useful in the arrangement of our own collections. Although this systematic study of the great European collections resulted in the acquisition of many valuable details concerning the mechanical appliances for the care and arrangement of materials, it afforded no results which could have an influence upon the general plan which should regulate the arrangement of the stores of a museum. So far as his observations extended he found no museum where any other purpose than a desire to produce a pleasing and convenient disposition of the specimens, was manifested in the general plan of arrangement. In the few cases where there was an evident intention of showing some of the more important general features connected with the distribution of life over the face of the globe or in the successive geological formations, the imperfection of the means has been too great to afford any great result. Among the fifty museums visited not one was found in a building especially designed for

the purpose of exhibiting collections arranged to show the history of life. Where, as in the Oxford, Heidelberg, and other university museums, buildings have been constructed to hold scientific collections, they have been designed to contain other museums besides the zoölogical, and have thus had their shape partly determined by the needs of other departments. The great collections of Europe are crowded into buildings which were not planned for their accommodation. The liberality of the people of Massachusetts has given to zoölogical science the first, and as yet the only structure erected for its sole use.

The work of cataloguing the collections of fossils has been resumed. This work has been nearly finished in the order of Brachiopoda, and is already well advanced in the Lamellibranchiata. Over twelve thousand (12,000) lots of fossils have been entered on the lists, and corresponding numbers written on the one hundred thousand specimens they contain; thus permanently securing those specimens against loss from accidental displacement. The arrangement of the Brachiopoda into its proper subordinate groups, and the separation into the different geological and faunal divisions, has been carried so far that the greater part of the specimens are in order for the work of placing on tablets for exhibition. The collection of Brachiopoda now in our hands, is one of the most extensive, if not the most complete in the world. We have added to the large and valuable collections purchased from Bronn, De Koninck, Campiche, and many others in Europe, very large collections from the most important American localities. Every effort will be directed towards making this collection of fossils useful in the development of our knowledge of the history of life on this continent, by increasing our stores of American fossils, and by extending the work of comparison of our own species with those found in other regions. As soon as the whole collection has been secured against mischance by the system of cataloguing and numbering, it can then be intrusted without danger to students and preparators for study and for the work of preparing for exhibition. The completion of the series of racks now being built to hold the two thousand drawers in which our fossils are stored, will greatly facilitate the work of arrangement and enable us to have all our materials readily accessible.

Although our collection of fossils is in many respects unsurpassed, many things are still necessary to give it the value it should have to accomplish the ends in view. Assistance for cleaning and mounting the specimens is imperatively necessary. At least two persons could be employed on this work for the next year without going out of the material already catalogued. There is also need of some expenditures to complete the series of forms now in our stores, which having been purchased from many hands, require considerable additions to fill the blanks which remain. We ought also to have at least one collector constantly at work on our American rocks, in order that our representation from them be more complete, and that we may have ample means for exchange. It is no exaggeration to say that for every lot of carefully collected American fossils we can obtain valuable European specimens, which would cost us twice or thrice as much to purchase as we pay by exchange. The assistant is now preparing a map to show the regions from which we have collections of American fossils to guide the work of collecting, should it be concluded to undertake it. The most serious deficiencies are to be found in the collections from the Southern States. The war prevented collection for many years, and the disturbed state of the country has made it difficult to get collectors to go there since its close. Now that this difficulty is removed, there should be more attention paid to the rich Cretaceous and Tertiary localities so generally absent in the seaboard Northern States. Several correspondents are very desirous of having collections from that region.

Since the resumption of work in September, several exchanges have been prepared for our European correspondents. During his journey, the assistant in charge of this department, was so fortunate as to make arrangements which secure this sort of co-operation on the part of about a dozen valuable correspondents, in addition to the thirty or more already on our books, to whom collections will be forwarded as rapidly as possible.

The assistant in Palæontology has given thirteen lectures of a course on Palæontology, which will be continued during the remainder of the present term and part of the next. The second part of the course will be especially devoted to instruction in the identification of fossils.

The Museum is indebted to the following persons for donations of fossils:—

GREENOUGH, HORATIO, Mrs. 1 lot of fossil, from Vaches Noires Calvados.

WHITNEY, Prof. J. D. Teeth of fossil elephant.

CLARK, President, of Mass. Agricultural College. 2 specimens of fossils, from South Carolina.

McPHERSON, WM., Jackson County, Florida. 1 mastodon tooth.

ELLIS, C. STUART, of Muscatine, Iowa. 1 fossil plant.

RAPIN, Dr., of Grandson, Switzerland. 1 lot of neocomian fossils.

GIBBON, Gen., U. S. A. Fossils, from Laramie Plain.

AGASSIZ, Prof. L., Curator of the Museum. Boxes of fossils, from the Smoky Hill route, Rocky Mountains.

AGASSIZ, Prof. L., Curator of the Museum. Boxes of fossils, from Ithaca, New York.

AGASSIZ, ALEX., Assistant in the Museum. A lot of fossils from the drift beds of the Lake Superior region.

BARNARD, JAMES M. Fragments of vertebrate skeleton, from Washington Territory.

BOUTELLE, Capt. Fossil tooth, from Ashley River, South Carolina.

WYMAN, Prof. J. 1 lot of fossils, from Florida.

RICE, Prof. J. M. 1 box of fossils, from Annapolis, Md.

SHALER, N. S., Assistant in the Dep't of Palæontology. 1,200 species, about 30,000 specimens of European fossils, representing about 100 localities, and most of the European horizons.

SHALER, N. S. 50 species, 300 specimens Silurian and Tertiary fossils, from Ohio and Kentucky.

PERRY, Rev. J. B., Assistant in the Museum. 915 specimens Pleistocene shells; 200 specimens Tertiary seeds and fruits, from Vermont and Canada, and 850 specimens of Palæozoic fossils, from Vermont and New York.

SERRES, M. HECTOR, à Dax, France. 1 lot of Tertiary fossils.

RAVEY, SAM'L. One large Orthoceratite, from Nashville, Tenn.

The following lots have been received in exchange since the last report of the assistant:—

DAVIS, H., McGregor, Iowa. 1 box of fossils.

HERZER, Dr., Delaware, Ohio. 1 box of fossils.

ALLEN, Prof. G. N., Oberlin College. 2 boxes of fossils.

PICKET, E. J. 1 box of fossils.

LAYARD, F. A lot of European fossils.

HAAST, Dr., New Zealand. A lot of *Dinornis* bones, embracing several nearly perfect skeletons.

PYBAS, A. 1 lot of American fossils.

Owing to the long absence of the assistant in Palæontology from his place, it is not impossible that some omissions will afterwards be detected in the list of persons to whom the thanks of the Museum are due; should such be discovered, the acknowledgment will be made in the next report.

[B.]

TRUSTEES OF THE MUSEUM OF COMPARATIVE ZOÖLOGY.
1869.

THE GOVERNOR OF THE COMMONWEALTH,
WILLIAM CLAFLIN.
THE LIEUTENANT-GOVERNOR,
JOSEPH TUCKER.
THE PRESIDENT OF THE SENATE,
ROBERT C. PITMAN.
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.

JAMES WALKER.	JAMES LAWRENCE.
NATHANIEL THAYER.	THEODORE LYMAN.
SAMUEL HOOPER.	C. W. FREELAND.

(And two vacancies.)

OFFICERS OF THE MUSEUM OF COMPARATIVE ZOÖLOGY FOR
1869.

His Excellency WILLIAM CLAFLIN, Governor of the Commonwealth,
President.

THEODORE LYMAN, *Treasurer and Secretary pro. tem.*

LOUIS AGASSIZ, *Director of the Museum.*

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

LOUIS AGASSIZ, REUBEN A. CHAPMAN, *Committee on the Museum.*

ANNUAL REPORT

OF THE

TRUSTEES

OF THE

MUSEUM OF COMPARATIVE ZOOLOGY,

AT HARVARD COLLEGE, IN CAMBRIDGE,

TOGETHER WITH

THE REPORT OF THE DIRECTOR

FOR

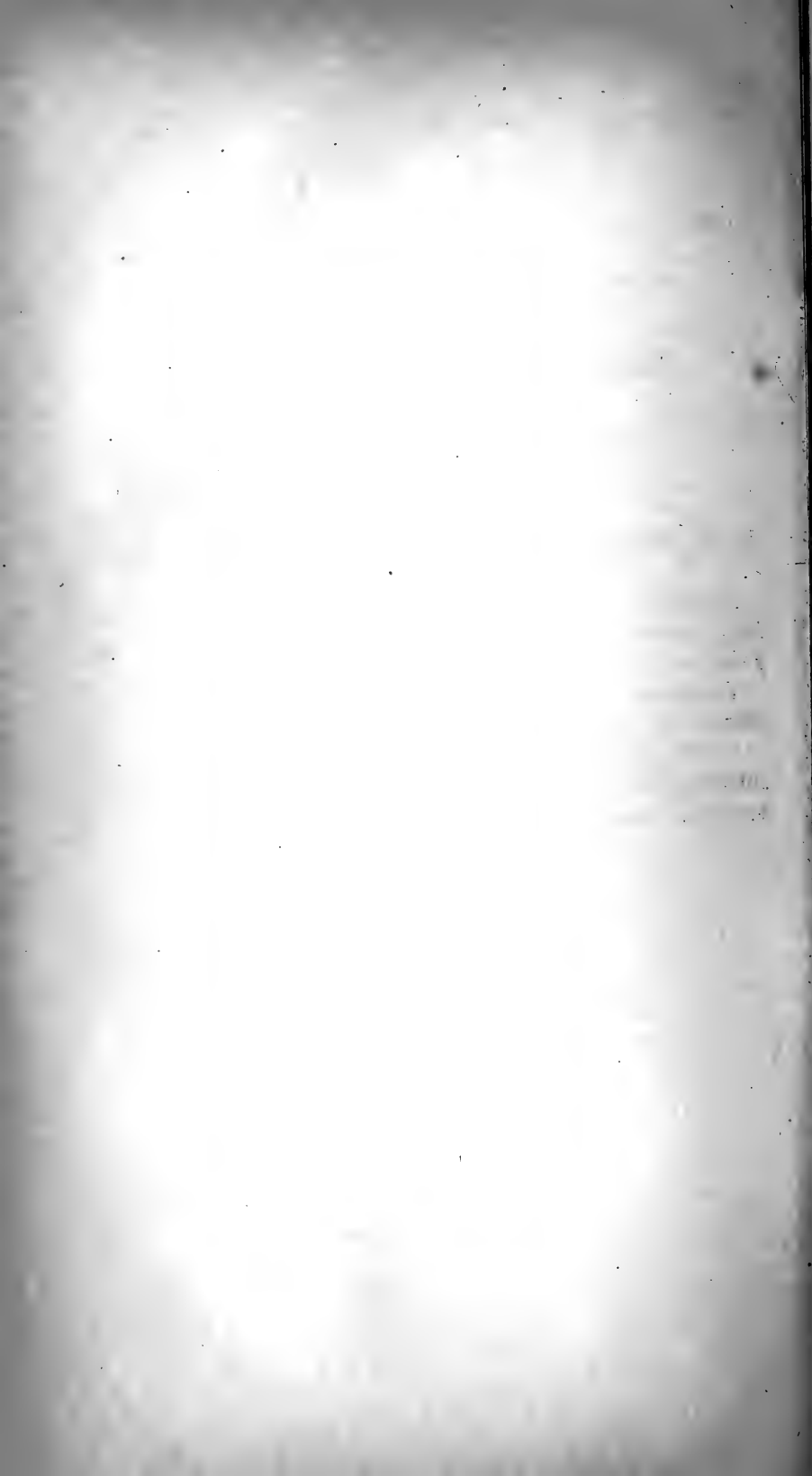
1869.

BOSTON:

WRIGHT & POTTER, STATE PRINTERS,

79 MILK STREET (CORNER OF FEDERAL).

1870.



Commonwealth of Massachusetts.

BOSTON, January 26, 1870.

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 marked [B] contains a list of the Trustees, the officers and committees for 1870.

During the past year the second \$25,000 of the conditional subscription has been raised, and the corresponding \$25,000 has been received from the State.

For the Trustees,

THEODORE LYMAN,
Secretary pro tem.

[A .]

REPORT OF THE DIRECTOR

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY,

FOR THE YEAR 1869.

It is now ten years since, in 1859, the Museum of Comparative Zoölogy in Cambridge was organized. We have closed our first decade, and it seems, therefore, appropriate to review the work thus far accomplished and to see where it has brought us. Beginning with very small means and scientific materials, the basis for which was chiefly the Gray fund and my private collection of specimens, hardly known at all abroad and attracting but little notice in those days at home, the Cambridge Museum occupies now a very honorable place among the prominent scientific institutions of the world. It is in no spirit of egotism that I, as Director of this establishment, speak thus of its present standing. But it is no more than fair that the legislature of Massachusetts and the individuals who have so generously sustained this undertaking should know that their liberality has not been misapplied. Familiar as I am with the history of museums, it is an astonishment and a gratification to me to find that in this short time we have attained a position which brings us into the most intimate relations with the first museums of Europe; we have a system of exchanges with like establishments over the whole world; while the activity of original research in our institution, and its well-sustained publications, the possibility of which we owe to the liberality of the legislature, make it one of the

acknowledged centres of scientific progress. Nor is this all. Men of high scientific standing in Europe are tempted to come and join us on the moderate salaries we are able to give, for the pleasure of working up collections in some respects more complete and more interesting to the student than any now existing. In this connection, I may add that I have secured, for a couple of years at least, the assistance of Doctor Steindachner, of Vienna, one of the first ichthyologists now living, to aid me in putting up our immense collection of fishes. Dr. Maack is another accession of the past year. He is making rapid progress in bringing our collection of fossil Vertebrates into order, in anticipation of the time when an increase of our building will enable us to display it to the public.

When our building was first put up, ten years ago, it was thought sufficient, and I myself then deemed it large enough, for the needs of the establishment. But so great has been the increase of our collections since that time that at this moment the Museum overflows from garret to cellar; there is hardly room to move between the boxes, barrels and temporary shelves put up for the accommodation of specimens, and with the utmost economy of space it is almost impossible for our daily increasing number of workers to proceed with their labors. Indeed, many most important and interesting features of the Museum must be ignored till we have more room; as, for instance, the large and perfectly unique collection of palms and tree ferns, with flowers and fruits preserved in alcohol, one of the most valuable results of the Thayer Expedition. This last collection has great importance in a museum like ours, intended especially for students and for educational purposes, because it illustrates, as no diagram can do, the ancient vegetation of our earth, and has a direct bearing on its geological and palæontological history. I had engaged Mr. Lesquereux, one of the few men in this country capable of arranging such a collection systematically, with reference both to its botanical and palæontological value; but on seeing the collection he declined to unpack it, before there was space enough to spread the whole out without danger of mixing or confounding the specimens; saying that as such a collection would probably not be made again, we should be unwise to endanger it by our impatience to display it and bring it into use.

The same is true of many other collections of equal interest in our Museum; as, for example, that of the fishes from the Amazons and other parts of Brazil. But a very small portion of the rich harvest from the Thayer Expedition has as yet been seen by the public. Indeed, since its foundation the collections of the Museum have been immensely enlarged by exchanges, which have been a fertile source of increase, as well as by gifts and by purchase, the latter mainly made from the Gray fund. In the past year this fund, which was our first important endowment, has been chiefly spent in the purchase of a collection of fossil insects from Solenhofen, and of a collection of fishes from the West Indies, bought of Professor Poey.

While I am preparing this Report, the welcome intelligence is brought me by Mr. Lyman, treasurer of the Museum, that the second instalment of the subscription from private individuals, upon which is dependent the contribution of a like sum by the Legislature, is just completed. This gives us \$50,000 for immediate use, and will enable us to proceed at once with our building; so that I trust in the course of another year we shall be able to show to the public, in tangible shape, the verification of the above statements.

Its rapid growth may give rise to the idea that the Museum has had large means at its command. It has certainly owed much to the generosity both of the State and of individuals; but I claim that its results, as compared with those of other institutions, are in more than due proportion to the money expended. The income of the British Museum and the Jardin des Plantes, for the maintenance of the departments included in our plan, is more than ten times that of the Museum of Comparative Zoölogy. I am not, of course, comparing equal things in naming these institutions together; but I maintain that while the two former are on so much larger scale, ours is in certain departments, such as corals and fishes, superior to both, and that in activity of research and publication it yields to neither, while the increase of its collections since its existence, and the prominence it has attained among other museums is such as no like establishment has reached in the same time and with the same means. I find myself constantly in a dilemma, between the modesty befitting a director and the desire, which is also a duty, of showing those who have supported this insti-

tution how their money has been spent and what ends their liberality has served. In thus extolling the institution I speak also more for others than myself, for I have owed in great degree to the corps of assistants working with me the possibility of accomplishing my aims. The organization must of course be the work of the Director ; but for the energetic and intelligent carrying out of the scheme I have to thank the gentlemen working with me either as assistants upon very moderate salaries or as friends of the institution who give their work without any remuneration whatever. Among the latter our thanks are especially due to Mr. Lyman, who takes upon himself the troublesome office of treasurer, and manages the funds of the Museum in a way to make them available to the last dollar.

The chief work done this year has been the mounting and labelling of specimens for exhibition, in order that whenever the new building should be ready we might open it to the public without delay. The special reports appended below, will show how much has been done in this way in each department. I may state in general that in the entomological department, under direction of Dr. Hagen, much progress has been made in arranging the collections, both for exhibition and exchange, and also for the benefit of special students. Besides the general systematic collections, the biological, physiological and palæontological collections are already well advanced, as well as one showing the metamorphoses and different stages of growth of the species. The palæontological collection of Insects has been enriched by a valuable collection purchased from Dr. Kranz, in Bonn, Prussia, to be paid out of the Gray fund, while we owe to Professor Ratzeburg, in Berlin, a collection of insects destructive to vegetation, and a valuable work on the same subject. The entomological department of our library has been increased by the library of the late Dr. Zimmerman of South Carolina. In connection with this subject I would draw attention to the arrangement announced in Dr. Hagen's report for furnishing students with cheap and excellent microscopes from Europe.

By a reference to the report of Mr. Anthony, it will be seen, that while the system of exchanges, in the department of Conchology, has been kept up with regularity, so that we are constantly in receipt of such specimens as are still wanting in our large collection, the chief labor has been in mounting and

putting up specimens. There are at this moment 26,250 tablets of shells, representing 67,749 specimens, a large proportion of which, for want of room, are hidden in drawers and cases. I cannot sufficiently praise the perseverance and industry of Mr. Anthony, who is indefatigable in his care of this collection.

Mr. Allen's report shows a considerable increase in the collection of Mammalia and Birds, during the past year, but we were obliged to be cautious in admitting larger additions in this department, on account of our deficiency of room. With our present prospect of increased accommodation any difficulty on this score is removed for the future. The most important addition to the mammalia has been a very valuable collection of seals and walrus from Alaska, which we owe to Mr. Charles Bryant, of Fairhaven. In birds the chief additions are from Florida and the West Indies. In the systematic arrangement of these collections, much has been accomplished, and the record of the year, in this respect, is very satisfactory.

I refer to the reports of Mr. Shaler and Mr. Perry for an account of the fossil collections.

Mr. Shaler's report is especially interesting from the notice of excavations, undertaken partly at his own expense, partly through the generosity of Mr. James M. Barnard, the constant friend of the Museum, in Big-Bone Lick. These excavations have been already very productive and promise larger results in the future, the more so from the facilities afforded us by the liberality of Mr. McLaughlin, owner of the ground, who has been exceedingly kind, and seems to take a cordial interest in the results of our efforts. Mr. Shaler has continued his courses of instruction, both in the lecture room and in the field. He has added to his University courses of lectures, those given as Professor of Palæontology, in the Mining School, also delivered in the hall of the Museum. His appointment to this new post leaves his former connection with the Museum unchanged, and indeed, widens the sphere of usefulness of our institution, inasmuch as it now affords the means of special study to a class of students who thus far have derived little or no benefit from it.

It will be seen that under the care of Mr. Perry great progress has been made in arranging and cataloguing the tertiary fossils and the fossil Corals, while numerous special collections

for exchange have been prepared. Beside his unremitting and most efficient work, in his own department, Mr. Perry has given two courses of lectures, during the academic year. He has presented to the Museum a valuable collection of fossils, the result of fifteen years' work among the rocks of New England. Our fossil collections have also been enriched by a large collection of fossil Echinoderms from M. Cotteau, the more valuable for being labelled by that distinguished palæontologist.

The report of Dr. Maack on fossil Vertebrates, simple and short as it is, speaks for itself. It will be seen how efficient and able an assistant we have secured in him, and how greatly such aid was needed in the Museum.

Dr. Stähli has been engaged in arranging and cataloguing the library, which is becoming, chiefly by exchange, every year more valuable. As this Report goes to press I have received an invoice announcing five series of costly German scientific periodicals, presented by Prof. P. Merian, in behalf of the University of Basle.

The class of Reptiles is the only one which has received little attention during the past year. For the class of Fishes a great deal has been done in the way of sorting and arranging specimens according either to their systematic or their faunal relations. In this work I have been chiefly aided by Messrs. Bliss and Lockwood, students in the Scientific School, and for a time also by Mr. Martin and Dr. Stähli. But the amount of materials on hand is so large that the progress appears slow. In the arrangement of the Mollusks preserved in alcohol, I have received much aid from Mr. Blake, also a student in the Museum.

Mr. Paul Roetter, now permanently attached to the Museum as artist, has been most industrious in drawing illustrations of various kinds, but chiefly of fishes and Crustacea for the forthcoming publications of the Museum. Among these a monograph of the North American Astacidæ, by Dr. Hagen, will soon be ready for distribution.

One of the most valuable accessions ever received at the Museum consists of collections brought up from deep-sea soundings, made by a party of the Coast Survey, according to the directions of the Superintendent, Professor Peirce. These large collections contain the various kinds of marine animals,

secured by the dredge and otherwise, along the coast of Florida, from the shore to the deepest waters of the Gulf of Mexico. These specimens, collected chiefly by M. de Pourtales and during the last cruise in part by myself, are now undergoing careful examination by various investigators, and it is hoped that the results thus secured will be shortly published in a fitting manner.

M. de Pourtales is now engaged upon a monographic description of the corals, some of which he has described in our Bulletin. Alexander Agassiz and Theodore Lyman have worked up the Echinoderms, and a summary of their investigations has also been published in our Bulletin, while the Crustacea and Mollusks have been entrusted to Dr. Stimpson, for description, and the Sponges to Professor Oscar Smith in Gratz, and the Annelids to Professor Ehlers in Erlangen. I have also published in the Bulletin a short report of these deep-sea dredgings and their general scientific results.

I should not omit to mention that we have had a number of young ladies as assistants in the Museum this year, and have found them very efficient and faithful workers. For several years, I have, at different times, accepted the services of ladies in the Museum, some as voluntary, others as paid assistants. I have been the more ready to do this, thinking that I might assist in securing for women a greater variety of employments, the need of which is now so much felt. With us the experiment has succeeded admirably. A large part of the work to be done in a museum is particularly appropriate for women, and I only regret that a necessary economy forces me to diminish the number of young ladies thus employed. Both as students and as assistants they have shown an apt intelligence, with great fidelity and conscientiousness in the performance of their work.

It is my pleasant duty, in closing this Report, to announce that a scholarship has been founded this year, at the Museum, endowed by the Boston Society of Natural History, and called the Humboldt Scholarship. That Society devoted the whole result of the festival, by which they celebrated the centennial anniversary of Humboldt, to this purpose, thus binding by a new tie, these two scientific institutions, and permanently connecting both with the memory of that great man.

With the new building a new chapter opens in the history of

the Museum. Hitherto the public has accepted to a great degree on my assurance alone, without ocular proof, the immense wealth of our collections. The projected additions to the building once completed however, the mounted specimens and those otherwise prepared for exhibition fairly laid out, it will then be possible for any intelligent visitor to judge not only of the riches of the Museum, but to trace also the plan of its organization and the ideas I have attempted to illustrate in its general arrangement. But to preclude possible disappointment, I would add that while I hope no true lover of nature will ever come to our Museum hereafter without learning something, while he has at the same time his eye and taste gratified, yet the object of our institution is not that of popular exhibition. Its highest aims are the advancement of science by original research, the opening of practical instruction in Natural History on the largest and most liberal terms to students, and as including and comprehending all lesser views, the attempt to illustrate so far as the present state of our knowledge renders it possible, the plan of creation as shown in the history of organized beings from the dawn of life on earth till now.

I herewith submit the special reports of Messrs. J. A. Allen, H. A. Hagen, J. G. Anthony, N. S. Shaler, J. B. Perry, G. A. Maack and T. R. Stähli, officers of the Museum in charge of special departments, as parts of my own. In absence of Mr. Alex. Agassiz, who is travelling in Europe on account of his health, I have no special report to present concerning the department of the Radiates.

L. AGASSIZ.

Report on the Mammals, by J. A. ALLEN.

As mentioned in the last Report, all the skins of the Mammals were catalogued and systematically arranged last year. Early in the present year the condition of the entire alcoholic collection was examined, and spirits added where there had been a loss by evaporation or leakage. A few weeks since the systematic arrangement of this collection was commenced, and several hundred specimens of those uncatalogued have been

catalogued. Many hundreds more still remain to be recorded. It is hoped that during the coming year the cataloguing will be completed, and the whole collection systematically arranged. As the work progresses, the specimens are removed from the barrels in which they are now stored, to glass jars and stone crocks, these having been found to be in the end the more economical and convenient. Each species is generally placed in a separate jar, suited to its size and to the number of specimens of it contained in the collection. When the number of specimens of any species is very great, as is the case in some of our smaller native species, the specimens are separated into several jars, and arranged according to the localities at which they were collected. This revision of the collection is revealing the fact that there are a large number of specimens that may be spared for skeletons, and the preparation of them has already been commenced. Although this work requires much time, if it is carried steadily forward, as it is now proposed by the Director that it shall be, the osteological collection in the Museum, already large, will soon be much increased from this source. In accordance with instructions received from the Director, it is proposed to prepare a large series of skeletons of those species for which there is ample material, for the purpose of determining within what limits individuals of the same species may present variations in their osseous structure. This will give a basis for determining the value of specific identifications when made from single bones, to which unsatisfactory data palæontologists are frequently restricted. A comparison of the young of different species is also to be made, in order to ascertain at what age they take on their specific, generic and family characters.

The additions to the collection of Mammals, during the past year, have been small. This is mainly due to the fact that at present, at least so far as skins are concerned, there is no longer room for their proper storage; perhaps in part to the general necessity for limited expenditures. One invoice of especial value, however, has been received, through the kindness of Captain Charles Bryant. This lot is from the Islands of St. George and St. Paul, Alaska, and embraces a skull, a complete skeleton and a fresh skin of the Walrus (*Trichechus rosmarus* Auct.), fresh skins and complete skeletons of two adult speci-

mens of the Northern Sea Bear (*Otaria Stelleri* Auct.), and skins and complete skeletons of two adult male specimens of the Northern Fur Seal (*Callorhinus ursinus* Gray), and also skins and complete skeletons of two adult females, and skins and skeletons of two four months old specimens of the same species. The skins being in good condition for mounting were immediately sent to Mr. S. Jillson to be stuffed.

The extent of the collection of Mammals already gathered may, in general terms, be thus stated. The skins alone, which comprise less than one-fifth of the whole number of specimens, represent about one-half of the described North American species; about one-third of the South American, European and Australian; one-tenth of the Asiatic, and one-half of the African. In the alcoholic collection, which must number about three thousand specimens, are represented all the leading groups, besides many species of which the Museum has no dry specimens. This evidently forms a satisfactory beginning, when it is remembered that the increase of this department, as of that of Ornithology, has not as yet received very special attention.

Below are enumerated the additions made to this department since the last report.

By Donation.

AGASSIZ, ALEXANDER. 3 boxes of stumps of trees felled by beavers, and sticks from beaver-dams, from Calumet, Michigan.

AGASSIZ, Professor LOUIS. 14 specimens, 4 species, in alcohol, from Jamaica Plain.

ALLEN, J. A. 1 *Lepus americanus*, in peculiar pelage, fresh, from Massachusetts.

ALLEN, J. A. and Rev. THOMAS MARCY. (*Florida Expedition*.) 30 specimens, 10 species, skins; 14 specimens, 6 species, in alcohol; 24 specimens, 10 species, skulls and skeletons, from St. John's River, Florida.

BLAKE, JAMES H. 1 *Scotophilus noctivagans*, from Cambridge; 5 specimens of *Hesperomys leucopus*, from Provincetown; 1 skeleton of *Hyperaodon bidens*, from North Dennis.

BRYANT, Capt. CHARLES. 2 fresh skins and two complete skeletons of the Northern Sea Bear (*Otaria Stelleri*); 6 fresh skins and 6 complete skeletons of the Northern Fur Seal (*Callorhinus ur-*

sinus); 1 fresh skin, a skull and a complete skeleton of the Walrus (*Trichechus rosmarus*), from Alaska.

GLEN, Mrs. M. 1 *Condylura cristata* and 3 skins of Bats, from Cambridge.

HAYDEN, Dr. F. V. Box of skulls and other bones of *Bos americanus*, from the Laramie Plains.

HAYS, Dr. I. I. 1 skull and 2 complete skeletons of Seals, from Greenland.

LOCKWOOD, SAMUEL, Jr. 3 specimens, 3 species, from Fallsburg, N. Y.; 5 specimens, 1 species, from Cambridge.

MARTIN, STEPHEN C. 1 skull of *Mesoplodon sowerbyensis*; 15 specimens, 4 species, in alcohol, from Nantucket.

RÆTTER, JOSEPH. 1 *Arvicola riparius*, from Cambridge.

By Exchange.

JARDIN DES PLANTES. 6 specimens, 6 species, skins.

Report on the Birds, by J. A. ALLEN.

During the past year the arrangement of the ornithological collection has considerably advanced. Some fifteen hundred North American skins and mounted birds received at the close of last year, and about nine hundred others received since, have been entered upon the general catalogue, and the entire North American collection of skins systematically arranged in the bird room. The condition of the alcoholic collection has also been thoroughly examined, and fresh alcohol added wherever it was needed. The North American birds preserved in alcohol have been entirely rearranged, the cataloguing completed and the specimens removed from the kegs and barrels, in which up to the present year they had been mainly stored, to glass bottles and stone jars. This portion of the collection now numbers above six thousand specimens, representing three hundred and seventy-two species, any specimen of which is perfectly accessible for examination. The South American collection is probably nearly as large, while there are also a large number of specimens similarly preserved from Europe, the East Indies, the Pacific Islands and Zanzibar. The whole number of birds

in the Museum is now not far from twenty thousand specimens, (excluding above thirteen hundred lots—four thousand specimens—embraced in the embryological series,) more than one-half of which are alcoholic. About eleven thousand two hundred are catalogued. The work of cataloguing and systematically arranging the alcoholic collection is comparatively slow, it requiring more than four times the amount of time to thus arrange a given number of alcoholic specimens that it does the same number of skins. It is expected, however, that during the coming year the South American lots will be finally arranged, and that before many months the entire alcoholic collection will be transferred to glass and stone vessels.

In the last report attention was called to the want of duplicate specimens for exchange, and, in respect to the water birds, the lack of specimens to properly represent many of the North American species in the reserve collection. Owing to certain unfavorable circumstances little has been done to supply this want, and the importance of providing for it is again urged. Through the addition during the present year of some seven hundred specimens of Florida birds, partly obtained by purchase and partly by the curator, during a vacation trip to that State, the birds of Eastern North America are now in general well represented, while of some of the most interesting species the Museum contains very large and valuable suites.

The circular in reference to obtaining data concerning the geographical distribution of the birds of North America, issued by the Museum last year, has received gratifying attention. While the number of local lists received is not yet large, assurances that such aid will be forthcoming are not wanting. In addition to the list of Cuban birds, received from Dr. Gundlach, mentioned in the report of last year, a list of the birds of Buffalo, New York, with annotations, has been received from Mr. Charles Linclen, custodian of the Buffalo Natural History Society; a partial list of the birds of Clarkson, Ohio, from Mr. Thomas Hale; notes on the arrival of birds in spring at Richmond, Indiana, from Mr. L. B. Case, and an annotated list of the species found in the breeding season at Marshall, Michigan, from D. Darwin Hughes, Esq. An annotated list of the winter birds of East Florida, has been received from Mr. G. A. Boardman, and another from Mr. C. J. Maynard. I should also here

acknowledge the indebtedness of the Museum to the Rev. Thomas Marcy for very important assistance rendered by him in collecting in Florida.

The additions to this department, as to that of Mammals, aside from the Florida collections, have been small. In consequence of want of storage room for specimens, some of our correspondents have been invited to retain, for the present, their exchanges; but it is now hoped that we shall soon be able, not only to heartily welcome any additions, but to make some special effort to increase the ornithological collection. From the special interest attaching to Florida birds, I consider it fortunate that the Museum has been able to secure the greater part of the large collection made in that State last winter, by Mr. C. J. Maynard; which collection is more than ordinarily valuable from the specimens being accompanied with measurements and other notes made from the fresh specimens. It has been for some time known that Florida-born birds, of certain species, differ considerably, in certain characters, from others of the same species born in the northern States; but the collections made in Florida last winter, now in the Museum, reveal the fact that in all the species which range in the breeding season from the Canadas to Florida, the specimens born at these two widely separated localities differ from each other very considerably. The southern are not only the smaller, but they have generally larger, slenderer bills, and brighter and darker or more intense colors. The Florida collections hence afford, not only important material for investigating climatic variations, but very desirable material for exchanges. The invoice of one hundred and three species of skins of East India birds, a part of which are mounted, forms also an important addition.

Two of the five duplicate collections prepared last year, averaging about eighty species each, have been sent out in exchange, as will be seen by reference to the following schedule of additions and exchanges:—

By Donation.

ALLEN, J. A., and Rev. T. MARCY. (*Florida Expedition.*) 315 specimens, 80 species, skins; 40 specimens, 26 species, in alcohol; 112 specimens, 45 species, skulls and sternums; 1 egg of *Aramus giganteus*; all from East Florida.

BABCOCK, A. L. 4 specimens, 2 species, embryos in alcohol, from Sherborne.

BLAKE, JAMES H. 1 specimen of *Larus argentatus*, and one of *L. delawarensis*, fresh, from Provincetown.

CURTIS, FREDERICK. 1 nest of Chimney Swift.

GIBBON, Gen. JOHN. 3 sage cocks (*Centrocercus urophasianus*), fresh, from the Laramie Plains.

MANN, BENJ. P. 26 specimens, 5 species, embryos in alcohol, including 4 of *Cathartes atratus*, from South Carolina.

PERRY, Rev. JOHN B. Nests and eggs of 9 species, from Burlington, Vt.

By Exchange.

JARDIN DES PLANTES. 28 mounted specimens, 26 species, and 20 skins, 20 species, from Asia and Africa.

MAYNARD, C. J. 9 skins of *Ægiothus linarius*.

THEOBOLD, W. Jr. 115 specimens, 103 species, skins, from the East Indies.

By Purchase.

278 specimens, 66 species, from East Florida. 142 specimens, 46 species, (chiefly rare or northern,) from different localities in New England.

Sent out in Exchange.

To C. J. MAYNARD, Newtonville, Mass. 9 specimens, 8 species, skins.

To Prof. WILLIAM SCHIMPER, Strasburg, 95 specimens, 73 species, skins.

To Dr. J. HAAST, Christchurch, New Zealand. 107 specimens, 90 species, skins.

Report on the Articulates, by DR. HAGEN.

The year 1869 has been an important one with respect to the entomological department of the Museum. The collections having reached a certain completeness, Professor Agassiz wished that they should be revised with reference to their permanent arrangement. For this purpose unusually large means, such as are not likely to be again needed in this department, were required. Our outfit for cabinets has cost about \$4,000. In this connection I ought to state that the pattern of the cases adopted

for this purpose by the Museum is so appropriate and convenient that it has already been borrowed for public and private collections, ours being considered by all as the best model.

The first object was to secure the whole collection against noxious and destructive insects. Next to this was a still more important work. The greater part of the collection was stored in separate boxes containing insects of different countries; but the Orders were often mixed, and it was necessary to ascertain the special locality to which every insect belonged and to label it accordingly. The value of every collection depends in a great degree upon the accuracy with which localities are given; and in the Museum of Comparative Zoölogy this has great importance in view of the peculiar and comprehensive scheme laid out by Professor Agassiz for its organization. The task was a laborious one, requiring much time and care in its details; a label was to be provided for every pinned insect, and it was the more difficult since it was impossible to have printed labels for every kind of insect, and even when printed they must be arranged and cut in a certain form and manner, while at the same time the different orders, families, and if possible the genera also, were to be separated. The work was delayed still more by the slow delivery of the new boxes. By the kind and efficient help of Messrs. Ed. Burgess and B. P. Mann the arrangement of the North American Lepidoptera and Coleoptera was completed at the end of August. It may also be said that the collection is now as far as possible secure against destructive insects or injury of any kind, as well as against errors concerning localities. I should add, in order to justify the expenditure for this object, that all attempts to make a cheaper kind of boxes than those used by us, proof against noxious insects by chemical preparations, have failed. In a Museum intending to preserve a standard collection permanently intact, they would be wholly ineffectual. The best made and most perfectly fitting boxes, and therefore the most expensive, are in the end the cheapest, considered with reference to the future development of the Museum.

In the further arrangement, the order of Lepidoptera was first considered, that order forming the greater part of the whole collection. The collection of European Lepidoptera was arranged

separately. It consists for the greater part of very fine and fresh specimens, in a superior condition, including between one-third and one-fourth of the described species of the Macro-Lepidoptera and one thirty-third of the Micro-Lepidoptera,—a small proportion, but in good preservation. Besides the specimens set aside for this purpose, the Museum possesses specimens enough to provide the general collection also with nearly all the species. Some are in very fine condition for public exhibition, which is indeed already begun, some boxes being actually arranged in the exhibition room. A more exact statement of the number of the European Lepidoptera possessed by the Museum, would be as follows:—For the Diurna, Crepuscularia, Bombyces, one-third; for the Nocturna and Geometrina, one-quarter; for the Tiniena, one-fiftieth; for Crambina and Pyralina, one-fifteenth; for Tortricina, one-forty-second of the known species. The identification of this portion of the collection is finished, and for the most part does not admit of doubt. The collection of North American Lepidoptera north of Mexico, like the European, has been provisionally separated from the whole, and is chiefly intended for the use of American students, and for purposes of exchange with foreign entomologists. This collection was arranged by Mr. E. Burgess, who began the work last December. His first care was to collect all the specimens together and place them by families in the new boxes. The collection thus arranged, filled about ninety boxes. He then began the systematic arrangement of the Rhopalocera, upon which he is still engaged. The Diurna and Crepuscularia are finished. This part of the collection, so far as arranged, contains only one-half of the described species. Good specimens of almost all the North American Lepidoptera, well set, with the locality carefully designated, are much needed. The Micros, in particular, are very poorly represented.

The general collection of the Lepidoptera is so far finished as to be placed in the new boxes, filling fourteen cabinets. The Diurna are farther revised, and the genera and species separated, some of them occasionally determined. All the rest are divided only according to families. For some families of the Diurna the proportionate number, in the possession of the Museum, was approximately ascertained. The Museum possesses of

Papilionidæ, Danaidæ, Pieridæ about one-fifth of the described species.

The collection of the American Coleoptera has been separately arranged, according to Dr. J. Le Conte's catalogue, by Mr. Benjamin P. Mann, during the past year. The work is finished so far as Dr. Le Conte's catalogue goes. Thirty-six boxes are already arranged. The remainder of the collection is provisionally divided in families and genera. This collection now contains only a small part of the known species. But further work in the general collection, and in those of Melsheimer and Ziegler, will add a considerable number of the rarer species belonging to the western part of the United States. The Carabidæ have been carefully studied and determined by Mr. Sprague; also a part of the Lamellicornia. There are in the Museum nearly one-half of the species of North American Carabidæ given in Dr. Le Conte's catalogue (417 species to 1,107 by Le Conte). The arrangement of the general collection of Coleoptera is completed for the Cincindelidæ and Carabidæ, filling thirty-six boxes. The same is true for the greater part of the Lamellicornia. The account of the Carabidæ shows that the collection contains one-tenth of the described species enumerated in the catalogue of Harold and Gemminger. The remainder are separated by families in the new boxes. The other orders are only separated by families in the new boxes, with the exception of a small portion of the Orthoptera, which are further separated and arranged.

The whole collection fills nearly eight hundred boxes. The whole work done as yet is very small, considering what remains to be done, and the scientific revision and determination of the species is of course only possible at present for a small portion. Mr. B. P. Mann has carefully identified the North American Catocalidæ, and stated the collection to be rich in species.

After careful consideration and by the advice of Dr. J. Le Conte, it has been resolved that the collection of Coleoptera of Melsheimer and Ziegler should no longer be kept separate, but should be incorporated in the above-named collection. The boxes containing them, far from being well made, have already endangered the collection. Under the circumstances its incorporation in the general collection seemed important; but every insect is labelled with "Melsh." or "Ziegl.," and with another

label agreeing with the former collection, so that in fact the integrity of both collections is preserved.

The collection representing the metamorphoses and all the different stages of the species is begun. The objects suitable for the purpose are taken out of the alcoholic collection, enclosed in glass tubes of a particular pattern, and closed in a manner used by me and found satisfactory in my own collection, for many years. The glass tubes, always labelled inside, are contained in eighteen boxes. Their systematic arrangement is partly completed, especially in some families of the Coleoptera.

The biological collection is partly arranged and fills twenty boxes, consisting chiefly of the nests of the Hymenoptera, the silk-producing Lepidoptera, the American galls and the insects injurious to trees. The splendid additions presented to the Museum by the celebrated Professor Ratzeburg, of Berlin, form a prominent and beautiful part of the collection. Some very fine specimens were collected by myself in the White Mountains. The materials contained in the Museum are comparatively rich. Some boxes are placed in the exhibition rooms.

The physiological collection consists as yet only of one box, with some beautiful specimens. The *Morpho* with the head of the caterpillar, is worthy to be remarked even in this general report.

The palæontological collection received a very considerable addition from specimens purchased from Dr. Krantz in Bonn, Prussia, belonging to the Jurassic schists of Solenhofen and to the Rhenish brown coal of Rott in the Siebengebirge. Most of them are types described and published in H. V. Meyers' *Palæontologica*, by the late Senator V. Heyden and myself. The Diptera, Coleoptera, and some Odonata, form the principal insects of the lignites, the Orthoptera and Neuroptera of the Jurassic schists. One specimen of *Locusta speciosa* Germar is the finest and most beautiful yet found. I had seen it some years ago in Munich, but it was then too expensive to be secured. Some of the Odonata are really beautiful. The collection is arranged, labelled and exhibited in the window cases of the exhibition room.

The microscopical collection has a beginning in preparations made by myself during my entomological work at the Museum, employing for that object duplicates otherwise useless for study.

The object of this kind of work is chiefly as a preparation for further study in this direction, and for the use of students who wish to devote their time to like investigations. Chiefly for this purpose the writer of this Report has ordered and imported new French and German microscopes of a low-stand pattern, recognized in Europe as the most fitting for such work. Some of them, paid for many months ago, have not yet arrived; especially the Gundlach objective, noticed in German and English papers as the strongest now known. After careful examination and many test experiments I have nearly completed the necessary arrangements for securing as useful and at the same time as cheap a collection of instruments as possible, and I hope in a few months that I shall be able to furnish to students an extensive plan for microscopical study. The Museum will then be provided with American, French and German microscopes of the best kind and power, with working lenses, especially Prof. Bruecke's working lens, not hitherto known here; also different kinds of instruments for drawing by the microscope and the best test objects, as Nobert's newest test plates and Miller's greatest Diatom plates, imported especially for the instruction of students.

The Library of the Museum has received by purchase a very valuable addition in the entomological works belonging to the late Dr. Zimmermann, of S. Carolina, containing chiefly coleopterological books. It was thought more convenient to unite in the entomological room, in the Museum, all works belonging to this department, from the library of the Museum as well as those from the private library of Professor L. Agassiz and my own. They are arranged alphabetically and a separate catalogue is ready. The portion of this library relating to the insects of North America is set aside for students, and everything is done to make it hereafter as complete as possible.

The alcoholic collection is revised and in tolerable condition. Further progress in it was not possible for want of time.*

* After this Report had been handed in, Dr. Hagen received the gratifying intelligence that Baron d'Osten Sacken has presented to the Museum his whole collection of Galls, of Cynipidæ or Gall-producers and their parasites. The collection contains all the species thus far found in the United States, and is the more valuable because all are types described by the Baron in his excellent papers upon this matter in the Proceedings of the Philadelphia and Stettin Entomological Societies. There exists no collection in the world, so far as I know, so complete and so carefully worked out as this. As the Museum already possesses the types of American Galls described by the late Mr. B. Walsh, this gift from Baron d'Osten Sacken now gives unquestionable superiority to our collections in this important department of Natural History.

Report on the Condition and Prospects of the Department of Conchology, made Dec. 31, 1869, by JOHN G. ANTHONY.

Our last Report brought us to the close of the year 1868, and we have now to chronicle the operations of the department during the year about to close.

From the date of that report the policy which was then pursued has been steadily persisted in, so that instead of pressing our exchanges as formerly and constantly laboring to increase our large stock of Mollusks, we have preferred to work up materials already on hand.

The classification, arrangement and mounting of the specimens has enabled us to know our possessions and wants with more precision and prepared us to exchange with better judgment and greater profit to our collection. Our advance in this direction may be summed up in the statement that within the past twelve months we have added nine thousand two hundred and fifty mounted tablets to the seventeen thousand then on hand, so that now we have twenty-six thousand two hundred and fifty tablets, mounted with sixty-seven thousand seven hundred and forty-nine specimens of shells.

Of this number, twenty-two thousand four hundred and three tablets have been mounted with fifty-six thousand nine hundred and seventy-two specimens by the writer of this during the six years he has been connected with the Museum, and the remaining three thousand eight hundred and forty-seven tablets have been added by the three female assistants, who under the policy recently adopted have been mostly employed in preparing the tablets, but who have also occasionally been allowed to mount the specimens, under proper supervision.

As might be expected, where so much time has been given to one object but little could be spared for others, and our exchanges have consequently been more or less neglected. Nevertheless we have not been altogether idle in that respect, and have to report twenty-four packages as having been received during the present year, containing one thousand one hundred and fifty-five species and twenty-one thousand one hundred and twenty specimens, while during the same period we have sent abroad fifteen packages containing two thousand four hundred and twenty-three species and seven thousand seven hundred

and seventeen specimens. This does not show a very large increase during the present term, but the accessions have been mainly of a very superior character. We cannot hope, with our large collection, to receive many new things, and it would be unwise to overburden ourselves with useless duplicates; hence it has been our constant aim to solicit such species only as were not already in our collection or but indifferently represented there, and this has also tended to limit the number received. Thus restricted, our increase has necessarily been slower but more useful, and we have had the pleasure of receiving several parcels of shells possessing no ordinary interest. Among these we may mention a package containing the most complete collection we have ever seen of the land shells found in the Madeira group, but few species being absent of all those which are known to occur there. These specimens were in a most excellent state of preservation, totally unlike the ordinary sub-fossil condition in which we so generally receive specimens from those islands; and the number was also considerable, being one hundred and forty-four species and four thousand four hundred and thirty specimens, all fluviatile and terrestrial. But one regret was felt in receiving this most beautiful and welcome addition to our collection, and that consisted in the fact that they came unannounced and unaccompanied by any letter or invoice through which the name of the donor could be with certainty determined, thus preventing us from making due acknowledgments to him for his valuable and timely present—it is one of the most complete additions made to our collection for many years.

Mr. J. A. Allen, the Ornithologist of the Museum, having for his health spent a period of last winter in the more genial climate of Florida, has contributed a valuable addition of fresh-water shells from a portion of our country to which we have hitherto had very few opportunities of access.

With the consent of Professor Peirce, Superintendent of the Coast Survey, Count Pourtales has also deposited with us the results of dredgings made in the Gulf Stream. These dredgings are of a highly interesting character, bringing to light specimens of many species hitherto considered only to exist in a fossil condition, tending strongly towards a material change of opinion,

if not to a total reversal, of many ideas hitherto considered firmly settled in geology.

From Mons. Cailliaud, Director of the Museum at Nantes, we have received a fine collection, consisting principally of boring shells *in situ* and of African fluviatile shells collected by himself.

The Smithsonian Institution has sent us, through Mr. P. P. Carpenter, about three hundred and fifty species of shells, carefully named from type specimens in the Cumingian collection, which will not only be of considerable value in themselves, but enable us to identify and name correctly many species which we have in quantities from former collections, made in the Society and Sandwich Islands and elsewhere.

We are also indebted to many other sources for valuable additions,—to the Portland Society of Natural History for a fine contribution of our coast shells, to Dr. Hensche for his invoice of Prussian and other shells, and to Messrs. Mayo, Layard, Bryan, Coronado, Bayley, Hubbard, Theobald and Geale, for their several handsome and valuable contributions. To all these contributors we desire to express our sincere thanks for these and other kind favors received from them.

The work of arranging and cataloguing the collection is still going on, though this is necessarily a slow process, under the rules we have adopted, by which we place no species on the list which has not been mounted or about the name of which we have any serious doubt.

In terrestrial genera our most extensive genus is *Helix*, as established by the older writers. Of this we have considerably over thirteen hundred species, carefully named and mounted, and these we are now engaged in endeavoring to arrange and classify under new and better generic relations, the many attempts by others to make a proper arrangement having in most instances failed to commend themselves to our judgment. We have as yet made but little progress in this work, but propose during the coming year to make it the most prominent object of our labors. We have also made considerable progress during this term, in arranging the *Naiades* under several new genera, based mainly upon anatomical considerations, our large collections of *Unios*, *Anodons* and *Alasmodons*, in alcohol, affording us many facilities in this respect. We

have in these genera five hundred and twenty-seven species, mounted on two thousand one hundred and sixteen tablets, with five thousand eight hundred and ninety specimens, and for beauty and perfection in every respect, our collection of Naiades will compare most favorably with the best on this continent.

We are more deficient in marine shells, and the work of mounting and identification is less advanced in this part of the collection than in the terrestrial and fluviatile genera. The genera most perfectly worked up in marine forms are *Conus*, *Cypræa*, *Marginella*, *Voluta* and *Columbella*. Of *Conus* we have named one hundred and seventy species, of *Cypræa* over one hundred and fifty, and of *Marginella* over seventy species, all mounted on tablets. We trust that we shall be able during the coming year to get our marine shells more thoroughly worked up, and be prepared in our next report to give a better account of them.

In summing up the results of our present year's labors, we see no reason for discouragement. Our course has hitherto been steadily onward, and we hope to continue in the same direction, with an accelerated progress.

Report on the collection of Fossil Remains in general, by Professor N. S. SHALER, assistant in Palæontology.

During the past year the work of cataloguing the collections has been pushed as rapidly as possible, with such success that at the present time almost all the specimens have been secured against risk of displacement. The whole collection has been placed on racks so that there is no longer any difficulty in obtaining in a moment any specimen which may be sought. Considerable progress has been made in the work of zoölogical and stratigraphical arrangement; about one-half of our stores are now so far advanced that they are ready for that mechanical work which will fit them for exhibition on our shelves. Several persons have been employed in the work of cleaning the fossils during the past few months, so that it is only required that they be properly mounted on tablets to complete the work of preparation. Of the persons engaged in this work, three are young women, who have been constantly employed. They are paid by the hour,

the rates being the same adopted in our Public Library. This arrangement has proved most satisfactory, the work has been very carefully done, the patience and dexterity being in many cases most commendable. Three students in the College and Museum have been employed in doing the heavier work of cleaning and arranging; these young men have been able to give only the hours which could be spared from their studies, so that the aggregate labor has not been greater than that of one person continuously employed. The result of this labor has also been very satisfactory. After a good deal of experiment the precise means of displaying the specimens has been determined, and one person is now employed in mounting the specimens on the exhibition tablets. It is hoped that during the coming year we may be able to take the final step in the work with a large part of the collection.

Although but little money has been spent by the Museum, in the purchase or collection of fossils, the additions to the collection have been numerous and important. We acquired by purchase from Dr. Krantz, in Bonn, a very fine collection of fossil insects, from the lithographic slates of Solenhofen and brown coal of the Siebengebirge, most of the specimens being types from which the species were described, by Dr. Hagen and Senator von Heyden. Considerable effort has been made to extend our exchanges. With this intent a printed list of those species of American fossils which we could furnish in quantities for exchange, was sent to most of the scientific institutions and leading naturalists of Europe, with the statement that we would be glad to exchange these or other species, for recent or fossil species, or for works on natural history which might not be contained in our collection or library. Responses to this circular have already begun to arrive, and it will probably do much to extend our intercourse with other institutions. A similar catalogue of European fossils is now being prepared for circulation in the United States. About a dozen valuable collections have been received in exchange, in value many times greater than has ever been obtained from this source in any one year before.

During the past summer the assistant in charge of the department spent two months in making a careful examination of the important deposit of Big Bone Lick, in Kentucky. The

excavations made at this point were quite successful, affording a large amount of material for determining the association of the extinct mammalia of the West and the relation of the recent to this fossil fauna. The expenses of these excavations were borne in part by an ever generous friend of the Museum, Mr. J. M. Barnard, and in part by the assistant himself. Arrangements have been made to continue these excavations during the coming summer. In addition to the materials obtained, much information was gained, which it is hoped will make these excavations even more successful, during the coming summer, than they were during the last. The Museum is especially indebted to Mr. Barnard for the assistance without which these rather costly excavations would not have been undertaken, and to Mr. C. A. McLaughlin, the owner of the ground on which the excavations were carried on, for the privilege of making the researches, and for numerous courtesies, while the work was being done. In addition to this favor Mr. McLaughlin has generously given to the Museum a number of valuable fragments of a mastodon and a mammoth skeleton, now on exhibition in the rooms of the Museum. A full report of the results obtained from these researches, will be published in a forthcoming number of the Bulletin of the Museum.

The course of lectures and the systematic instruction in Zoölogy and Palæontology, begun during the past year, has been continued through both terms of the present year. This teaching has afforded to those who were desirous of obtaining special training in these sciences an opportunity of pursuing their studies with the necessary guidance and an abundant supply of the requisite materials. The plan of the course covers two collegiate years, with four hours instruction per week. In addition to this specified instruction, those who were pursuing this course have been allowed to spend their spare time in the Museum and have received such attention as their studies might require. The attendance on these courses of instruction, although never large, has been such as indicated that they supplied a want in the University. Since their organization forty persons have pursued a more or less extensive system of studies in the Museum, taking these lectures and practical exercises as the basis of their work. This does not include a number who have attended the lectures but have taken no part in the practical in-

struction. Among those who have attended this teaching were teachers from five different collegiate institutions.

In order to render the instruction as effective as possible, there should be separated from the collections of the Museum a lot of specimens for the especial use of students. Owing to the care which has generally been taken to secure large amounts of materials in making collections for the Museum, it will be possible to make a good students' collection without encroaching upon that part of our stores which must be reserved for scientific purposes.

In addition to the instruction given in the Museum, an opportunity has been given to the students of the University who were attending the lectures of the Curator of the Museum on geology, as well as the special students of the course of instruction before described, to learn something of practical field geology. On the Saturdays in October and November excursions were made to a number of points of interest in the vicinity of Boston. Coming just after the Saturday lecture on geology, these excursions have been numerous attended and have served to supplement the geological instruction.

The teaching power of the Museum, as well as all its other functions, is now hampered by want of room. The hall, originally designed for a lecture-room alone, has necessarily been made to serve as a store-room and work-room, and has besides to afford quarters to the special students. This has made it impossible at times to afford a chance to work to those who sought instruction. It will be possible when the contemplated addition to the Museum is effected to have a set of work-rooms fitted up at a small expense, which will give accommodations for one hundred students engaged in laboratory work. It seems likely that under the new system of elective studies in the College we shall soon have at least that number seeking instruction in the Museum in the several departments of Natural History. At present, we have not space in which to accommodate a single additional student.

The most pressing need in this department is larger supplies of American fossils. One thousand dollars a year would enable us to keep one collector constantly in the field, and the duplicates obtained from him would enable us to exchange for European fossils worth far more than all his collections cost.

List of persons to whom the thanks of the Museum are due for donations of fossils:—

ALLEN, J. A. Fossils from St. John's River, Florida.

BARNARD, J. M. For one-half the expenses of excavations for fossils, made at Big Bone Lick.

HODGE, Gen. G. B., of Newport, Ky. A valuable specimen of crinoid.

MARTIN, S. C., Student in the Museum. A lot of fossils.

McLAUGHLIN, C. A., of Covington, Ky. A lot of bones and teeth of a mastodon and a mammoth.

PERRY, J. B., Assistant in the Museum. 17 boxes, 148 specimens of Palæozoic fossils and 850 of Pleistocene fossils.

POURTALES, L. F. de. A lot of fossils, from Springfield, Illinois.

SHALER, N. S., Assistant in the Museum. Share in the expense of collections made at Big Bone Lick and a collection of Silurian fossils from Kentucky.

WYMAN, Prof. JEFFRIES. A lot of fossil mollusca, from Florida.

Report on the Tertiary Fossils, by Rev. J. B. PERRY, Assistant in Palæontology.

As the first of January is near at hand, it becomes my duty to report generally upon what I have done, and more in particular upon the advancement which has been made, during the year, in the arrangement of the fossil collections entrusted to my care. Presuming that there is an acquaintance with the condition of things twelve months ago, I proceed to touch upon such points of interest as are calculated to show the changes wrought, and the improvements effected since that time.

First of all, I am to indicate the work carried on and the progress achieved in the systematic disposition of the Tertiary fossils.

The last annual Report gives an account of the initiatory steps taken with a view to the arrangement of the Gasteropoda of the Tertiary era, and of the plan laid out for further investigations upon them and upon the other Cainozoic remains. Remembering what is there said, one can readily appreciate the character of the undertaking, and the aims which should be kept constantly in mind as a guiding light. These aims have

been made prominent throughout the year, and in consonance with them the work has been pushed forward with as much vigor as circumstances have allowed.

Deserving of special notice, and of great importance as respects the security of the collections, is the Museum system of cataloguing. It is the design to enter all the specimens received into the Institution on blank sheets expressly prepared for the purpose, and which, for convenience of reference, are to be bound when the work is completed. Each entry bears a definite number, and is intended to comprise the generic and specific designation of the parcel catalogued, the name of the person who described the species, of the place at which the collection was made, and its geological horizon; also that of the collector, followed by an indication of the mode in which the specimens were obtained, whether by donation, purchase, or exchange, the donor's name, when known, being distinctly written, with a brief record of the number and condition of the individual examples. Of the Tertiary Gasteropods, more than ten thousand such lots have been separately entered during the past year. These ten thousand parcels contain some seventy thousand individual specimens. According to a rough estimate, the number already thus catalogued, comprises about four-fifths of the Cainozoic Gasteropoda belonging to the Museum collections. In order to give some impression of the work done in this direction, it may be added that each entry implies a careful examination of all the parcel contains, specimen by specimen, and that the sheets of the catalogue, as thus far made out, are sufficient to form four quarto volumes of good size.

Upon a considerable portion of the specimens, of which a permanent record has been in this wise made, the catalogue numbers have been duly placed, by young ladies working under my direction, while all the remaining specimens are in a way to receive their appropriate numbers, with as much rapidity as the care requisite to accuracy will warrant. It may be thus seen at a glance, that this part of the Palæontological treasures of the Museum is securely guarded against the dangers to which it would be otherwise exposed, from occasional mishaps or accidental displacements. Indeed, should all the specimens be thrown into a heap, turned upside down, or otherwise mixed, if not broken or destroyed by the process, being numbered they would

be, for the most part capable, by means of the catalogue, of restoration to their true position. They could be made to bear witness as before in respect to classification, geographical distribution and chronologic succession, to say nothing of all the other important points, on which their testimony might be invoked.

I have also been busily engaged pushing forward the systematic arrangement of the different parts of the collection, as time has been at my disposal or opportunity has allowed. The aim has been to group the specimens as nature dictates, irrespective of much that is arbitrary, if not positively false, in the usual modes of arrangement, according to the prevalent systematic nomenclature. Meanwhile what has been done in the past, and what others are now doing, has not been overlooked. Great pains have been taken to search out, so far as the means have been at my disposal, the first authentic designation and figuring of each species. The data in this way obtained have been usually either noted with brevity or entered more at large on appropriate labels. The work has been thus carried on by a combined study at once of specimens themselves and of what others have done, in order both that every past investigator may receive his due, and that whatever of progress is made in the present may be organically linked with the valid results reached by those who have gone before,—so linked that there shall be, not a mere juxtaposition of the old and the new, but an interstitial growth in our knowledge of the organic world.

At the same time the collection has been greatly improved in other respects. By the aid of assistants, many of the specimens have been thoroughly cleaned. By this means, and in other ways, they have been put in readiness for mounting, so far as they need to be by such manual processes. The mounting of the specimens upon tablets has been thus far purposely deferred, but a very large number of tablets are ready to receive them. Other preliminary matters are further advanced. In the working up of a group,—in the selection of specimens for the systematic, the faunal and the chronologic, to say nothing of any other collection or collections to be formed,—it is of great advantage to have all the material at hand and under the eye. Indeed, when one has not such a command of his material it is almost impossible for him to make as choice a selection, or to

do his work, so well as he could wish and otherwise might. In short, every day which is spent in the systematic arrangement of the fossils puts them in a better condition for mounting.

Another work has been begun, to which I briefly refer. In order to the harmonious advancement of the several sections of palæontological work, I entered, in August last, at the suggestion of Professor Agassiz, upon the systematic arrangement of the fossil Corals of the Museum. A considerable number, about thirty-one hundred parcels of these specimens, had been already catalogued and numbered, either by my colleague, Professor Shaler, or under his direction. Still other parcels, owing to the pressure of the moment, had been simply registered by numbers. Since that time, many additional entries have been made; while appropriate numbers have been put upon all the specimens thus entered, which had not before received them. The parcels thus far catalogued, amount to six thousand four hundred and sixty-two. There are others yet to be entered, though the number cannot be very large. Thus the greater part of this section of the Museum treasures has been placed in a secure condition. But, in connection with the numbering of specimens, other work has been done. Since September, there has been constantly going on, and there is still in active progress, the process of cleaning these corals, and preparing them in due time to be mounted on tablets. There have been thus far prepared all those of the Tertiary times, and a portion of those of the Cretaceous, while a beginning has been made upon those of the Lower Silurian age. In addition to this preparation for mounting, it is very desirable that sections should be made of a considerable number of the specimens, in order that there may be a better exhibition of the structure and other peculiarities of these interesting forms of life.

In entering upon the arrangement and study of this portion, or of these portions, of the animal kingdom, it was my aim, at the start, to arrange the multitudinous collections according to their geological horizons. This was done by bringing all the specimens of each different age together, so far as I could make them out, in divisions, answering to the several successive horizons between the Primordial and the latest Tertiary. Of course, perfect exactness could not be secured at once, from

the imperfection of labels and other kindred defects. The work was accordingly done somewhat roughly, though the best the circumstances would allow, the determination of many details being left gradually to appear as the fruit of other labor and more critical examinations.

My next aim was the separation of the organic forms of the several horizons, according to faunas. In other words, I endeavored to throw the fossils of each geologic stage into divisions answering to the localities or basins, to which they geographically belong, and thus into faunal sections. This task also was accomplished, at first only in an approximative manner, the full working out of many points being left to come as the matured result of future and more detailed investigations.

A third aim all the while had in mind, and carried out by degrees, involved the separation of each faunal division into minor divisions, accordingly as the specimens belong to the class of Polyyps, of Acalephs, or of Bryozoa. This work has been carried forward with a good degree of success; it is, however, as yet, far from complete, there being up to the present time, much doubt whether given groups be Polypian, Acalephan, or Bryozoan Corals; in other words, whether they should be systematically arranged as Polyyps, Acalephs, or Mollusks.

Another aim which has been kept prominently in view, has reference to the accurate recognition and bringing together of all specimens of the same species, as well as the arrangement of them in groups according to their affinities. Of course, this work involves the separating from each group of all alien specimens, and their removal to other circles to which they are akin. In connection with this aim, not a little care has been taken to verify the systematic names inscribed on the labels, so far as any appear; also to discover and record the earliest distinctive designation, description and figure of each species. This task, indeed, has been entered upon, and carried forward with great painstaking in some portions of the collection. While, however, much has been done in this direction, the work as a whole, is only just begun, and will require an immense amount of labor and patient investigation, in order to its satisfactory completion. It must thus be evident that not a little preliminary work has been already accomplished on the fossil corals,—work which is necessary in order that they may be at once safe, and studied

with advantage. The collection being arranged according to the method indicated, it becomes easy, not only to turn to a given group, but also on a moment's notice, to lay one's hand on any species or particular fossil in the group. Such an arrangement accordingly renders the consultation of the collection a pleasure rather than a task; it prepares the way for further and more critical work; thus it invites and lures on to original investigation.

A few words should be next devoted to matters outside of the systematic arrangement of fossils.

In the first place, lectures have been delivered. The course on the Geology of Vermont, which was already begun at the time of the preparation of the last Report, was duly completed during the early portion of the year. Another course, on the Geological History of the Primordial Era, is now in progress. It was commenced in October last; it is to be completed during the spring term. The aim of this course of instruction is the detailed account of all that is up to this time known, at once of the oldest sedimentary rocks, and of their included organic forms, which stand as monuments of the earliest well-accredited life of the globe.

Again, material has been prepared for exchanges. As the systematic arrangement of fossils has gone on, spare specimens, not needed in the Museum collections, have been gradually eliminated and placed by themselves. These specimens have been carefully cleaned, examined and determined; or, if there had been a previous determination of the name, it has been duly verified and authenticated. As thus worked up, these specimens have been properly labelled and are in readiness for collateral uses. As must be evident, the amount of such surplus material is in a way to be steadily and greatly increased, in proportion as the work of classification goes on. There are accordingly now on hand and in readiness, or are likely to be in due time, specimens in large numbers, as well for exchanges as for distribution, upon proper conditions, among the various institutions of learning, not only in this Commonwealth but throughout the country. These specimens, as serving to characterize the several different stages of geologic history, must be of great benefit in giving broader, more definite and better

views than have always prevailed of the formation and of the progressive steps in the advancement of our planet.

Once more, as it may be proper to remark, specimens in considerable number have been brought to light and put in a more determinate shape in connection with the preliminary work on the Museum collections. The soil removed from many of the Tertiary specimens abounds in minute shells, which are of great value as showing more fully the actual life of the times to which they belong. These specimens have been to a great extent catalogued, numbered and disposed in vials for safety. They are now ready to take their places, and become permanently incorporated in the several Museum collections which are in process of formation. They consist in part of the young of species already well known in their mature forms; in part of adult individuals of species which never attain to a large size, and partly of specimens probably both young and adult, representing groups heretofore undescribed. The sands and clays also have been as carefully preserved and accurately labelled, as if they contained gold. And they do contain that which is more precious than gold to the naturalist; they abound in Foraminifera and other low forms of life, and thus will afford abundant material, and in due time a rich harvest, for the microscopist.

The collection of specimens which has been gradually accumulating on my hands during the last fifteen years, I present to the Museum. In addition to a small variety of recent land and fresh-water shells and a considerable number of mineralogical specimens, it consists for the most part of fossils from various parts of the country, more especially characteristic of the different horizons of Palæozoic and Tertiary times.

For information respecting exchanges, and other additions to the Palæontological stores of the institution, reference may be made to the report of Mr. Shaler.

In closing this Report, I desire to refer to the efficient aid I have received from the several young ladies who have acted as my assistants. While receiving benefit themselves, becoming imbued with the spirit of the institution, and acquiring a taste for Natural History, with some knowledge of it, they have enabled me to devote more time than would have else been possible to critical investigations intimately and necessarily connected with the systematic arrangement of the collections.

Our thus working together, as it is thought, has been a means of good to them and of economy to the Museum. Accordingly, in reviewing the labors of the year, I feel that something has been done, a little progress made, in the work under my hands, toward the realization of the purposes of the Director. All things considered, and so far as I can judge of other departments from what has been accomplished in my own field of work, the prospects of the institution, as intended to carry out the high ends and to reach the grand scientific results implied in a Zoölogical Museum, were never brighter than they are to-day.

Report on the Collection of Fossil Vertebrates, by Dr.
G. A. MAACK.

I arrived at Cambridge, May, 1869, having come to this country in order to take charge of the collection of fossil Vertebrates in the Museum of Comparative Zoölogy. After my arrival I found it absolutely necessary to submit those fossils which had been collected for years past, but which had never been arranged according to a scientific classification, to a close investigation. I began with the fossil Mammalia, and endeavored to collect the various materials in this department, scattered over the Museum, in various cases and boxes. Nearly all of these fossil Mammalia, that is, bone by bone, tooth by tooth, I have now determined, labelled and catalogued. I am happy to be able to report that I have found among this mass of fossils a larger number of species and genera than I at first expected to find. Nevertheless, there exist certain gaps in this department of the Museum, which, however, I hope to be enabled to supply, during the ensuing year, through the assistance of my friends in Europe.

The following list exhibits what I have so far determined:—

<i>Elephas primigenius</i> Blumenb.,	20 specimens.
<i>Mastodon angustidens</i> Cuv.,	30 “
<i>Mastodon longirostris</i> Kaup,	2 “
<i>Mastodon giganteus</i> Cuv.,	6 “
<i>Rhinoceros tichorhinus</i> Cuv.,	33 “
<i>Rhinoceros incisivus</i> Cuv.,	26 “
<i>Rhinoceros leptorhinus</i> Cuv.,	6 “
<i>Rhinoceros Steinheimensis</i> Jäger,	9 “

<i>Rhinoceros Schleiermachersi</i> Kaup,	3 specimens.
<i>Tapirus priscus</i> Kaup,	2 "
<i>Tapirus arvernensis</i> Croiz. et Job.,	1 "
<i>Lophiodon parisiensis</i> Gerv.,	24 "
<i>Lophiodon Duvalii</i> Pomel,	1 "
<i>Palaeotherium magnum</i> Cuv.,	4 "
<i>Palaeotherium medium</i> Cuv.,	10 "
<i>Palaeotherium minus</i> Cuv.,	15 "
<i>Palaeotherium curtum</i> Cuv.,	14 "
<i>Palaeotherium aurelianense</i> Cuv.,	10 "
<i>Palaeotherium crassum</i> Cuv.,	3 "
<i>Palaeotherium Schinzii</i> H. v. Meyer,	1 "
<i>Anchitherium Bairdii</i> Leidy,	2 "
<i>Hippotherium gracile</i> Kaup,	16 "
<i>Equus fossilis</i> Cuv.,	110 "
<i>Siderotherium</i> Jäger,	1 sp.
<i>Hippopotamus major</i> Cuv.,	7 specimens.
<i>Choeropsis liberiensis</i> Leidy,	1 "
<i>Sus palaeochærus</i> Kaup,	18 "
<i>Choeropotamus parisiensis</i> Cuv.,	1 "
<i>Hyopotamus porcinus</i> Gerv.,	1 "
<i>Anthracotheium magnum</i> Cuv.,	1 "
<i>Anthracotheium velaunum</i> Cuv.,	5 "
<i>Anthracotheium alsaticum</i> Cuv.,	2 "
<i>Hyracotherium siderolithicum</i> Pictet,	10 "
<i>Rhagatherium valdense</i> Pictet,	7 "
<i>Cainotherium</i> Brav., (<i>Oplotherium</i> Laizer et Pariet,)	1 "
<i>Anoplotherium commune</i> Cuv.,	10 "
<i>Chalicotherium Goldfussi</i> Kaup,	7 "
<i>Xiphodon gracilis</i> Cuv.,	13 "
<i>Dichobune Campichii</i> Pictet,	3 "
<i>Cervus fossilis</i> Cuv.,	23 "
<i>Cervus furcatus</i> Hensel,	5 "
<i>Cervus (Palaeomeryx) minor</i> H. v. Meyer,	2 "
<i>Dorcatherium</i> Geoffr.,	4 "
<i>Bos primigenius</i> Bojanus,	50 "
<i>Bos priscus</i> Bojan.,	5 "
<i>Ursus spelæus</i> Blumenb.,	40 "
<i>Dinotheium giganteum</i> Kaup,	6 "

Besides the work above mentioned, I have begun to arrange the skeletons stored in the attic. From what I can judge the

collection of skulls in particular is a very large one. But as it is necessary for the study of fossil Mammalia, to have a collection of the skulls of the now living Mammals, at different ages, I have taken the necessary steps, in this direction, with regard to our domestic animals. During the ensuing year I hope to make such a collection.

Report on the Library, by DR. F. R. STAHLI.

During the winter of 1868-9 I have examined the Library of the Museum and compared the books on the shelves with the shelf catalogues as well as with the card catalogue, marking their respective places in pencil on the cards. I did not find many books missing, but many misplaced, some being even in the wrong alcoves, while a good many had never been entered in any of the catalogues. My first work was to replace them and to complete the existing catalogue of accessions.

In order to make the library more useful, as well as to avoid misplacement of books, as much as possible, I was directed to rearrange the library, and to make fewer divisions and subdivisions; and to place the books in alphabetical order in the eight or ten large classes to which they belong, according to their contents. At the same time a general catalogue, according to this arrangement of books is in preparation, and will be completed in such a way as to allow any future accessions to the library to be easily entered in their proper places. It will be also provided with a general register of topics and authors, with cross references and references to the actual place on the shelves. Any book may in future easily be found by means of this catalogue.

During the year 1869, the valuable library of the late Dr. Zimmermann has been added to our collection, consisting of two hundred and seventy-three volumes, and two hundred pamphlets, all on entomology. A large number of volumes and pamphlets have also been added by Professor Agassiz, and Mr. Alexander Agassiz. The latter will complete sets of valuable works for the Museum during his stay in Europe. Our exchanges also have increased considerably. Of these I shall be able to give a full account in the next report. We have also

been indebted to various friends of the Museum for works of interest and value. Such gifts are always received thankfully.

The increase of the collection from January 1, to December 31, 1869, has been five hundred and fifty-one volumes and six hundred and two pamphlets. The exact number of books belonging to the library I am not prepared to give before the full catalogue is ready for use. The last number on our list of additions is three thousand nine hundred and seventy-five. I estimate the full aggregate at somewhat over eight thousand volumes and pamphlets.

Desirous of knowing as accurately as possible the present condition of the collection of Fishes, I directed Mr. Lockwood to count the glass jars already put up with specimens in alcohol. He reports that there are 2,842 in the Exhibition rooms, 7,203 in the work rooms, and 5,197 in the cellar,—altogether, 15,242; say fifteen thousand two hundred and forty-two jars, of all sizes, from the smallest, three inches high by one inch in diameter, to the largest, three feet high by nine inches in diameter, containing each from one to fifty and more specimens, and occasionally even several hundreds. And yet this is by no means half of the collection. The rest remains for the present piled up in tanks, barrels, kegs, cans, earthen jars and other vessels.

L. AGASSIZ.

[B.]

TRUSTEES OF THE MUSEUM OF COMPARATIVE ZOOLOGY, 1870.

THE GOVERNOR OF THE COMMONWEALTH,
WILLIAM CLAFLIN.

THE LIEUTENANT-GOVERNOR,
JOSEPH TUCKER.

THE PRESIDENT OF THE SENATE,
HORACE H. COOLIDGE.

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. THEODORE LYMAN.

JAMES WALKER. JAMES LAWRENCE.
NATHANIEL THAYER. C. W. FREELAND.
SAMUEL HOOPER. SAMUEL ELIOT.
MARTIN BRIMMER.

OFFICERS OF THE MUSEUM OF COMPARATIVE ZOOLOGY FOR 1870.

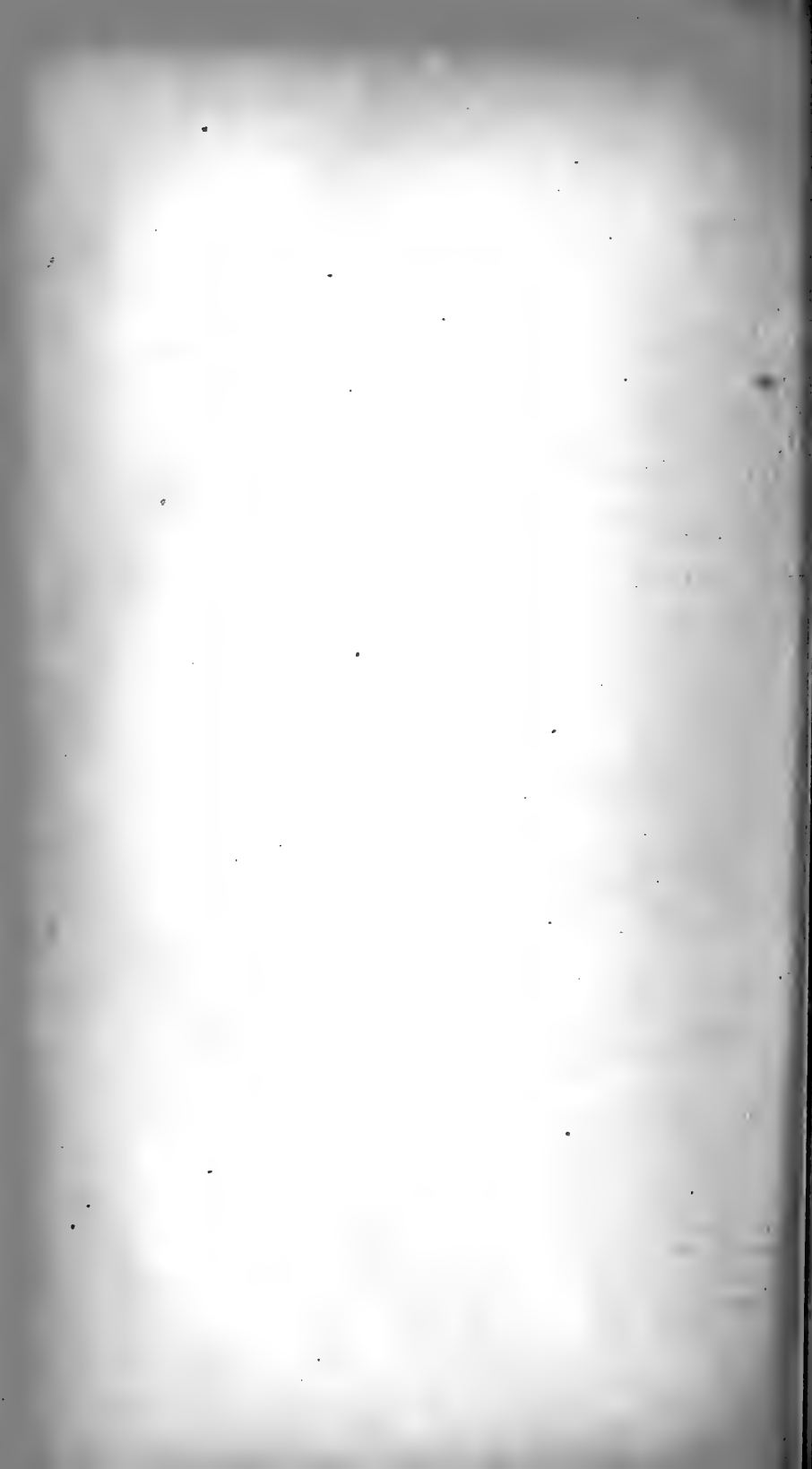
His Excellency WILLIAM CLAFLIN, Governor of the Commonwealth,
President.

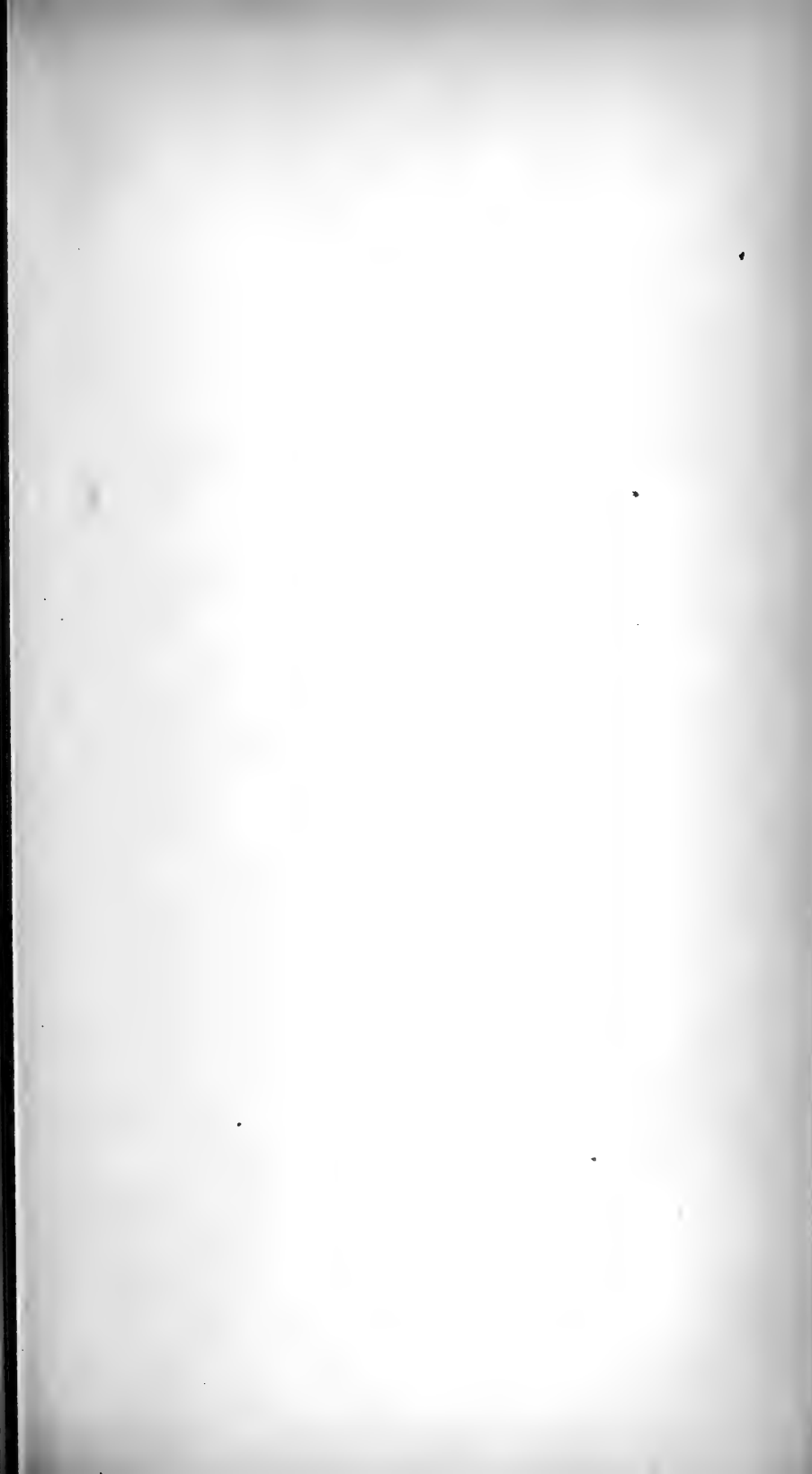
THEODORE LYMAN, *Treasurer and Secretary pro tem.*

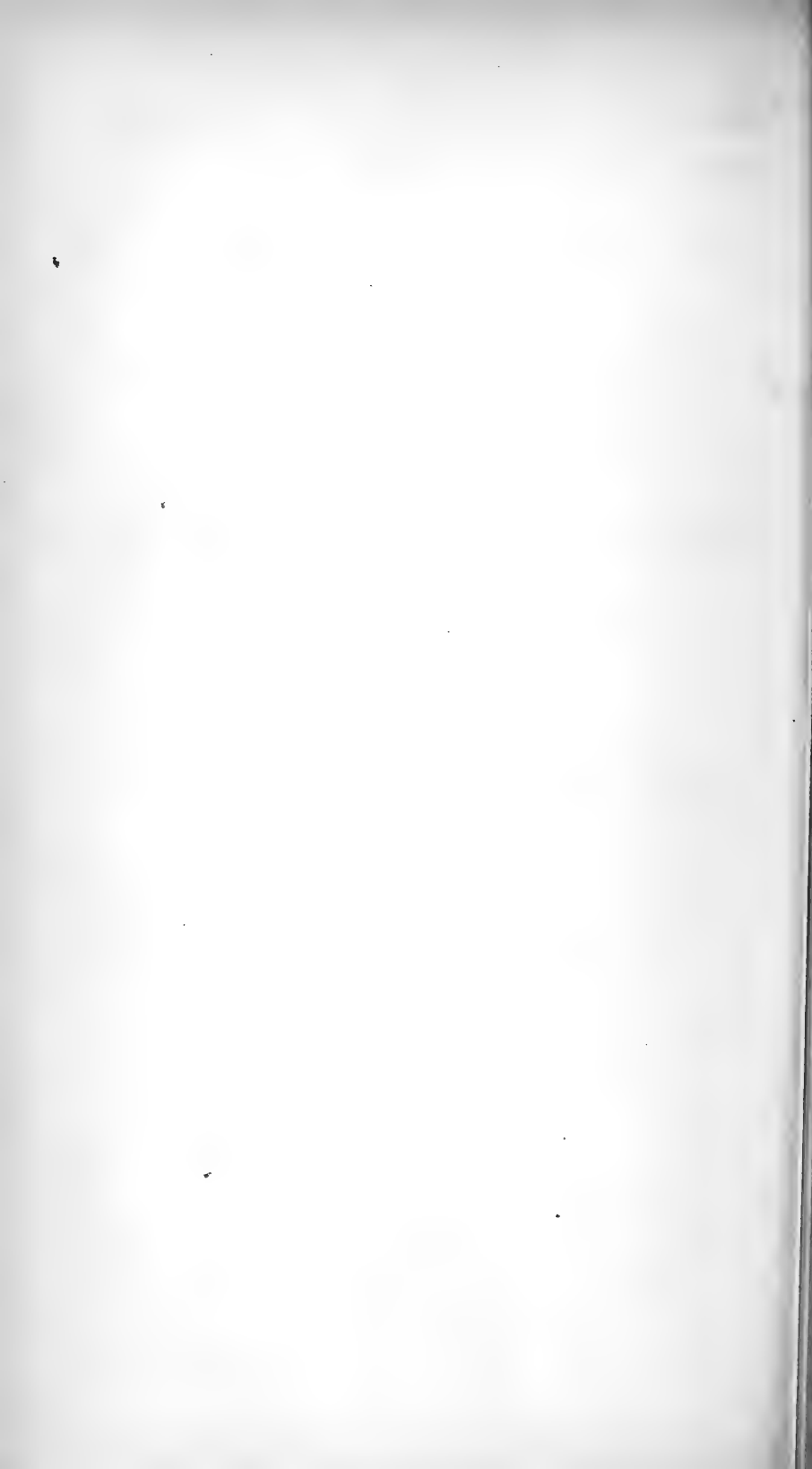
LOUIS AGASSIZ, *Director of the Museum.*

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

LOUIS AGASSIZ, JAMES WALKER, SAMUEL ELIOT, CHARLES W. FREELAND,
Committee on the Museum.







ANNUAL REPORT

OF

THE TRUSTEES

OF THE

MUSEUM OF COMPARATIVE ZOOLOGY,

AT HARVARD COLLEGE, IN CAMBRIDGE:

TOGETHER WITH

THE REPORT OF THE DIRECTOR

FOR

1 8 7 0 .

BOSTON:

WRIGHT & POTTER, STATE PRINTERS,
79 MILK STREET (CORNER OF FEDERAL).

1871.



Commonwealth of Massachusetts.

BOSTON, May 23, 1871.

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 marked [B] contains a list of the trustees, officers and committees for 1871.

During the past year the third \$25,000 of the conditional subscription has been raised, and the corresponding \$25,000 has been received from the State.

For the Trustees,

MARTIN BRIMMER, *Secretary.*

[A.]

REPORT OF THE DIRECTOR

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY,

FOR THE YEAR 1870.

Although, in consequence of protracted illness, I have been unable for most of the time to attend to my duties as Director since I presented my last Report, the Museum has nevertheless progressed with regularity in its onward course. This is chiefly owing to the fact that the organization of our institution is steadily acquiring more stability through experience. We have now an increased number of assistants, are better able to appreciate our own wants and resources, and enjoy an enlarged intercourse with other similar establishments. Our prosperity, and especially the system with which the business details of the establishment have been conducted, are in no small degree due to the disinterested devotion of Mr. T. G. Cary, who for nearly two years has attended day by day to the management of our ever-increasing affairs. I rejoice the more over this state of things, as it shows that with every year the progress of the Museum is less dependent upon my personal attendance, and therefore likely to go on as well as before, when I can no longer take care of it.

One of the characteristic features of the organization of the Museum is that all its officers are expected to work seven hours a day, purely for the good of the institution; no outside work,

even of a scientific character, being admitted during that time, as the Museum is designed to advance science generally, and in no way to afford either its Director or the curators of the different departments an opportunity of benefiting themselves. It is a great pleasure for me as Director to be able to say that all the officers of the Museum are now coöperating with me in that spirit. It is, no doubt, to this devotion to the institution on the part of so many able workers, that the Museum owes its unparalleled and rapid growth. Moreover, the services of Messrs. Theodore Lyman, Alex. Agassiz and T. G. Cary are given gratuitously.

The intended arrangement of the collection is not yet fully made apparent, owing to want of room. It may, however, be said that in preparing specimens for exhibition, the intention of keeping the faunal collections distinct from the general systematic collection is constantly held in view, and that synoptical collections are made besides, for the special use of students, not to speak of the collections intended to illustrate the structure, development and successive appearance upon earth of the different classes of the animal kingdom, which from their very nature require to be put up separately.

The zoölogical collection intended for the special use of students, begun in 1861, has been extended, and in some parts completed and labelled. A new gallery destined for a special palæontological collection, also for the exclusive use of students, has been cleared for this purpose. Elementary collections of typical specimens are also preparing for our normal schools; but I find it most difficult to make proper selections.

The accessions to the Museum during the past year have been very great and of surpassing importance. Foremost stands Deyrolle's collection of Curculionidæ, presented by Mrs. A. Hemenway; next the collection of Galls of Baron d'Osten-Sacken, presented by him; then the magnificent collection of Fossil Plants of Mr. Lesquereux, especially remarkable for the exquisite selection of the specimens it contains, and that of Insects of Texas, made by Mr. J. Boll, both of which have been bought by the Museum.

The fact that Dr. Hagen has brought to this country his unparalleled collection of Neuroptera, which is now deposited in the Museum, is calculated to have the most beneficial influence

upon the progress of that branch of entomology in this country. Besides this, Dr. Hagen has secured for the Museum a number of special collections during his late visit to Europe. Mr. Alex. Agassiz has also made many valuable acquisitions for the Museum during his journey in the old country. Among the additions to our means of study, I ought especially to mention the large series of scientific periodicals presented to the Museum by the University of Bale, and the many works and pamphlets received in exchange for our own publications.

The special reports of the curators of the different departments give a full account of all the donations received by the Museum during the past year. There are, however, some which require a special mention in this place: from Mr. G. V. Fox, late under-secretary of the navy, sundry specimens from Japan and the East Indies; from Mr. Benjamin O. Peirce, a Cape Ant-Eater; from Professor Worthen, fossils of Illinois; from the Massachusetts Agricultural College in Amherst, from Mr. Haskell in Deerfield, from Colonel Theodore Lyman in Boston, and from Mr. W. W. Cheney in Belmont, valuable specimens of domesticated animals.

On the whole, the work done in the Museum during the past year has been a continuation of that of the preceding year, with this essential difference, however, that the accession of Dr. Steindachner, Count Pourtales and Messrs. Léo Lesquereux and E. Bicknell to our corps of officers, has made it possible to take in hand parts of the collections which had been much neglected of late. Thus Dr. Steindachner has begun the identification and final arrangement of the Fishes; Mr. Pourtales has carried forward that of the Corals; Mr. Lesquereux has put in order the whole collection of Fossil Plants, and Mr. Bicknell has resumed the preparation of microscopic sections, entirely neglected since the death of Mr. Glen. The large collection of palms and other tropical plants intended to illustrate the vegetation of past geological ages is still packed up. Mr. Lyman has determined and described all the Ophiurans obtained by the Coast Survey's deep-sea dredgings. Mr. Alex. Agassiz has done the same for the Echinoids; Dr. Wm. Stimpson for the Brachyuran Crustacea, and Mr. Pourtales for the Corals. Meanwhile the monograph of the North American Astacidæ, by Dr. Hagen, and the papers of Mr. J. A. Allen upon the Eared

Seals and the Mammalia and Winter Birds of Florida have been printed and distributed. The paper of Mr. Allen on the Seals is accompanied with remarks by Mr. Charles Bryant and with plates neatly drawn by Mr. Paul Roetter, who has, moreover, since prepared the plates for the paper on Corals, by Mr. Pourtales. Mr. Konopicky is now engaged upon the plates for the paper of Mr. Cabot on the larvæ of Gomphidæ.

In addition to this kind of work several officers of the Museum have given lectures or special instruction to the undergraduates as well as to the special students of the Scientific School and in the university course. Since my sickness Professor Shaler has taken charge of the whole course of instruction given to the undergraduates, while I have only retained the supervision of the instruction of the scientific students. Prof. Perry has delivered a special course upon the geology of Massachusetts in the university course.

The general policy pursued during the whole year, in consequence of our limited means, has been to foster such operations and do such work as requires knowledge and personal application, while requiring only small outlays of money; but the time has come when it will be indispensable for the further increase of the Museum to make extensive purchases of objects which money only can procure.

In anticipation of the final arrangement of the collections in that part of our building which is now in course of erection, regular conferences have been held among all the officers of the Museum, in which we have carefully discussed the questions which may have an influence upon our future progress. Among the topics which have especially engaged our attention, I may mention: *Coöperation* with other institutions in this country, with a view of avoiding useless or costly competition; *nomenclature*, with a view of determining the best mode of labelling the specimens; *structural collections*, as contrasted with zoölogical series; *the arrangement of the library*, with the special intention of facilitating the work of identification by the curators of the different departments, when it was agreed that all the special treatises should be kept in the rooms in which special work is done, and only general works remain together in the library. It is hoped by thus bringing books and specimens

together within reach of the curators, that everybody's task will be rendered less laborious.

With this I present also the special reports of the curators of the different departments of the Museum, as parts of my own.

All of which is respectfully submitted by

LS. AGASSIZ.

Report on the Mammals, by J. A. ALLEN.

Little has been done in this department during the past year beyond the partial revision of the osteological collection, by Dr. G. A. Maack, and the work necessary to insure the safety of the alcoholic specimens and the skins, and the cataloguing of the recent additions. A small portion of the alcoholic collection, however, has been catalogued and systematically arranged; but on the whole the collections remain in nearly the condition reported last year, a small part of the alcoholic collection being still uncatalogued. This collection, as well as that of the skins, continues in good condition; but the increasing danger to the skins from destructive insects, resulting from their hitherto necessary storage in imperfectly closed cases, has shown the necessity of a more secure method of preservation. This danger is now happily to be soon obviated, as these preparations are soon to be transferred to hermetically closing tin cans, which have already been provided.

The additions during the past year number 242 specimens, representing about 60 species. About one-fourth of these were obtained through donations, and one-fourth by exchanges, the rest having been acquired by purchase. Among the noteworthy acquisitions are a European skeleton of *Alces malchis*; skeletons of a thoroughbred Jersey bull and Jersey cow,—the first presented by the Massachusetts Agricultural College and the last by Mr. H. C. Haskell of Deerfield; and a collection of Florida specimens, numbering 56 skins and 30 skulls, representing about 20 species, purchased of Mr. C. J. Maynard. The osteological series designed to illustrate the different breeds of domesticated animals has also been further increased by the donation of the skeleton of a Black Hawk mare by Mr. Theo-

dore Lyman, and the skeleton of the celebrated brood mare "Meg Merrilies," by Mr. W. W. Chenery of Belmont. Among the other important additions are a series of nine embryos of different ages of the *Globiocephalus melas*, and five skulls of the same species obtained for the Museum by Mr. James H. Blake.

The following is a list of the additions to this department during the year 1870,—

By Donation.

AGASSIZ, Prof. LOUIS. 6 specimens, 4 species, in alcohol, from Deerfield, Mass., and Bethlehem, N. H.

ALLEN, J. A. 1 skin of *Putorius ermineus*, and several skulls of other species, from Springfield, Mass.

BLAKE, JAMES H. 9 embryos and 5 skulls of *Globiocephalus melas*, from Wellfleet, Mass.; 1 skeleton of *Delphinus erebennus*, from Provincetown, and a skeleton of an African monkey.

CHENERY, WINTHROP W., Belmont, Mass. The celebrated brood mare "Meg Merrilies."

HAGEN, Dr. H. A. 5 specimens, 2 species, of *Arvicole*, from near Koenigsberg, Prussia.

HASKELL, H. C., Deerfield, Mass. The Jersey cow "Emma" (Am. Herd Book, No. 322).

LYMAN, Col. THEODORE. 1 albino woodchuck, and the skeleton of a Blackhawk mare, his war-horse during Gen. Meade's campaign.

MASSACHUSETTS AGRICULTURAL COLLEGE, through Col. W. S. CLARK. Skeleton of the thoroughbred Jersey bull "Essex."

MUNROE, J. S., Lexington, Mass. Several young pigs.

By Exchange.

AUSTRALIAN MUSEUM, GERARD KREFFT, Esq., Director. 5 specimens, 5 species, skins, from New South Wales.

CUTTING, Dr. H. A. 20 specimens, 5 species, fresh, from Lunenburg, Vt.

MONTES-DE-OCA, RAFAEL. 8 mounted specimens, 8 species, from the vicinity of Jalapa, Mexico.

MÜLLER, Prof. AUGUSTUS, Koenigsberg, Prussia. Skeleton of a European specimen of *Alces malchis*.

PARKER, Prof. H. W. 5 specimens, 4 species, skins (including two specimens of *Mephitis bicolor*), from the vicinity of Grinnell, Iowa.

By Purchase.

48 specimens, 18 species, skins from various parts of New England; skeletons of *Alces malchis*, *Ursus arctos* and *Lupus americanus*, from Northern Maine; 56 specimens, 18 species, skins, from Florida. Also 60 skulls, 20 species, from New England and Florida.

Report on the Birds, by J. A. ALLEN.

In consequence of other duties, the arrangement of the Birds has not advanced during the past year so much as in some previous years, or as much as was anticipated when last year's report was prepared. Little has been done on the alcoholic collection further than to look after its safety. Some three thousand skins, recently added, have been entered on the general catalogue, while the provisional systematic arrangement of the whole collection of skins has been completed, and systematic catalogues of all the alcoholic North American birds have been prepared; as also of a part of the North American skins. Much more time than is usual has been required to check the inroads of destructive insects, to the attacks of which the skins of the birds, as well as those of the mammals, have been thus far exceedingly susceptible. Only a very small part of the collection, however, has been infected, and no serious loss has resulted. The collection is now apparently entirely free from these pests, and it is confidently expected that by transferring the collection of skins to the tightly-closing tin cases which have been ordered for them, and a part of which have already arrived at the Museum, no further trouble from this source will be experienced.

The additions made during the past year embrace 938 skins and alcoholic specimens, representing about 450 species, and about 120 eggs. The most important invoices consist of a lot of 132 specimens of beautifully prepared skins, representing 82 species, from the vicinity of Jalapa, Mexico, purchased from Sr. Rafael Montes-de-Oca; another of 72 specimens of European birds, and another of 65 specimens from New South Wales, acquired by exchange, the first from Dr. H. Dohrn of Stettin, Prussia, and the other from the Australian Museum. A collection of 470 specimens, chiefly mounted, received from the Harvard Natural

History Society, has also added many valuable specimens to the collection.

The following schedule indicates the sources from which specimens have been received the past year, and the number of specimens from each :—

By Donation.

AGASSIZ, Prof. LOUIS. 1 *Accipiter fuscus*, from Deerfield, Mass.

ALLEN, IRVING. 8 specimens of *Cyanura cristata*, from Springfield, Mass.

ALLEN, J. A. 10 specimens, 4 species, and 30 eggs and young birds, 3 species, in alcohol, from Orleans, Mass.; sterna and other bones of 18 specimens of *Ectopistes migratoria*; several complete skeletons of other species, and 6 skins.

ATWOOD, DANIEL W. 23 specimens, fresh, 5 species, from Provincetown, Mass.

BLAKE, JAMES H. 8 specimens, 5 species, in alcohol, from Provincetown, Mass.

BLISS, RICHARD, Jr. 3 specimens, 2 species, skins, from Cambridge, Mass.

COTTING, Dr. B. E. 1 *Chrococephalus Bonapartei*, from the coast of Maine.

HARVARD NATURAL HISTORY SOCIETY. 470 specimens, 250 species, chiefly mounted specimens, from various localities.

HUGHES, D. DARWIN, Esq. 9 specimens, 6 species, skins; 42 dry eggs, 8 species; from Calhoun Co., Michigan.

MANN, BENJ. P. 36 specimens, 26 species, skins, from Lady Island, S. C.

THAXTER, ROLAND. 1 egg of *Aramus giganteus*, from Florida.

WEBBER, Mrs. M. 8 specimens, 4 species, skins, from New Orleans, La.

By Exchange.

AUSTRALIAN MUSEUM, GERARD KREFFT, Esq., Director. 15 specimens, 12 species, in alcohol; 50 specimens, 40 species, skins, from New South Wales.

CUTTING, Dr. H. A. 11 specimens, 7 species, fresh, from Lunenburg, Vt.

DOHRN, Dr. H., Stettin, Prussia. 72 specimens, 52 species, skins and mounted specimens of European species.

HAMLIN, Prof. CHAS. E. 8 specimens, 2 species, skins, from Waterville, Me.

PARKER, Prof. H. W. 61 specimens, 38 species, skins, from Grinnell and vicinity, Iowa.

SMITHSONIAN INSTITUTION. 26 specimens, 14 species, dry eggs, from various localities.

By Purchase.

Two skins of hawks, from Hudson, Mass.; 132 specimens skins, 83 species, from the vicinity of Jalapa, Mexico; 70 specimens, 30 species, from Dallas, Texas.

Report on the Fishes, by Dr. FRANZ STEINDACHNER.

I arrived in Cambridge, May 11, 1870, having come to this country in order to assist Prof. Agassiz for a few years in the arrangement and determination of the magnificent collection of Fishes in the Museum of Comparative Zoölogy. As the disposition of these specimens should agree in every respect with the plan adopted by Prof. Agassiz for all the collections belonging to the Museum, I had to put up separately: (1) Faunal collections, to illustrate the ichthyological character of the different zoölogical provinces; (2) a systematic collection exhibiting the various degrees and different kinds of affinities of these animals; and (3) a collection representing the types of the different families and genera for the special use of students.

The collection of the fishes of Brazil secured during the Thayer Expedition is without any exaggeration the richest and most complete in the world, and for that reason it is of the highest importance that they be well preserved and correctly determined.

I began my investigations with the marine fishes of Brazil, partly and provisionally arranged in glass jars and scattered over the different stories of the Museum. Many were still in barrels and all undetermined. The arrangement of so large a number of fishes according to their systematical position, their locality and their collectors, was a laborious task and required much time and care in its details, particularly as all the jars had to be cleaned and filled with new alcohol. I have now the satisfaction of seeing that all marine fishes of Brazil, except the Murænidae and Chondrostei, are carefully determined and that

3,600 specimens of them, belonging to 170 different species and assorted in 610 glass jars, are catalogued, labelled and placed by myself in the exhibition room; the rest may be labelled in the course of two or three months.

Among the new species of marine fishes of Brazil I found two of the genus *Thalassophryne*, two of the genus *Uranoscopus*, two of the family of *Sciænidæ* (*Pachypops* and *Micropogon*), one of the genus *Centropomus*, etc., etc. Among the species already described are fine and beautiful specimens of *Gobioides Broussonetii* C. Val., from Rio Para; *Corniger spinosus* Agass., from Rio Janeiro; *Pachiurus Lundii* Reinh., from Rio das Velhas; *Belone tæniata* Gthr., from Gurupa, etc.; *Borridia grossidens* from Rio de Janeiro. In regard to the geographical distribution of the fishes, Prof. Agassiz's Brazilian collection is without doubt the most important in the history of Ichthyology.

Besides the above I have completely examined Mr. Garrett's most valuable collections from the Society, Kingsmill and Sandwich Islands. They contain more than 250 species, in nearly 2,400 specimens, and are in the best state of preservation. I hope to be able to arrange and catalogue this collection also during the next year, and to publish a scientific catalogue with descriptions of the new species. Among the fishes of the Sandwich Islands I will only mention a beautiful specimen of *Pogonoperca ocellata* Gthr.

Finally I have begun the scientific revision and determination of the *Holocentridæ* and *Percidæ* for the systematic collection.—Nothing has been done during the present year to increase the collection of Reptiles, which is, however, in a satisfactory state of preservation.

Report on Conchology, by JOHN G. ANTHONY.

In my last report made December 31st, 1869, it was promised that during the current year some progress should be made in mounting, arranging and identifying our Marine Shells, and that the present statement would show a marked improvement in that respect.

Since then 2,417 tablets have been added, mounted with

5,376 specimens, making the entire number now on exhibition 28,667 tablets, and 73,125 specimens. This falls somewhat short of our expectations, but it was all that could be done by one assistant only, who was able to devote to it but a portion of her time, and that during only about three-fourths of the year.

My own time, meanwhile, has been taken up with other duties, among which may be mentioned our exchanges, with the correspondence necessary to carry them on successfully, the identification and labelling of species, and the entire re-arrangement of all our collection of Mollusks. At the commencement of the year it was under the old Lamarckian classification and arrangement, which has since been changed to the newer method of H. and A. Adams. This has been an important step forward in the right direction, although it cannot be considered as by any means a finality, since many errors and deficiencies can readily be perceived, which time and patience will enable us to amend; while with all its short-comings, this is nevertheless a real improvement. While making these radical changes, the plan of cataloguing each species under its ascertained genus has been steadily pursued, and we are thus progressing towards a complete catalogue of all our Mollusks, a consummation most devoutly to be wished, and which now bids fair soon to be realized.

Over 6,500 species of shells have been arranged and registered within the past six months, being nearly two-thirds of our whole collection. The main work in this line to be done includes some very large and important Lamarckian genera, such as the *Helices*, the *Unios*, and other *Naiades*, and the *Melaniadae*, all of which have been registered under the old genera. The progress thus far made is truly gratifying in its main features, although revealing many great deficiencies which it is to be hoped may, before the next report, be supplied. It may be remarked, also, that much remains to be done in the way of identification, our means to that end being still inadequate; but what could be done has been done, and no species has been registered without being carefully and thoroughly examined. When the Museum funds will admit of a little outlay for a few very essential books on conchology, we may expect a better knowledge of all our species, and a more satisfactory statement on our Museum catalogue.

Besides the important addition of 2,417 mounted tablets to our previous number, I have, in the process of re-arrangement, found it necessary also to remount a very large number of the species. This has been owing to the unsatisfactory nature of the cement first used for the purpose, the very dry atmosphere of our exhibition rooms operating unfavorably upon all the cements known, at the time when we commenced this mode of exhibiting shells. Much time and labor has been bestowed upon this problem of the best cement for the purpose, and I am happy to be able to say that I have so far succeeded in removing all difficulties, that we may reasonably hope to be spared hereafter the time and labor of remounting, our present cement seeming to be all that we could desire or expect.

During the earlier portion of the year much of my time and attention was given to our exchanges, which have continued to increase in value and importance as a longer experience and a better knowledge of the condition and wants of our collection has enabled me to arrange with our numerous correspondents for such species only as would supply deficiencies, and thus add directly to our resources without, at the same time, burdening ourselves with undesirable or unnecessary duplicates.

Most of the specimens received during the year have been of the most desirable and useful kind, and hence our collection has increased both in value and importance in a much greater ratio than ever before. By these exchanges we have received from 27 contributors 40 packages of shells, containing 2,117 species and 15,853 specimens. These contributions have been so uniformly good and so entirely acceptable that we cannot well discriminate in favor of any one contributor, but would render to all and each our unqualified thanks for their kind and generous assistance.

We cannot, however, omit to mention a few cases which, owing to peculiar circumstances, have been to us of especial value and interest. Thus, Mr. W. G. Binney, of Burlington, New Jersey, sent us his entire stock of duplicates, which, having been used by him in his many works on American shells, comprised many species very desirable, not only for intrinsic worth, but for collateral considerations, and has also already been of service by furnishing unusual material for our exchanges.

Several special and faunal collections have also been sent us, and deserve particular mention.

From Mr. Henry Dohrn we have two packages, with 180 species, mostly collected by him at the Cape de Verde Islands and on the African coast. Mr. McAndrew sends us 234 species, a large portion of which were dredged by him in the Gulf of Suez, and which, therefore, are particularly valuable for faunal considerations.

Another and very important addition to our faunal collections has been received from Dr. Cox, who sends us two packages containing a series of terrestrial and marine species from a region hitherto very indifferently represented in our collection, and the beauty and perfection of the specimens, in addition to their rarity, render them doubly valuable, and call for our warmest and most hearty thanks.

From J. W. Sever, Esq., of Boston, we received early in the year two packages comprising 177 species, 529 specimens of East India marine shells, which for beauty and perfection could not well be surpassed, and leave us but little to be desired from that faunal region.

Since our last report we have sent to our correspondents, 27 in number, 33 packages, containing 3,151 species and 10,655 specimens. This leaves us in debt to but three persons for exchanges, while we are largely in advance to others, so that this portion of the work of the Museum may be said to be in a very satisfactory condition.

Report on the Articulates, by Dr. HAGEN.

The additions to this department in the past year have been exceedingly important:—

By Donation.

1. A very valuable collection from Prof. RATZEBURG in Berlin, containing parts of trees and plants from Europe damaged or injured by insects (dry), with the insects or larvae in alcohol, all types described and figured in Prof. Ratzeburg's work. 20 species of insects.

2. From Mr. JAMES M. BARNARD a collection of patterns of the Japanese silks.

3. From Baron D'OSTEN-SACKEN. His collection of American galls, gall insects, described in the Transactions of the Philadelphia Entomological Society; also many types of galls from Mr. Bassett and the late Mr. Benj. Walsh, from Rock Island, and a valuable lot of European gall insects, types of Dr. Reinhardt. (See below for details about this important collection.)

4. From Mrs. AUGUSTUS HEMENWAY of Boston, the collection of Curculionidæ of the late A. Deyrolle of Paris, containing 10,014 species in over 17,000 specimens. (See below for details about this important donation.)

5. From Mr. J. SHUTE of Worcester, Mass. The currant worm in all its stages, and several other insects, dry and in alcohol.

6. From Mr. P. B. MANN, two boxes of Neuroptera of the United States, dry.

7. From HARVARD COLLEGE, a collection of insects of all orders, formerly belonging to the Harvard Natural History Society.

8. From Mr. BRYANT, a collection of insects from Maryland, dry and in alcohol.

9. From Dr. KREFFT of the Australian Museum in Sidney, a collection of Coleoptera, from Sidney, 231 species in 906 specimens, dry.

10. From Dr. STEINDACHNER of Vienna, a collection of Microlepidoptera, 68 species in 260 specimens, and Macrolepidoptera 58 species in 80 specimens, both from Europe, in beautiful condition, prepared and determined by the renowned lepidopterologist, Mr. Mann, in Vienna. Also determined European Coleoptera, 830 species in 2,105 specimens, from Mr. Thirk, in Vienna.

11. From Prof. L. AGASSIZ, a collection of insects and biological objects, dry and in alcohol, from Bethlehem, N. H., and from Deerfield, Conn., made during the last summer.

12. From Messrs. LOCKWOOD and BLAKE, some Articulata from Cambridge.

13. From Mr. ROLAND THAXTER, a collection of Lepidoptera, from Cambridge.

14. From Mr. ED. BURGESS, a lot of Neuroptera and Diptera, collected in New England.

15. From Mr. A. R. CRANDALL, galls and several biological objects from Cambridge.

16. From Dr. STEINDACHNER, a lot of Coleoptera, from China, in alcohol.

17. From Dr. H. A. HAGEN, galls, gall insects and specimens of wood injured by insects, from Cambridge and the White Mountains.

From Dr. H. A. HAGEN, a collection of insects, from Waco, Texas, collected by Mr. Belfrage, Neuroptera 211 specimens, Hymenoptera 240, Orthoptera 58, Hemiptera 251.

18. From Mr. J. BOLL, Microlepidoptera and Macrolepidoptera from Bremgarten and Zurich, Switzerland, mostly raised, in superior condition and determined by the renowned lepidopterologist, Prof. H. Frey, in Zurich, 900 specimens.

By Exchange.

19. From Mr. WITTE, Berlin, Prussia, a collection of determined Coleoptera, (mostly micros) about 2,000 specimens, many hundred species.

20. From Dr. KRIECHBAUMER, in Munich, Bavaria, three boxes of determined Hymenoptera, from Europe, Apidæ and Tenthredinidæ, several hundred specimens.

By Purchase.

21. An entomological herbarium, in fine condition, for Microlepidoptera, of Europe, belonging formerly to the late Mr. Lederer of Vienna, collected by Mr. Hofmann in Regensburg, Bavaria, containing 90 species of Tineina.

22. A collection of insects of all orders, made in Dallas, Texas, by J. Boll, 1,600 species in 15,000 specimens; 600 Lepidoptera, many raised, 600 Coleoptera, 100 Hymenoptera, 100 Hemiptera, 100 Neuroptera, Orthoptera, etc., nests and biological objects. (See below for details.)

23. From Prof. F. POEY, insects and larvæ from Cuba, in alcohol.

24. A collection of Microlepidoptera, from Europe, by the renowned lepidopterologist, Mr. Zeller, in Stettin, as types of his work.

25. A collection of Diptera, types of genera, and partly from the United States, from the celebrated dipterologist, Mr. Loew, of Gaben, together with a complete series of his works and pamphlets.

26. A collection of insect formations and biological preparations, from Mr. Brischke, in Danzig, similar to those made before by him for the Museums in Berlin and Tiflis, etc., above 180 species.

The last three collections are ordered not to be forwarded before the transport from Germany is unobstructed.*

For Crustacea and Arachnida.

27. A collection of spiders, types of his works, from the renowned Prof. Menge, in Danzig.

* Nos. 26, 27 have arrived; Nos. 24, 25 may arrive in a fortnight.

28. From Mr. RIGAZZI, of Civita Vecchia, Italy, a great lot of Mediterranean Crustacea, dry.

29. From Mr. J. GRAHAM BRIGGS, spiders in alcohol, collected in Barbados, West Indies.

30. From Mr. H. EDWARDS, Pseudo-scorpions, from California.

31. From Dr. H. A. HAGEN, a lot of *Apus caneriformis*, from Prussia.

32. From Mr. ED. BURGESS, some Branchipus, from Cambridge.

33. From an unknown party, a *Cermatia* found living in a tobacco store in Boston, in December.

34. From Capt. GOFF, ship "Derby," collected upon the west coast of Mexico, Scorpions, Phryne, Spiders, Myriapods in alcohol.

35. From Mr. M. M. CARLTON, North Indian Crustacea, in alcohol. Collected in the Himalaya.

36. From Mr. J. BOLL, Crustacea and Spiders, in alcohol. Collected in Dallas, Texas, and Galveston, Texas.

The work of my department was delayed by my voyage to Europe from the month of May till October. Nevertheless, I am very happy to state that the portion of the collection stored in the new pattern of boxes has passed through those most dangerous months for an entomological collection without injury. After a general revision by myself in the first days of May, Mr. P. B. Mann had the kindness to examine the whole collection twice in my absence. After my return, in a general revision, the collection was found to be in a perfectly good condition. The same may be said of the alcoholic collection. It is true, and worth repeating, that the more expensive way of putting up entomological collections, viz., in good and costly cases or boxes, is in the end the safest and cheapest mode, saving time as well as specimens. Even some old collections of exotic insects, formerly much infested, are now nearly safe, through reiterated care and observation. Of course a certain time must always elapse before new additions can be entered in the collection. For examination they are placed in provisional boxes, and are watched for about three months, before being finally arranged in the collection. If they are still found to be in any way infested or in doubtful condition, this care is continued for a still longer time.

Concerning the work in the arrangement of the Articulates, the beautiful and very important donation of Baron d'Osten-

Sacken is in order and fills nearly two cabinets, forming a collection of galls, gall-producers and their parasites probably unsurpassed. This collection is somewhat enlarged by other donations, and the curator will be very happy to receive new objects belonging to this group of insects. Baron d'Osten-Sacken intends to arrange the collection finally himself, in a scientific manner. As he is unsurpassed in the knowledge of this interesting family the collection will have no superior.

The collection of Neuroptera and Pseudo-neuroptera, belonging to the Museum, is now arranged and for the most part determined, filling two cabinets. This work is to be done again, as the collection of the curator has now arrived from Europe, and by permission of Prof. L. Agassiz is to be deposited in the Museum. Except the destruction of eight boxes (containing about three-fourths of the Myrmeleon, one-half of the Chrysopa and one-half of the Sialidæ), the collection is in good order, and has not sustained damages in transportation above the common average. Just the most delicate objects, for instance the biological collection, and the easily broken small families, arrived in perfect order. As the above-mentioned collection contains the types of all the published North American Neuroptera and Pseudo-neuroptera, besides the types of many other publications upon this group, the advantage of studying them will be very great for everybody interested in this branch of entomology.

The collection of Curculionidæ of the late A. Deyrolle of Paris, the princely gift of Mrs. A. Hemenway of Boston, is without any doubt the greatest addition to this department, and brings our collection of this family into the same rank with the oldest and best worked collections in the world. As the insects belonging to this family, almost without exception, live in all parts of plants and trees, they form a considerable agency in the policy of nature. As they are in other ways the most damaging and injurious insects for agriculture and trade, so, by the natural or artificial accumulation of certain kinds of plants, growing out of the progress of husbandry, do they become formidable to man. A collection of this family was, therefore, a special desideratum for a Museum like ours. Mr. E. Deyrolle writes on the collection, which has arrived in perfect condition, that it has been seen by the most prominent entomologists, and that it has served as a basis for the work of the late Mr. Th.

Lacordaire, now the standard work on this family. Indeed the collection contains many determinations in his handwriting. The Apionidæ are determined by the newest monographist, Mr. Wencker; other families by Mr. Jekel; the Hyperides, by Mr. Capiomont; the Pachyrhynches, by Mr. Westwood; the Otiorynches, by Mr. Seidlitz; the Centorhynches, by Mr. Brisout; the Polydrones, Chlorophanes and Phyllobius (not yet arrived), by Mr. Desbroches de Loges; the Epindes and Microcerites (not yet arrived), by Mr. Jekel; the Cleonides, by Mr. Chevrolat; the Cratopus, by Mr. A. Deyrolle. So far as I know, only the collection of Mr. Bowerbank, containing also those of Mr. Jekel, and now deposited in the British Museum, is richer in species than this one of M. Deyrolle. It is further increased by a number of species, chiefly American, already belonging to the Museum, so that for this family the collection of the Museum can now rival any in the world. The arrangement in our boxes was at once commenced, and nearly one-half of the collection is now arranged.

Besides other work, the curator has begun to arrange and put up safely in new boxes, the Pseudo-neuroptera and Neuroptera of the collection of the late Mr. Th. Harris, belonging to the Museum of the Natural History Society in Boston, and kindly placed in the hands of the curator for this purpose. The collection is a most important one, containing many types of Th. Say and of Mr. Harris himself, and was already in the way to be annihilated by destructive insects.

This work and the study of a considerable lot of insects of the same order of the United States, placed in the hands of the curator, will enable him to give important additions and corrections to his published synopsis of the North American species,—perhaps lead to the preparation of a new edition of this work.

Mr. L. Cabot has begun the study and illustration of the interesting collection of the larvæ of Gomphidæ belonging to the Museum. Nearly all of them are new to science, and any contribution to our knowledge of other larvæ of this family would be an important progress.

The collection of insects of all orders presented by Harvard College has been arranged in separate boxes by Mr. Hubbard and Fr. Howe. It is intended to form the first basis of a student's collection, and will chiefly contain insects to be given into the hands of students beginning to study entomology.

The formation of a separate collection for students is an object of the highest importance. The systematic collection I consider to have the same value as a dictionary for anybody intending to study a language. But while nobody would like to read a dictionary, nobody could study without its help. The arrangement of a scientific collection is the work of a long and careful study, and represents in itself the result of many years' investigation. Even if the Museum, for the sake of more rapid progress, buys a scientific collection, or parts of it, the money spent represents not only the specimens but also the time bestowed upon their identification. Of course a collection representing such a mass of work, and beside this so easily damaged, could not be intrusted to any one not accustomed to handle such valuable objects. The necessary experience must first be acquired by work and study. Besides this the large amount of nearly related forms would not be adapted for elementary study. A student wishing to study the Coleoptera, for instance, would be confused by more than 10,000 species all belonging to the same family. He must first examine a special select collection, a real student's collection, fitted precisely for the purpose of elementary study, and containing the most striking forms of all classes taken chiefly from the country about him, perhaps with the addition of some important forms not represented in the native fauna. It would be very easy to form a most complete and excellent collection of this kind, if the students using them would assist in the enlargement of the collection. Such coöperation would be an admirable training for the student himself, and would at the same time enhance the value of the collections.

As it was announced in the foregoing report, a complete set of instruments for microscopical purposes, and for an intended course on this matter was imported by the curator from Europe. As, in the meantime, another gentleman was engaged to open such a course, the curator would not interfere with his work, and has postponed his own course for a later time. But even now, newly ordered simple microscopes of a new pattern and superior quality, not known here before, will be on hand in the room of the entomological department for any one intending to work in the Museum.

The purchase of Mr. J. Boll's collection of Texan insects is in every way an important addition to the Museum. It was

stated in my last report that specimens of North American Lepidoptera were a desideratum for the Museum. As Mr. J. Boll is a very experienced collector, and a considerable part of his Lepidoptera were raised either from the caterpillar or from the chrysalis, the Museum possesses now a stock of unsurpassed beauty even for Microlepidoptera. As a greater part of the Texan Lepidoptera are to be found living in the Middle States and in New England, the collection of Mr. Boll is a very important addition, giving beautiful specimens for many species before badly represented. Mr. Boll has added some remarks about the plants on which the caterpillars were found, the time of transformation, and similar notes of scientific value. The Coleoptera collected by him are almost equally important for the Museum. The Hymenoptera, Orthoptera, Neuroptera, Hemiptera, form, together with the addition of those collected in Waco, Texas, by Mr. Belfrage, a valuable stock. The whole collection of Mr. Boll, made in a certain limited region and in the course of only one year, affords from its unsurpassed beauty of arrangement a very high testimonial to the collector's ability, and furnishes a model of the way in which insects should be handled and arranged for a collection.

The department has made great progress in European insects. The Lepidoptera, by the beautiful specimens of Micros from Messrs. Boll, Mann and Zeller, will nearly represent three-fourths of the species known, perhaps a little more. The Coleoptera, by the additions before enumerated, will give between two-thirds and one-half of the species enumerated in the newest catalogue of European Coleoptera. I believe this to be a very fair relation.

As to the Crustacea, nothing has been done except the additions above related. The monograph of the Astacidæ of North America, by the curator, is published and now ready for distribution. In the meantime some new species have been received by the Museum.

Dr. Stimpson has completed the examination of the Decapoda brachyura from the deep sea dredgings of Count Pourtales, and his account of them has been published in the "Bulletin"; but the specimens themselves are not yet incorporated into the collection.

Our Annelids still remain in the hands of Professor Ehlers.

Report of N. S. SHALER, Assistant in Palæontology.

The greater part of my time since my last report has been given to the work of instruction in the Museum. A larger number of students than have ever before sought instruction within the walls of the Museum are now partaking of its advantages. Owing to the illness of Professor Agassiz the whole of the instruction in zoölogy and palæontology has fallen into my hands, and as teaching of a practical kind, as well as by lectures, had to be given in both these branches to a class that now amounts to thirty-seven students, it will be easily perceived that little time has been left for the special work on the collections. A good deal has been done, however, in the way of improving the mechanical condition of the whole collection and carrying forward its arrangement. By carefully systematizing the work of those persons who are aiding me in my task I have been able to secure as rapid an advance in the work of preparation for exhibition as ever before accomplished during a single year. Miss Cutler has been employed in placing the Lamellibranchiate and Brachiopodous shells on tablets for the exhibition rooms. Of these groups about eight thousand tablets have been completed and are nearly ready for the shelves. Miss Atkinson has been engaged in cleaning the specimens and in making lists of the fossils laid out for exchange. Both these ladies have attained great skill in their respective branches of work, and have displayed a most intelligent and devoted interest in executing the tasks which have come into their hands.

Mr. Crandall has aided me greatly in the work of getting the collection of Lamellibranchiata in order for exhibition. The locality catalogue of the whole of this collection is now made. The specimens are all numbered to correspond with the number on the lists, so that displacement is not likely to occur and can always be rectified. I hope before the next report to announce that the whole collection of Aceptala is ready for the shelves.

The Anticosti collection of fossils, made in 1861 by Messrs. Verrill, Hyatt and myself, consisting in the main of several tons of blocks of stone containing valuable specimens, has been brought into better shape by breaking up those masses and arranging the material for monographic work. This tedious work has required a great amount of supervision. It now

gives us, however, one of the most complete collections of the fossils of one locality ever made in this country. The accuracy with which the localities were determined gives to this collection a peculiar value.

An appropriation having been made for the collection of fossils, Mr. Crandall was sent to some of the important localities in New York State. His work, done with care and great economy, has given us a good amount of material for exchange, and done much to complete our suites of fossils from the Upper Silurian and Devonian of that region.

The Museum has received this year the very extensive and valuable collection made by M. Léo Lesquereux, during his long and important work upon the Carboniferous Fossil Plants of this country. This collection is the largest accession made to the department of palæontology since the purchase of the collections of Bronn and De Koninck. It is believed to be richer in typical specimens than any other American collection, and to furnish the best illustration of the Carboniferous vegetation of this continent ever made. This collection, together with those obtained from Bronn and Heer, will enable us to furnish means for the comparison of European and American fossil plants on a more extensive scale than has yet been undertaken. Special effort should be made to give this collection all possible completeness by collecting the plants of certain localities which are not yet adequately represented. The plants from the Coal Basin of Richmond are specially desirable, and the assistant is about to make an excursion to that region. As the owners of the most considerable coal areas in the world, the people of the United States are more directly interested in the study of the character of the Carboniferous vegetation than those of any other country. Very little labor and expense will enable us to present to the student very adequate means for studying the problems which arise in the scientific or practical investigation of the coal formation.

Seventeen collections have been sent in exchange, and several others destined for institutions in France, Switzerland and Germany, are awaiting the close of the war to be shipped.

The Museum is indebted to the following persons for donations of fossils:—

AGASSIZ, Prof. L. Fossils from the Connecticut Valley.

AGASSIZ, A. E. R. (Assistant in the Museum). A lot of fossils from England.

RICE, Lieut. V. H. (U. S. A.). A lot of fossils from the Upper Missouri.

SHALER, N. S. (Assistant in the Museum). Fossils from the Champlain Basin and from New York and Rhode Island.

Report of J. B. PERRY, on Fossils and on the Library.

In reporting progress at the end of the year, I find my time so crowded with work, that I shall confine myself to simple results without entering to any great extent into details.

During the first part of the year, considerable attention was given to the fossil Corals. This was in the way of identifying species, and perfecting the arrangement of the collection generally. Many of these corals were also cleansed, and partially prepared to be mounted on tablets. In this labor I was aided for four months, by an assistant.

The work on Tertiary fossils, though somewhat interrupted, has been carried forward for the most part, with a good degree of success. I am happy to announce that the cataloguing of the Gasteropoda, which was begun during the preceding year has been nearly completed. The number of parcels of Tertiary Gasteropods now entered on the catalogue exceeds 15,000. While I was engaged in this work, a young lady was occupied in writing the appropriate numbers on the different specimens, or placing them in vials, when too small to receive the numbers; also in preparing tablets with labels, and otherwise assisting me.

Most of my time, from the first of June to about the tenth of November, was devoted to the more thorough arrangement of given groups of Gasteropods; to a revision of my previous identifications; to the preparation of tables containing the results reached, as to specific and generic designations, geologic horizons, and the like; and to the actual mounting of the specimens, as thus prepared, on tablets. The work of mounting has been shared by an assistant, who has been employed during the remainder of the time in removing the soil from the specimens, pasting labels on tablets, and helping me in various other ways.

As the work has gone on, I have taken great pains to separate from the mass of material, all specimens not needed in making up the several collections of the institution. These specimens, having been accurately identified in connection with those reserved for Museum purposes, have been distributed into separate lots and carefully labelled, the specific and generic names, references to original figures, localities from which the specimens came, their geological horizons, and other matters of importance being given with scrupulous fidelity. They thus constitute valuable material for exchanges,—material which, it is hoped, will reflect credit on the Museum, and, as affording valuable aid, prove acceptable to correspondents.

This reminds me that an active correspondence has been kept up during most of the year, with a view to the increase of the Museum collections. As a result, the institution has already received, or is in a way still further to receive, valuable specimens in exchange. For details in regard to exchanges, reference may also be made to the report of Professor Shaler.

A course of thirty-five lectures, *On the Geology of Massachusetts*, is now in progress. In these lectures it has been the aim, while furnishing beginners with necessary instruction in elementary geology, to embody all the trustworthy results historically thus far reached by previous local investigators, as well as the fruit of considerable original examination of the rocks of the State, thus to give the most complete exposition of its geology up to this time rendered possible.

The crowded state of the portions of the Museum now in use, as well as the recent erection of additional parts, suggest the hope that the specimens now crowded in drawers are destined soon to be transferred to the new exhibition rooms, where as duly mounted, labelled and arranged, they may perform their part as public instructors, showing in their quaint and peculiar way what they have to tell, at once of the past history and of the present condition of the globe.

Additions to the Collections Received.

From Professor L. W. BAILEY, in exchange.—134 specimens, including radiates, mollusks, articulates, and fish, from the palæozoic rocks of New Brunswick.

From F. LAYARD, in exchange.—9 landeilo trilobites, from England.

From T. A. CONRAD, as gift.—Some 350 specimens of United States tertiary fossils, identified by himself.

From L. E. HICKS, in exchange.—A lot of palæozoic fossils, from Ohio.

From OLIVER N. BRYAN, in exchange.—193 tertiary fossils, from Maryland.

From FRANCE.—A lot of anthropological specimens.

Since November 10th I have been almost incessantly occupied in re-arranging the Museum library. The work is going on steadily, and promises, when completed, to give greatly increased facility in consulting its treasures.

The recent accessions of standard scientific works, periodicals and pamphlets are considerable. The collection of books on entomology, made by Dr. Zimmermann, having been lately secured by purchase, has been duly transferred to the library. There have also been various additions by exchange. The largest additions, however, have come as gifts from Professor Louis Agassiz and from Mr. Alexander Agassiz, the very valuable private library of the former being now in process of transfer to the Museum.

When the new organization of the library is completed, and the many additions are properly entered and arranged, the plan and results will be duly reported.

Report on Fossil Vertebrates, by Dr. G. A. MAACK.

The progress made during the past year may be seen by the following statement :—

(A.) The whole collection of fossil Vertebrates, which I found at my arrival in Cambridge scattered over the Museum in various cases and boxes partly not unpacked, is brought at present not only into such order as is necessary for scientific study, but is also so exhibited that every visitor can see what kind of specimens belonging to this department our Museum has in its possession. The time and labor required for this work may be estimated by the fact that every fossil had to be cleaned in order to show its natural appearance.

Without too many details, allow me to state the following results :—

(1.) Besides those fossil Mammalia mentioned in my first report, I have found a large series of very well preserved specimens of *Lagomys*, Cuv., *Arctomys* Gmel. and *Arvicola*, Cuv., besides a lower jaw-cast of *Castoroides ohioensis*, Forster. I found further many horns of different deer-species, and a large quantity of cattle and deer-bones. *Halitherium*, Kaup (syn. *Halianassa*, H. v. Meyer), is well represented by a well-preserved skull, many ribs and back-bones from the miocene deposits of the Basin of Mayence. *Zeuglodon*, Owen (syn. *Basilosaurus*, Harlan), is represented by a skull, several jaw-bones and a large number of teeth. The order of Cetacea is represented by several bones, four ear-bones (Cetotolithes), and several teeth of *Delphinus*.

(2.) The collection of fossil Birds is especially rich in the remains of *Dinornis*, Owen, for which the Museum is indebted to Dr. J. Haast of Christchurch, New Zealand. Four species are very well represented by these fossils, namely: *Dinornis crassus*, *D. casuarinus*, *D. elephantopus* and *D. didiformis*.

Two well-preserved skulls, one of *D. casuarinus*, the other of *D. didiformis*, several rings of the larynx (*Cartilago cricoidea*), and a piece of an egg, are among these fossils. Besides, we have two good casts of the egg of *Epyornis*, Geoff. St. H., from Madagascar, and some bone-casts of this bird.

(3.) The collection of fossil Reptiles is represented by several turtle species. We find here some typical specimens of *Testudo antiqua*, Bronn, from the miocene formation of Hohenhöven, Swabia; a very good cast of *Palæochelys novemcostatus* Val., from the Gault of the Cap la Hève, near Havre (France); further, *Chelydra Murchisonii*, Bell, from the miocene of Oeningen, Switzerland; some typical specimens of *Trachyaspis Sanctæ-Crucis*, Campiche and Pictet, from the cretaceous formation of St. Croix, Switzerland; few remains of *Apholidemys granosa*, Pomel, from the eocene formation of Cuisse-la-Motte (Dép. de l'Oise), France; some fragments of *Tretosternon*, Owen, from the Wealden formation of Tilgate Forest, Sussex, England; some well-preserved carapaces from the London clay; and several typical specimens of *Chelone valanginiensis*, Pictet, from the cretaceous formation (Neccomien) of St. Croix, Switzerland.

The Saurian order is represented by some *Crocodile* remains

from the green sand of New Jersey; by teeth of *Iguanodon Mantelli*, H. v. Meyer, from the Wealden formation of England; by *Teleosaurus bollensis* (*Gavial de Boll*), Cuv.; by two *Gavial* jaws, one of them from the Kimmeridge clay of Honfleur, France; and by some remains of *Mosasaurus*, Conybeare, besides a good cast of *Mosasaurus Hoffmanni*, Mantell, from the cretaceous formation of the "Petersberg," near Mästricht (Holland).

The order Pterosauria, Owen, is represented by a good cast of *Pterodactylus crassirostris*, Goldf.

The Enaliosaurian order is represented by several well-preserved species of *Ichthyosaurus*, Koenig, namely: *Ichthyosaurus communis*, de la Beche and Conyb., from England and Würtemberg; *Ichthyosaurus tenuirostris*, de la Beche and Conyb., from England and Würtemberg; *Ichthyosaurus acutirostris*, Owen, from England and Würtemberg; *Ichthyosaurus integer*, Bronn, from Boll, Würtemberg; *Ichthyosaurus Cuvieri*, Val., from Cap la Hève, Havre; *Ichthyosaurus quadricissus*, Cuv., from Holzmaden, Würtemberg; further by *Plesiosaurus dolichodeirus*, Conyb.; *Plesiosaurus macrocephalus*, Conyb.; *Plesiosaurus neocomiensis*, Campiche; and by several remains of *Nothosaurus*, Münster (syn. *Dracosaurus* Münster), from the triasique sediments of Gailsdorf, Würtemberg.

The order Labyrinthodontes is well represented by several remains of *Mastodonsaurus Jaegeri*, Alberti (syn. *Salamandroides giganteus*, Jaeger), from the "Lettenkohle" (lower red marls) of Würtemberg; further by several well-preserved skulls of *Archegosaurus Dechenii*, Goldfuss, and of *Archegosaurus minor*, Goldf., from Lebach, near Saarbrück, Prussia.

The Batracian order is represented by three specimens of *Rana* from the lignite formation near Bonn, Prussia. One of them represents the *Palæobatrachus Goldfussii*, Tschudi (syn. *Rana diluviana*, Goldfuss).

(4.) The collection of fossil Fishes is large in specimens as well as in species, and good in their preservation.

(a) The Devonian system is represented by a large number of *Acanthodes pusillus*, Ag.; of *Cheiracanthus microlepidotus*, Ag.; of *Osteolepis major*, Ag.; of *Diplopterus macrocephalus*, Ag.; by several remains of *Coccosteus*, Ag.; of *Pterichthys*,

Ag.; and of *Cephalaspis*, Ag., from the old red sandstone of Scotland.

(b) The Carboniferous system is represented by a large number of *Palæoniscus* and *Amblypterus* specimens, namely: of *Palæoniscus Vratislaviensis*, Ag., from Ruppertsdorf, Bohemia; of *Palæoniscus Duvernoy*, Ag., from Münster-Appel, near Kreuznach, Prussia; of *Palæoniscus*, from the Albert Mine, New Brunswick, and from Horton Bluff, Nova Scotia; of *Palæoniscus*, from Burdie-House, near Edinburgh; of *Amblypterus macropterus*, Ag., from Saarbrück, Prussia; of *Amblypterus eupterygius*, Ag., from Saarbrück, Prussia; of *Amblypterus latus*, Ag., from Saarbrück, Lebach; of *Amblypterus lateralis*, Ag., from Saarbrück, Lebach; of *Acanthodes Bronnii*, Ag., from Saarbrück.

Besides, we have many well-preserved *Ichthyodorulites* specimens from this period, and many teeth of the genera *Orodus*, *Cladodus*, *Psammodus*, *Cochliodus*, *Chomatodus*, *Helodus*, *Petalodus* and *Ctenoptychius*.

(c) The Permian system is represented by several *Palæoniscus* species, namely: *Palæoniscus Freieslebeni*, Ag., from Mansfeld, Thuringia; *Palæoniscus magnus*, Ag., from Mansfeld, Thuringia; *Palæoniscus comptus*, Ag., from the magnesian limestone of Midderidge, England; *Palæoniscus macrophthalmus*, Ag., from the magnesian limestone of England; *Palæoniscus glaphyrus*, Ag., from the magnesian limestone of England; *Palæoniscus elegans*, Sedgw., from the magnesian limestone of England; further, by *Pygopterus Humboldtii*, Ag., from Mansfeld; *Platysomus gibbosus*, Ag., from Mansfeld; *Acrolepis asper*, Ag., from Mansfeld.

(d) The Triasique system is represented by teeth of the genera *Hybodus*, *Placodus*, *Ceratodus* and *Saurichthys*; further by a large number of fish-remains from the sandstone of the Connecticut River.

(e) The Jurassique system is represented by many well-preserved *Ichthyodorulites* specimens from the lias of Lyme-Regis, England; by many well-preserved specimens of *Dapedius politus*, de la Beche, from the lias of Lyme-Regis; of *Dapedius granulatus*, Ag., from the lias of Lyme-Regis; of *Dapedius punctatus*, Ag., from the lias of Lyme-Regis; of *Dapedius Colei*, Ag., from the lias of Lyme-Regis; of *Dape-*

dus arenatus, Ag., from the lias of Lyme-Regis; of *Tetragonolepis*, Ag., from Lyme-Regis and from Boll; of *Lepidotus*, Ag., from the lias and from the Purbeck limestone of England; of *Pholidophorus*, Ag., from Lyme-Regis and from Solenhofen; of *Ptycholepis bollensis*, Ag., from Boll, Württemberg; of *Pachycormus*, Ag., from Boll; of *Ophiopsis procerus*, Ag., from Solenhofen; of *Notagogus Zietenii*, Ag., from Solenhofen; of *Caturus pachyurus*, Ag., from Solenhofen; of *Sauropsis latus*, Ag., from Boll; of *Thrissops*, Ag., from Kelheim and Solenhofen; of *Leptolepis*, Ag., from Lyme-Regis, Boll, Solenhofen and Kelheim; of *Aspidorhynchus*, Ag., from Solenhofen, Kelheim; of *Belonostomus Kochii*, Münster, from Cirin, France; of *Megalurus*, Ag., from Kelheim, Solenhofen; of *Macrosemius rostratus*, Ag., from Solenhofen; of *Pycnodus rhombus*, Ag., from Torre d'Orlando, near Neapel; of *Pycnodus gigas*, Ag., from the Kimmeridge clay of Switzerland; of *Microdon radiatus*, Ag., from the Purbeck limestone of England; of *Cololithes*, from Solenhofen.

Besides we have many teeth of the genera *Hybodus*, Ag., *Acroodus*, Ag., and *Strophodus*, Ag.

(f) The Cretaceous period is represented by specimens of *Beryx ornatus*, Ag., *Beryx radians*, Ag., and *Beryx microcephalus*, Ag., from Sussex, England; by several species from Sendenhorst, near Münster, Westphalia, namely: *Platycormus germanus*, v. d. Mark (syn. *Beryx germanus*, Ag.); *Istieus mesospandylus*, v. d. Mark; *Sphenocephalus fissicaudus*, Ag.; *Sardinius Cordieri*, v. d. Mark (syn. *Osmerus Cordieri*, Ag.); *Sardinioides Monasterii*, v. d. Mark (syn. *Osmeroides Monasterii*, Ag.); *Sardinioides microcephalus*, v. d. Mark (syn. *Osmeroides microcephalus*, Ag.); *Leptosomus guestphalicus*, v. d. Mark; further by *Rhacolepis buccalis*, Ag., from Pernambuco, Brazil; *Rhacolepis Olfersii*, Ag., from Ceara, Brazil; by a large number of fish-remains from the "terrain cenomanien" of the upper cretaceous formation from Mount Lebanon and Beirut, Syria; and by teeth of the genera *Corax*, Ag.; *Ptychodus*, Ag.; and *Otodus*, Ag.

(g) The Tertiary period is represented by a very large series of well-preserved fishes from the Nummulitique formation of Monte Bolca, near Vicenza. We find among them representatives of the families *Pycnodontes*, *Sclerodermes*, *Per-*

coides, *Sparoides*, *Gobioides*, *Chaetodontes*, *Aulostomes*, *Pleu-ronectes*, *Scomberoides*. Further, by many fish-remains from the tertiary deposits of Turin; by several species from the "Flysch formation" of the Plattenberg, near Matt, in the Canton Glarus, namely: *Acanus ovalis*, Ag.; *Acanus minor*, Ag.; *Fistularia Koenigii*, Ag.; *Palæorhynchus glaronensis*, Ag.; *Palæorhynchus latus*, Ag.; *Palimphyes latus*, Ag.; *Palimphyes brevis*, Ag.; *Archæus glaronensis*, Ag.; *Archæus brevis*, Ag.; *Anenchelum heteropleurum*, Ag.; *Acanthoderma spinosum*, Ag. Further, by a very large series of well-preserved fishes from the fresh-water limestone of the Molasse formation of Oeningen, Switzerland, namely: of *Perca lepidota*, Ag.; of *Cottus brevis*, Ag.; of *Acanthopsis angustus*, Ag.; of *Cobitis cephalotes*, Ag.; of *Gobio analis*, Ag.; of *Tinca furcata*, Ag.; of *Tinca leptosoma*, Ag.; of *Leuciscus oeningensis*, Ag.; of *Leuciscus pusillus*, Ag.; of *Aspius gracilis*, Ag.; of *Esox lepidotus*, Ag.; of *Lebias*, Ag.; and of *Anguilla pachyura*, Ag. Further, by several remains from Aix, Provence, with a fine specimen of *Lebias cephalotes*, Ag.; by some fish-remains from the "calcaire grossier" of Vaugirard, near Paris, namely: of *Acanthurus Duvalii*, Ag., and of *Zanclus eocaenus*, Gervais; and from the deposits of the Département de l'Hérault, namely, of *Perca Reboulia*, Gerv., and of *Chaetodon Pseudo-Rhombus*, Gerv.; by a fine specimen of *Alosa elongata*, Ag., from Oran, Africa; and by a great number of well-preserved specimens of *Leuciscus papyraceus*, Ag., from the lignite formation near Rott, Siebengebirge, Prussia.

Besides, we have many teeth of the genera *Lamna*, Cuv.; *Oxyrhina*, Ag.; *Otodus*, Ag.; *Carcharodon*, Smith; *Carcharias*, Cuv.; *Notidanus*, Cuv.; and *Myliobates*, Duméril.

(B.) A great part of the skeleton collection is now brought into such order that it can be used for scientific studies. I am able to report that several students have called upon me already for the use of these valuable collections in their investigations. The want of room has thus far prevented me from exhibiting this collection to general visitors. I can say, notwithstanding, that our collection is a very rich one in Mammals, as well as in Birds, Reptiles and Fishes. A beautiful skeleton of Moose forwarded by Prof. A. Müller of Königsberg, was recently received.

(C.) I have endeavored during this last year, through my personal acquaintances, to enlarge our relations with foreign museums as well as with private friends, in order to stimulate exchange and assist the Museum in further collecting specimens necessary for scientific investigation.

In consequence of my appointment as "Geologist and Naturalist of the Darien Expedition," I am obliged to stop my work at the Museum for several months; but I hope that I shall nevertheless be able to do good work for it during this journey.

[B .]

TRUSTEES OF THE MUSEUM OF COMPARATIVE ZOOLOGY,
1871.

THE GOVERNOR OF THE COMMONWEALTH,	WILLIAM CLAFLIN.
THE LIEUTENANT-GOVERNOR,	JOSEPH TUCKER.
THE PRESIDENT OF THE SENATE,	HORACE H. COOLIDGE.
THE SPEAKER OF THE HOUSE,	HARVEY JEWELL.
THE SECRETARY OF THE BOARD OF EDUCATION,	JOSEPH WHITE.
THE CHIEF JUSTICE OF THE SUPREME JUDICIAL COURT,	REUBEN A. CHAPMAN.

 LOUIS AGASSIZ.

THEODORE LYMAN.

JAMES WALKER.	JAMES LAWRENCE.
NATHANIEL THAYER.	C. W. FREELAND.
SAMUEL HOOPER.	SAMUEL ELIOT.
MARTIN BRIMMER.	

OFFICERS OF THE MUSEUM OF COMPARATIVE ZOOLOGY FOR
1871.

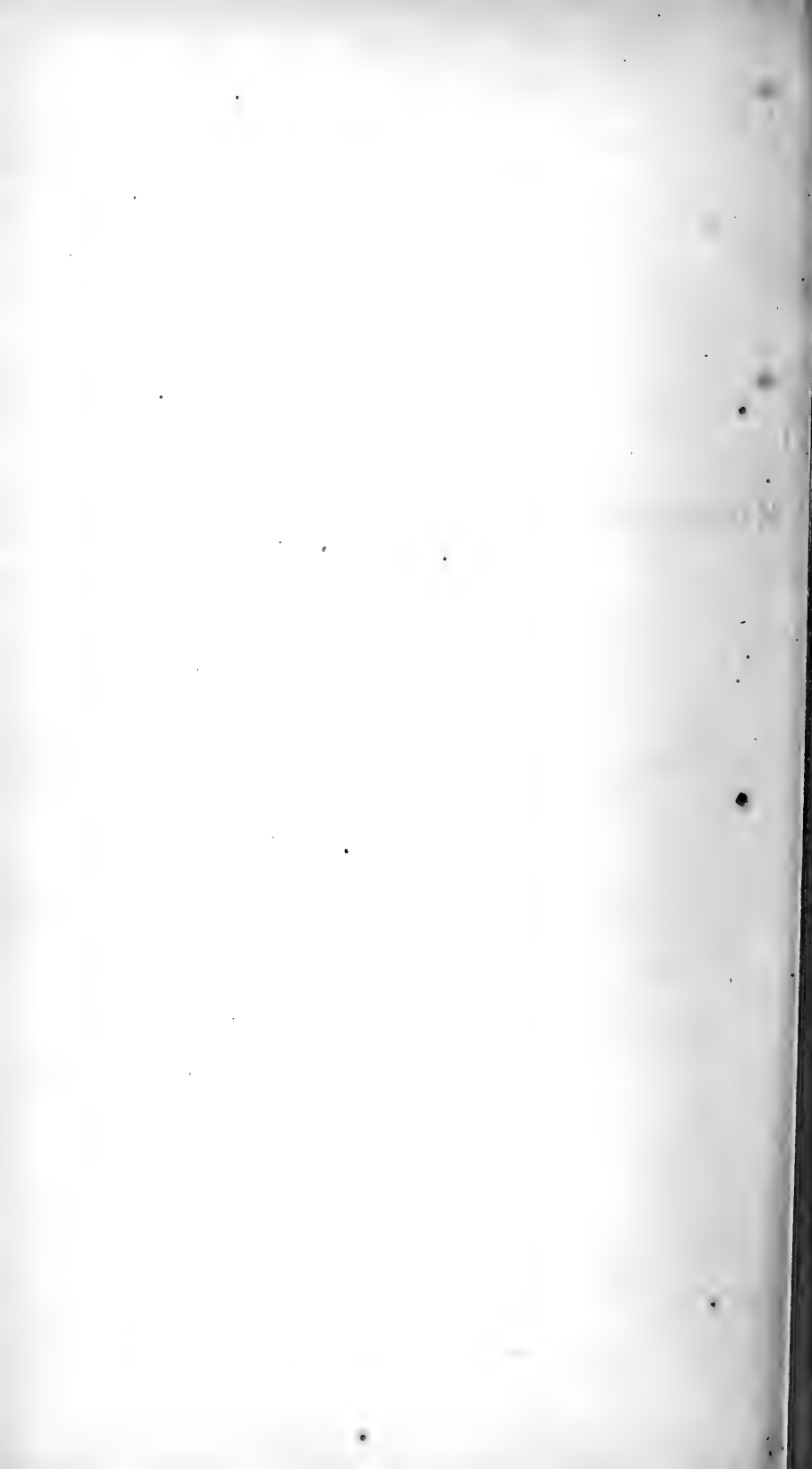
His Excellency WILLIAM CLAFLIN, Governor of the Commonwealth,
President.

THEODORE LYMAN, *Treasurer.*

MARTIN BRIMMER, *Secretary.*

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

LOUIS AGASSIZ, JAMES WALKER, SAMUEL ELIOT, CHARLES W. FREELAND, *Committee on the Museum.*



ANNUAL REPORT

OF THE

TRUSTEES

OF THE

MUSEUM OF COMPARATIVE ZOOLOGY,

AT HARVARD COLLEGE, IN CAMBRIDGE:

TOGETHER WITH

THE REPORT OF THE DIRECTOR

FOR

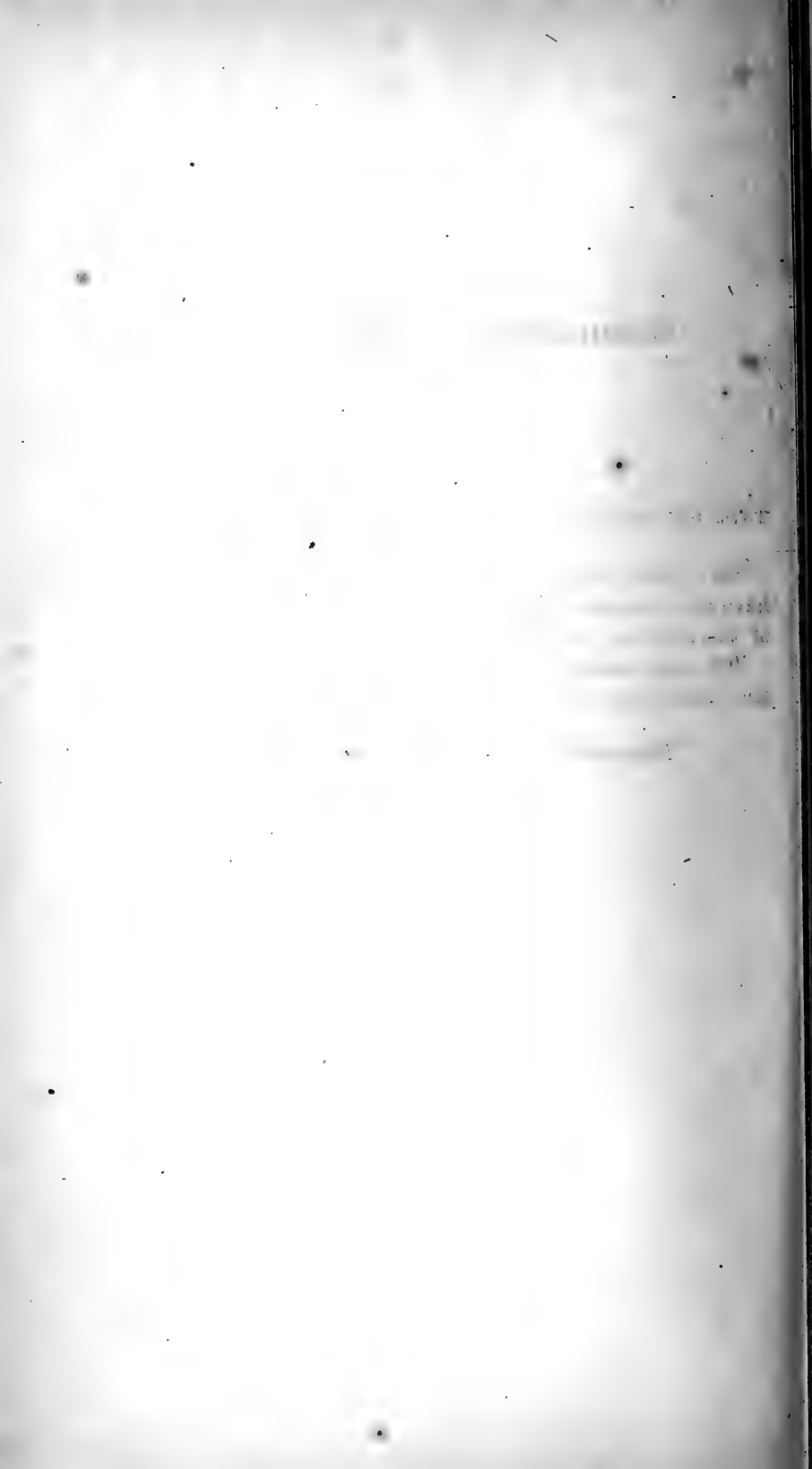
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BOSTON:

WRIGHT & POTTER, STATE PRINTERS

79 MILK STREET (CORNER OF FEDERAL).

1872.



Commonwealth of Massachusetts.

BOSTON, April 1, 1872.

To the Hon. HORACE H. COOLIDGE, *President of the Senate.*

SIR:—The Trustees of the Museum of Comparative Zoölogy have the honor to present to the Legislature the Annual Report of the Director, for the past year, marked [A].

The paper marked [B] contains a list of the Trustees, officers and committees for 1872.

Respectfully submitted, for the Trustees,

MARTIN BRIMMER, *Secretary.*

[A.]

REPORT OF THE DIRECTOR
OF THE
MUSEUM OF COMPARATIVE ZOÖLOGY,
FOR THE YEAR 1871.

On the point of leaving Cambridge for an extensive journey, to explore the greatest depths of the Atlantic and Pacific Oceans, on both sides of the American Continents, I deem it my duty to state to this Board, what measures I propose to take for the management of the Museum during my absence.

Owing to the rapid increase of the institution, the management of its business affairs has become very laborious. For the last two years, Mr. T. G. Cary has taken chief charge of this part of the work, giving his whole time to it, with untiring and disinterested devotion. With your approbation, I propose to entrust it entirely to him during my absence; while Mr. A. Agassiz would advise on matters more especially concerning the scientific interests of the Museum.

With reference to the regular work of the different departments, I propose to transfer to the heads of each department the daily supervision I used to make personally of its progress, and I have prepared written directions for them all, to serve as a guide.

Mr. J. A. Allen is entrusted with the care of the Mammalia and Birds. He has been especially directed to put in order, for the purposes of the Museum, the collections he is now making in the Rocky Mountains, with Messrs. Bliss and Bennett. I have further directed him to dispose of our duplicates, by ex-

changes, to the best advantage of the collections under his care ; and further, to take the proper steps for the final exhibition of the Mammals and Birds in the new building.

As Dr. Steindachner will accompany me on the Deep Sea Dredging Expedition, Messrs. Bliss and Lockwood are charged with the care of the Reptiles and Fishes in his absence. I expect that they will together look to the safe-keeping of this most extensive and laborious department of the Museum. Mr. Bliss is more particularly directed to complete his examination of the collection of Fishes from the Himalaya Mountains, which we owe to the Rev. M. M. Carleton of Umbala, and also to prepare his monograph of the Ichthelidæ (Pomotis, Centrachus, &c.), for publication, while Mr. Lockwood is to arrange the Characines.

Mr. J. G. Anthony, with his two young assistants, will continue the arrangement and identification of the Shells, and especially attend to the critical identification of the specimens, and the preparation of collections for the use of the State Normal Schools, the Agricultural Colleges, and the Girls' High and Normal School in Boston. His long acquaintance with my aims in the Museum renders it superfluous that I should give him special instructions. The alcoholic collections of Mollusks will unfortunately remain for another year in their present state, as Mr. Blake, who lately had begun their arrangement, is to accompany me during the Deep Sea Dredging Expedition.

Dr. Hagen has presented to me so comprehensive a plan of the arrangement he proposes to carry out in the management of his department, that I need only say here, that I have referred him to his own report of last year for instructions. But the class of Insects is so numerous, and our stores already so extensive, that, in order to accelerate the final exhibition of the whole, I have appointed Mr. Boll and a young pupil of Dr. Hagen, to help him in the work. Mr. Boll is especially directed to put up all the insects requiring a new setting, and to prepare the way for extensive exchanges by eliminating the duplicates from the collection proper, and, in the most suitable seasons, gathering additional material for this purpose. As this work advances, Dr. Hagen is instructed to prepare entomological collections for the Normal Schools, on the same basis as those already in progress for the shells.

I have great pleasure in adding that Mr. Louis Cabot is successfully working up the larval conditions of the Neuroptera.

The Annelids of the Museum are in the hands of Prof. Ehlers, in Erlangen, for identification; and Dr. W. Stimpson, of Chicago, proposes to take charge of the Crustacea.

In the absence of Mr. Lyman, who is now in Europe, and of Count Pourtalès, who goes with me on the Deep Sea Dredging Expedition, to take especial charge of the dredging operations, Mr. Alex. Agassiz will have the sole charge of all the Radiates; but as Messrs. Lyman and Pourtalès have prepared in advance, for exchange, sets of duplicates from the collections lately in their hands, no disadvantage is likely to accrue to the Museum from the suspension of their work. Mr. Alex. Agassiz will be chiefly engaged with the final revision of the Echini. The Sponges are now completely identified, thanks to the revision made of them by Prof. Oscar Schmidt.

Dr. Maack is charged with the final arrangement of the Fossil Vertebrates. But he is first expected to work up the collection he has brought home from the Darien Expedition, under command of Captain Selfridge, and to complete his report upon the same. Meanwhile, I expect Dr. Maack to superintend the casting of new and characteristic fossils which I have selected to be multiplied by Mr. Kappeler for our exchanges. Mr. Kappeler is so completely master of his art that I expect to render a signal service to our science, by having him make casts of the most remarkable fossils described by American palæontologists, and by procuring casts of unique specimens from the Old World, in exchange for specimens thus far only known from American deposits, a direct comparison of which is often an absolute necessity for accurate identification.

Mr. Perry will continue the arrangement and identification of the tertiary fossils, with the aid of two young assistants, who have already had considerable practice in this kind of work. The investigations Mr. Perry has made, this summer, of the tertiary deposits of the Southern States have furnished him the means of a more accurate comparison of the American formations of these recent periods in the earth's history with those of Europe, from which I expect much benefit to our collection. Besides this, Mr. Perry is devoting special attention to the fos-

sils of the primordial era. It is intended to put aside a set of fossils for the Normal Schools.

Mr. St. John has undertaken the arrangement of the Carboniferous Fossils, and made a beginning with the fossil fishes of that formation, of which he has brought to the Museum the finest collection I have ever seen.

Mr. Lesquereux has so far completed the arrangement and identification of the Fossil Plants, that this part of our collection only awaits the finishing of the new building, and of the cases in which they are to be put up, to be made accessible to the public.

We now lack only a monographer of the secondary fossils, to complete the arrangement of our palæontological collections.

Mr. Bicknell continues to make microscopic sections of Sea Urchins, spines, shells, teeth and the like, alternating with the arrangement of the Foraminifera and other minute shells, of which large supplies are among our miscellaneous collections. The appointment of Mr. Bicknell as assistant to the Museum has been considered important, as collections of preparations such as he makes are too much neglected in most Museums.

Professor Wilder has been intrusted with the task of putting up a special collection of anatomical preparations to illustrate the structure and economy of our domesticated animals, with a view to complementing the instruction in our agricultural colleges. Prof. H. A. Ward is to prepare a series of skeletons of all the breeds of horses, cattle, sheep, pigs, &c., &c., for this purpose, a large number of which are already completed in his hands, and will shortly be exhibited in the Museum.

The preparation of the last number of our illustrated catalogue, and the facility with which valuable specimens, received in a fresh state, may be reproduced for future publication, with all their characteristics, have satisfied me of the great advantage we enjoy over other Museums in having an artist constantly engaged in this work. Mr. Roetter has been chiefly occupied, during last summer, with the drawing of fish embryos, with a view of helping those engaged in fish-breeding; and he has nearly completed the plates for the forthcoming number of the illustrated catalogue of our Echini, prepared by Mr. A. Agassiz.

Mr. Konopicky has drawn the plates for Mr. Cabot's Neuroptera, and is now engaged with those of Mr. Hyatt's Embryology of Ammonites.

Miss Slack, our librarian, is performing her duties with the most praiseworthy diligence.

Professor Shaler is now chiefly occupied with teaching our under-graduates; and, in order to render his instruction more practical and impressive, every possible effort is now making to prepare suitable collections for the lecture room, for the use of the professor, as well as for the purposes of the students, of which Professor Shaler will have charge. All the heads of the different department are instructed to assist Professor Shaler in the preparation and systematic arrangement of these collections, and at the same time to prepare materials for distribution among the Normal Schools. Besides this, Mr. Shaler continues to take part in the work of the Museum, and is at present devoting his attention to the Silurian Fossils.

The friends of science will, no doubt, be pleased to learn that the Museum of Comparative Zoölogy has made arrangements, by which Dr. Wm. Stimpson may be able to begin making another collection of those specimens upon which he had bestowed special attention during his untiring and successful devotion to zoölogy.

The most valuable additions to the Museum, during the past year, have been the collection of Devonian Fossils, bought of Dr. L. Schultze, and the large collection of marine animals of Mauritius, presented by the Hon. Nicholas Pike, U. S. Consul at Port Louis; not to speak of the numerous exchanges mentioned below in the special reports of the heads of the departments.

Thanks to the liberality of the legislature, and of the citizens of Boston, our institution has been put upon a footing of rapid growth and improvement. Its corps of workers is efficient and devoted. Our relations with other scientific bodies in different parts of the world are all we could desire. Our exchanges are rapidly increasing and improving, and we are missing few opportunities of making valuable purchases. If its present rate of expenditure could be made permanent, in a few years the Museum may have no superior, perhaps no equal.

With this I submit the special reports of my fellow workers as part of my own.

(Signed),

LS. AGASSIZ.

Report on the Mammals and Birds, by J. A. ALLEN.

During the past year little has been done on the collections of Mammals and Birds, beyond caring for their preservation, owing to my absence from the Museum, on a collecting tour to the Rocky Mountains. Early in the year, hermetically closing tin boxes were provided for the entire collection of unmounted skins of both birds and mammals, excepting a few of the larger specimens of the latter, for which tight wooden boxes were prepared. The skins were immediately removed, from the insecure cases in which they had been previously stored, to these insect-proof boxes. They were thoroughly fumigated as they were removed, and have since remained undisturbed. The alcoholic collections were also examined and properly cared for during the early part of the year, so that they still remain in good condition.

In respect to the additions to these departments, the year has been an important one. Dr. G. A. Maack, an assistant in the palæontological department, made, while attached as naturalist to Commander Selfridge's Darien expedition, valuable collections of birds and mammals, which, through the kindness of the Hon. G. W. Robeson, Secretary of the Navy, have become the property of the Museum. These collections number several hundred specimens, and contain many of great value.

A collection of Florida birds and mammals, numbering nearly 1,500 specimens, has been purchased of Mr. C. J. Maynard. This collection supplies many deficiencies in the reserve collection, and furnishes many duplicates of Florida forms for exchange.

The Museum has also received a collection of beautifully prepared skins of European birds, numbering 47 species, and nearly 100 specimens, from Dr. H. Dohrn, of Stettin, Prussia, and from the same gentleman, a choice collection of eggs, numbering over one hundred specimens, and representing 38 European species.

Valuable and extensive additions to these departments have also resulted from the expedition sent out to the Rocky Mountains, the past year, by the Museum. The expedition left Cambridge in April, and was in the field nearly nine months. Collections were made at intervals from the Missouri River to the

Great Salt Lake Basin, but principally at the following points: Leavenworth, Topeka, and Fort Hays, Kansas; Denver and Park County, Colorado Territory; Cheyenne, and Carbon County, Wyoming Territory; and the north-eastern part of the Great Salt Lake Valley. The results of this expedition may be briefly stated, as follows:—Altogether, about 1,700 skins were collected, 1,500 of which were of birds, and the remaining 200 of mammals, besides many skeletons and skulls, and specimens in alcohol. The collection of mammals, includes 8 elk, 12 black-tailed deer (*Cervus macrotis*), 1 white-tailed deer (*Cervus leucurus*), 25 prong-horned antelopes, 11 big-horns, or Rocky Mountain sheep, and 23 buffalo. In each case both sexes and the young are represented, and the specimens are about equally divided between skins and skeletons. In addition to these were obtained 35 skulls of antelope, 18 skulls of buffalo, and a fine series of skulls of elk and black-tailed deer. Among the smaller species are nearly 50 specimens of the little chief hare (*Lagomys princeps*), and about 30 specimens of *Cynomys*, or prairie dogs, divided about equally, between *C. ludovicianus* and *C. Gunnisonii*. Many of these specimens are already in the hands of able preparators; the preparation of the skeletons, which are to be retained by the Museum, having been undertaken by Prof. H. A. Ward, of Rochester, N. Y., while Mr. S. Jillson is engaged in mounting the skins of the larger mammals, many of which were sent to him fresh. The collection of birds contains extensive series of most of the species characteristic of the Great Plains, and the central region of the Rocky Mountains, including, not unfrequently, from twenty to forty of a species, and representing the first or nestling, and the autumnal plumages, as well as that of the breeding season.

Mr. Richard Bliss, of the Museum, accompanied the expedition for several months as ichthyologist, and Mr. C. W. Bennett was engaged as taxidermist. To both of these gentlemen the expedition is greatly indebted for its success, and especially to Mr. Bennett, whose zeal and activity were untiring. The Museum is under great obligations to Major-General John Pope, Commander of the Department of the Missouri, for important aid rendered to the expedition, and for the kindly interest with which he favored its work; to Dr. W. E. Webb, of Topeka, Kansas, for many substantial favors; and to the Hon. W. N.

Byers, of Denver, Colorado. It also gives me pleasure to acknowledge the indebtedness of the expedition, for valuable assistance, to Capt. Samuel Obersheim, Acting Commander of the Military Post at Fort Hays; to Colonel Morris, Major Robinson, Captain Sturgeon, and Lieut. F. W. Baldwin, of the same post, and to Colonel E. Morrow and Lieut. Chase, of Fort Fred. Steele, Wyoming Territory, for many favors. Acknowledgments are also due to the American Merchants' Express Company, and to Wells, Fargo & Co., who have kindly forwarded our specimens at greatly reduced rates; to the Union Pacific Railroad Company, and to the Kansas, and the Denver Pacific Railroad Companies, for passes for the members of the expedition over their respective roads, and for the free transportation of specimens and baggage. The Hannibal and St. Joseph, the Chicago, Burlington and Quincy, and the Michigan Central Railroad Companies have also presented the expedition with passes. The cordiality with which all these favors in behalf of science were rendered, made their reception the more gratifying.

Other collections received during the year, and deserving particular mention, are the fine suite of 15 Hawaiian skulls, presented by Dr. Robert Wood, of Honolulu; the skeleton of a young "fin-back" whale, presented by Mr. James H. Blake; the skeleton of a Holstein bull, presented by Mr. W. W. Chenery, of Belmont; and the skeleton of a manatus, received from Dr. Krauss.

In addition to the skeletons sent by the Rocky Mountain expedition to Prof. Ward, a large number of others have been forwarded to this gentleman for preparation, a considerable part of which are to be mounted. Among these last, are several skeletons of domesticated cattle and horses, representing different breeds; six species of *Pinnipedes*; several specimens of *Alces*, including a specimen from Europe, and many smaller animals.

The subjoined schedules exhibit more fully the additions that have been made to these departments since the last report:—

Mammals, by Donation.

ATWOOD, Hon. N. E., Provincetown, Mass. Skeleton of a young Sperm whale.

BICKNELL, EDWIN (Assistant in the Museum). About 100 specimens of white mice, in various stages of development.

BLAKE, JAMES H. (Student in the M. C. Z.) Skeleton of a young Fin-backed whale (*Balænoptera*).

BUEHLER, CHAS., Fort Fred. Steele, Wyoming Territory. Skull of a Grizzly bear.

CHENERY, W. W., Belmont, Mass. Skeleton of a thorough-bred Holstein bull.

DARIEN EXPEDITION, Capt. T. O. SELFRIDGE, Commander. 15 specimens, 10 species, in alcohol; 9 specimens, 6 species, skins; several skulls and skeletons, collected by Dr. G. A. Maack, naturalist of the expedition.

PIKE, NICHOLAS, U. S. Consul in Mauritius. 2 species of Pteropus; several skulls, and other small mammals, from the Island of Mauritius.

PHILIPS, Capt. C. O., Deerfield, Mass. Skeleton of a fox, and skull of a young calf.

WOOD, Dr. ROB'T, Honolulu, S. I. 15 Hawaiian skulls.

By Exchange.

DOHRN, Dr. H., Stettin, Prussia. 3 specimens, 3 species.

KRAUSS, Dr. Skeleton of a Manatus, and other specimens.

From the Rocky Mountain Expedition.

Two hundred skins, 30 species; 60 skeletons, 14 species; 240 skulls, 25 species; 20 specimens in alcohol, 6 species.

By Purchase.

Forty specimens, 12 species, skins; several skulls of walrus, Cetaceans, and other species, from various localities.

Birds, by Donation.

DARIEN EXPEDITION, Capt. T. O. SELFRIDGE, Commander. 184 skins, 75 species; 75 specimens in alcohol, 42 species, and several skulls, collected by Dr. G. A. Maack.

SCOTT, W. D. 37 skins of New England birds, 15 species.

By Exchange.

DOHRN, Dr. H., Stettin, Prussia. 100 skins of European birds, 51 species; 103 eggs of European birds, 38 species.

From the Rocky Mountain Expedition.

Fifteen hundred skins, 200 species; 100 specimens in alcohol, 30 species; 33 nests and 160 eggs, 20 species; several lots of young birds in alcohol, and a number of skulls.

By Purchase.

Forty-three skins, 21 species; 34 specimens in alcohol, 15 species, from Dallas, Texas; 74 skins, 7 species, from Massachusetts; 1,430 skins, about 100 species, chiefly from Florida.

Report of DR. G. A. MAACK.

At the close of my last report, November, 1870, I expressed the hope that it might be possible for me, in the position of Geologist and Naturalist of the U. S. Darien Exploring Expedition, to which I was appointed at that time, to do, besides my official work for the United States Government, some good work for our Museum. At present, when everything I have collected has arrived at Cambridge in good condition, I am happy to be able to report that my hope has been wholly fulfilled. Thirty cases filled with geological, palæontological and lithological specimens from the Isthmus of Panama, Darien and Chocó, collected on the Atlantic side as well as on the Pacific, have been the result for our Museum, as the Hon. Secretary of State has given permission to unite all the collections with those of the Museum.

It may be allowed to me to return here publicly our heartiest thanks to the Hon. Secretary of the Navy for this contribution to our collections.

In giving some outlines of them, I may say, first, that I labelled all the various specimens with the greatest care, to be sure of what occurs on the Atlantic slope and what on the Pacific slope. This careful labelling is nowhere so necessary as on the Isthmus, where the continental mass of Central America contracts to its greatest narrowness, and where the influence of the climatic differences between the two ocean-shores, as well as that of the different geological and botanical characters of this region upon the development of animal life, can be studied better than at any other place, after having ascertained carefully the *habitat* of the species.

The collections from the Atlantic side have been made:—

- 1st. At Carthagena and its neighborhood.
- 2d. At Turbo, a village on the Gulf of Darien, and its vicinity, for several miles.
- 3d. Along the Atrato River and in the interior of that region.
- 4th. At Aspinwall and along the Panama Railroad.

The collections from the Pacific side have been made:—

- 1st. At Panama.
- 2d. In the Gulf of St. Miguel and up the Tuyra River.
- 3d. In the Cupica Bay and across that region along the Napipi River.

The zoölogical collection contains, of Mammals, several monkeys representing two species of the Genera *Cebus* Erxl. and *Hapall*, Ill, which are preserved in alcohol; a dozen bats; some specimens of squirrel, and of aguti (*Dasyprocta Aguti* L.); several skulls of the Water-hog (*Hydrochærus*, L.); two specimens of the Ant-eater (*Myrmecophaga jubata*, L.); specimens of the Opossum (*Didelphys*, L.), and of the Sloth (*Bradypus pallidus* Wagn); several skulls of the Pecari (*Dicotyles torquatus*, Cuv.), and of the Manati (*Manatus Americanus* Cuv.)

The birds of the Isthmus are represented very well in my collection, which contains a good many skins, as well as alcoholic specimens; especially a very fine specimen of *Trogon resplendens*. This most beautiful bird, found only near the volcanoes of Mexico, in the Altos of Guatemala, and near the volcano of Chiriqui, is worthy noticing.

The collection of Reptiles is likewise very well represented by many specimens of turtles, of lizards, of iguanodons, by one Alligator-skeleton, by many snakes, and by various species of frogs.

The collection of Fishes contains several species from the Atlantic side, and some from the Pacific side.

The Invertebrata are represented by a large number of beetles, of locusts, of butterflies, of spiders, of crabs, of centipedes and millipedes, of Mollusca and of Radiata.

This would be a general statement of the zoölogical collection

which I brought back from the Isthmus, and the material of which has been given to the different Curators of the Museum.

My geological and palæontological collection is very rich in good and characteristic specimens of the various rocks which occur on the Atlantic and on the Pacific, and which form the constituent parts of the dividing ridge between the two oceans. I made geological surveys at three different parts of the Isthmus, namely: 1st, between Aspinwall and Panama (Province of Panama); 2d, between the Gulf of Urabá, or Darien del Norte, and the Gulf of St. Miguel, or Darien del Sur (Province of Darien); 3d, between the Napipi River and Cupica Bay (Province of Chocó); and collected as much material as possible, in order to obtain a clear insight into the geological structure of these regions. It was important for me, in this respect, to determine the existence of several coal-beds on the Atlantic, near the Gulf of Urabá, and to discover various tertiary deposits, full of fossil-shells, up the Tuyra River, on the Gulf of St. Miguel on the Pacific Ocean.

The principal results which I have gained by this geological examination of the Isthmus are the following:—

1st. The Cordillera de los Andes changes its general character in the Province of Chocó; while it strikes through the whole of South America in a meridian direction, its general bearing there is in the direction of the parallels. This strike is preserved through the whole Isthmus, causing its curved form and the sudden contraction of the continental mass.

2d. The height of the Isthmus mountains is much less than that of the South American Cordilleras, and decreases especially between Panama and Aspinwall, where the whole orographical character of the Isthmus undergoes a great change. The mountainous system in the Province of Chocó, near Limon Bay, and the internal part of Cupica Bay, has a geological character different from that of the Tuyra, and of the Chucunaque regions, in the Province of Darien; and this mountainous system differs again, by its parallel arrangement, as well as by its petrographical composition, from that between Panama and Aspinwall. Consequently the whole Isthmus consists of three systems differing from one another.

3d. The Isthmus-Cordillera does not possess, in general,

table-lands of so large an extent as those which are frequently encountered in the South American Cordillera, as well as in Central America. This is a very important fact, if we bear in mind that these high table-lands on the western coast alone make it possible for a white man to work with endurance in the tropics, and to cultivate with success all those natural products which create tropical commerce. This orographical fact, properly understood and applied, is the key to an explanation of a great many things in the past history of South America, of the Isthmus and of Central America.

4th. We possess palæontological proofs, preserved in the tertiary strata of the Tuyra River on the Pacific slope, on the one hand, and in the tertiary deposits from Empire Station to Monkey Hill, along the Panama Railroad on the Atlantic slope, on the other hand, which show us that at least two channels,—one between the Gulf of St. Miguel and the Gulf of Urabá, the other between Panama and Aspinwall,—existed up to the later tertiary period, by which both oceans mingled their waters. This fact is important for an understanding of the geographical distribution of the present botanical and animal life.

5th. The upheaval of the Pacific Cordillera belongs to the later eruptive period, and its rocks belong to the petrographical families of the trachyte and the basalt; while the San Blas Cordillera, of the Atlantic slope, belongs to an older geological period, and is composed of the older crystalline rocks,—granite, syenite and diorite. The northern Atlantic slope was consequently already upheaved and in a state of tranquillity when the waters of the South Sea still covered the whole area which forms at present the Pacific slope. If after this we take into account the constant disintegrating effect of the north-eastern trade-wind, saturated with the moisture of the Caribbean Sea, we shall understand how it was possible that the rocks of the Atlantic slope could be so greatly decomposed, and could furnish afterwards the material of a fertile soil which had the power to produce a most gorgeous vegetation.

I have given, so far, the positive results which have been gained up to the present time for the Museum by the expedition. But I can add that I have also gained for our Museum, during this journey, several friends residing on the Isthmus, as well as in

Nicaragua, in Costa Rica, in San Salvador, in Guatemala and in Peru, who have promised me their ready assistance for the future in promoting the interests of the Museum.

After my return in July, 1871, I was engaged in preparing my report on the Geology and Natural History of the Isthmus of Panama, Darien and Chocó, for the United States Government.

After this work was done I devoted most of my time to examining and putting in order the osteological collection of the Museum, which work makes more and more progress daily, but will still occupy me for a long time, because the material, which has been collecting for years, is very great, and has been augmented during the last year by several presents from friends of the Museum. I use this opportunity to return our best thanks to Professor Krauss of Stuttgart, who sent us a fine manati skeleton; to Mr. J. A. Allen, who presented to the Museum a large number of mammalia skeletons, collected during his late exploration in the West along the Pacific Railroad; to Dr. Robert W. Wood, who presented fifteen well-preserved Hawaiian skulls; to George J. Nickerson, Esq., of New Bedford, from whom we received several good skulls of *Porcus babyroussa Klein*, one skull of a young walrus and one skull of a whale-killer, caught on the coast of California; and to Mr. J. Boll for some turtle-skeletons from Texas.

In regard to fossil Vertebrates, a great deal of progress has been made in adding a collection of exact casts from rare original specimens, which have been described and published. It has been the good fortune of the Museum to gain the services of Mr. Kappeler, an artist of great ability in this department. Moulds of several skulls of *Mastodon giganteus* belonging to the collection of Professor J. Wyman have already been made, and are ready for making casts. Another series of moulds and casts have been made from various typical fossils belonging to the Smithsonian Institution. I return, in the name of the Museum, our thanks to Professor Wyman and to the Smithsonian Institution for the liberality with which these fossils have been lent to us.

The collection of fossil Vertebrates has been increased by:—

1st. A set of Fossil Mammalia from France, presented by E. LARTET.

2d. Several Fossil Mammalia from Texas, presented by J. BOLL.

3d. Various Bones of a Fossil Bird, and of a Fossil Turtle, from Mauritius, presented by N. PIKE, Esq., U. S. Consul at Port Louis.

4th. A number of Fish-Teeth from the phosphate beds, Charleston, S. C., presented by the U. S. Coast Survey.

5th. Several Fish-Teeth from Gay Head, Martha's Vineyard, presented by B. LUCE, Esq.

6th. A large series of Fossil Vertebrates from the Red Crag of England, presented by H. C. QUIMBY, Esq.

7th. A large number of fine fish-specimens from the Harz Mountains and from Bohemia, presented by Professor VON CORTA of Freiberg.

8th. A number of Fish-remains from the tertiary shales of Green River, Wyoming Territory, collected and presented by Mr. J. A. ALLEN.

I return, in the name of the Museum, our thanks to all these different gentlemen.

Report on Conchology by JOHN G. ANTHONY.

Early in the year my time was mainly devoted to a revision of the genus *Helix* as restricted and bounded by Lamarck and the writers of his day. The authors of that time had much curtailed and improved the Linnæan arrangement previously in use, but the genus *Helix* still contained many species not properly belonging therein until Albers commenced his labors among the terrestrial Mollusks, his works far exceeding in accuracy those of his predecessors. I have carefully followed Albers in the arrangement which I have completed of our 1,500 species in this interesting genus, and trust that our very large number and range of species has enabled me to do this with perfect satisfaction. Nearly all the divisions made by him are well represented in our collection, and the completion of this very desirable work enables me to record another great and additional step towards a complete catalogue of our Mollusca, which we have long been desirous of seeing completed, and of which the *Naiadæ* and *Melaniadæ*, with a few of the minor groups, alone remain unarranged.

Two lady assistants have, as usual, been occupied in cleaning and mounting the specimens, and their labors in this way have been very satisfactory. During the current year some 2,000 tablets, mounted with 5,500 specimens, have been added to the collection; our present number of mounted tablets being considerably over 30,000, and the number of specimens thus mounted exceeds 80,000.

These labors, however important, have not been allowed to engross all my time and attention, or to interfere with the increase and improvement of the collection in other respects. Our exchanges have been steadily kept up, and some of the most interesting species we have ever received have come to us during the current year.

Among these, I recur with peculiar pleasure to one species which happened to be among my earliest acquisitions in 1825, but which has since persistently eluded all attempts to procure additional specimens, until we received during the present year, shortly after our last report, quite a number of specimens.

The number of specimens received since our last report, has not been as great as in many former years; but we now aim at greater discrimination, and only desire those which will be of immediate service, either by supplying the many deficiencies in our collection directly, or indirectly by furnishing us with available duplicates, which need only a second exchange to add to our species. Nearly every exchange made during the year has therefore been a special one, and thereby all useless duplicates have been in a great measure avoided.

Among the valuable contributions thus received, we desire to note a most interesting series of specimens received from Mr. Gates of the U. S. Navy, consisting of about 500 species, very largely from Tahiti and the Feejee Islands; which, on faunal considerations as well as the great beauty and perfection of the specimens, were very desirable to us.

Our Pacific Coast Shells have also been considerably enriched by a fine collection purchased from Dr. J. G. Cooper, of about 400 species, carefully named and well preserved. These, with our previous possessions from that quarter, and some which are promised from another source, will render our fauna of that region very complete and satisfactory.

Our East Indian fauna, hitherto very complete, has been fur-

ther enriched by a valuable contribution from Rev. Mr. Fairbank, who has added about 50 new species from that interesting portion of the world, and from localities hitherto unrepresented with us.

Dr. Maack brought home a large number of highly interesting shells, obtained on both sides of the Isthmus of Darien, but principally at Panama, on the western side, and at Carthagena on this side. They are the more interesting, as those from Carthagena show some forms which have generally hitherto been credited to the African coast, and not before known to exist at any intermediate point.

I cannot here omit to allude to the very valuable, though small collection of marine forms, received of J. Gwyn Jeffreys, Esq., who paid us a visit in September, for the purpose of examining and comparing our deep-sea dredgings with those brought to light by the British expeditions for the same purpose, of which Mr. Jeffreys is one of the most zealous operators. Only 33 species were thus received. Mr. J. subsequently paid a visit to Chicago, shortly previous to the great fire, and minutely examined our specimens in Mr. Stimpson's hands there, taking home with him many species for better comparison with the European dredgings. Our other specimens in Chicago all perished in the ruins of the Chicago Museum by the great fire.

From Santo Domingo we have a small but interesting series of land shells, received through Mr. Charles Wright, who accompanied the American commissioners to that portion of Hayti. It is to be regretted that the scientific men who went on that occasion could not have penetrated further into the island, and brought away larger and more complete representations of its fauna.

Mr. Geale, who has hitherto contributed largely and very acceptably to our collection, has again laid us under obligations, by sending us two fine lots of handsome and rare forms, thereby supplying some of our desiderata and filling many a hiatus which has long troubled us.

Since my last report, the collection of shells formerly belonging to the Harvard Natural History Society which had for some time previously been in the Museum building, has been placed in my hands, and found to be a considerable addition to our resources. It has enabled us to furnish in return a large number

of suitable specimens for teaching the scientific class, organized in our Museum from students in Harvard University, as well as to add some good species to our own general collection.

Dr. H. Dohrn has also given us another proof of his kindness, by contributing a choice and valuable selection of species, besides making us a most acceptable visit, inspecting carefully our collection, and revising in some cases our imperfect determinations of species.

From many others of our tried friends, we have received during the present year additional proofs of their kindness, which we are duly grateful for, and most heartily thank them. Among these we cannot but mention Dr. Cox, Nicholas Pike, Esq., and the Museum at Bordeaux.

From every source we have received 34 packages, 2,494 species and 20,566 specimens since our last report.

Our consignments during the same period have been 23 packages, 1,965 species and 8,007 specimens.

Comparatively little has been done in my department, during the year, in the way of determining species, as up to the last of the year we were without the books needed to carry our determinations beyond the point to which they had already attained. But just previous to closing this Report, our library has been greatly enriched by receiving a handsomely bound copy of Reeve's Iconography, in 17 volumes. This valuable work I have long desired the use of, in vain, and no time will be lost in availing myself of its important aid during the coming season, to reduce the number of our undetermined species.

One other important work which I have been called upon to do during the year, remains to be noticed; viz., that of furnishing the normal schools of the State with generic types of shells, carefully selected, for the instruction of the scholars, to which we hope to add in due time such specimens as we can furnish illustrative of the species found in New England particularly, as well to some extent with the species from foreign as well as domestic localities. I have commenced this arrangement with the normal school in West Newton Street, Boston, under the management of Mr. Hunt, and, in order to make this more useful to that institution, have required him to detail a few of his best scholars to come at stated times for many weeks in order to learn the proper method of handling and mounting shells, and

this work has been done by them very neatly and satisfactorily. Upwards of 200 generic types illustrated by a large number of species, have been thus prepared and mounted ready for delivery whenever the cases are ready to receive them.

Report on the Articulates, by Dr. HAGEN.

The additions to this department during the past year have been numerous and valuable: —

By Donation.

1. From the Rev. M. M. CARLETON, in the East Indies, insects, in alcohol, collected in the Himalaya Mountains; mostly Coleoptera, Orthoptera and Hemiptera, 15 jars.
2. From the same, insects and spiders, in alcohol; also collected in the Himalaya Mountains, 30 jars.
3. From Dr. MAACK, insects, in alcohol, collected at Carthage, New Granada, by the Darien Expedition, Orthoptera, caterpillars and larvæ, and spiders, 7 jars.
4. From Prof. F. SANBORN, fleas, in alcohol.
5. From Mr. EMERTON, the larva of *Myrmelion innotatum*, in alcohol.
6. From Mr. W. HOLDEN, a lot of insects, of different orders, collected in California and Ohio.
7. From Mr. ROLAND THAXTER, a large lot of *Att. Promethea*, living cocoons.
8. From Dr. MAACK, a valuable lot of insects, dry and in alcohol, collected by the Darien Expedition, in different localities.
9. From Mr. F. D. GREEN, *Danaïd Archippus*, caterpillars and chrysalids, living.
10. From Mr. W. HOLDEN, a rich lot of insects, collected in San José, California, and various other localities.
11. From Baron OSTEN-SACKEN, additions to the collection of American galls, previously presented by him to the Museum.
12. From Messrs. WM. MORRISON and M. M. CARLETON, a lot of insects, spiders and centipedes, in alcohol, from Kooloo, in the Himalaya Mountains.
13. From Mr. ULKE, 15 North American Micro-lepidoptera, in very fine condition.
14. From Mr. E. L. LAYARD, butterflies, 95 species, and Coleoptera, 62 species, from the Cape of Good Hope, comprising, in all,

325 specimens. This collection was received some time since, but was not until now deposited in the proper department.

15. From Mr. S. A. TOOTHAKER, living Colorado potato-beetles.

16. From Mr. R. HOWELL, specimens of *Sphenophorus*, destructive in Nichols, Tioga Co., New York.

17. From Mr. TROUVELOT, a lot of living caterpillars, from New England silk-worms; also silk of *Att. Polyphemus*, and eggs of that species.

18. From Messrs. J. A. ALLEN and R. BLISS, a lot of butterflies, collected in Kansas and Colorado, nearly 400 specimens. Also Coleoptera, Orthoptera and Parasites, in alcohol.

19. From Prof. N. S. SHALER, a lot of insects, in alcohol, collected during his trip to Virginia, in different localities; in all, 2,489 specimens, of which 1,395 are beetles; other insects, 1,095.

20. From Rev. M. M. CARLETON, insects, in alcohol, collected at Koolloo, in the Himalaya Mountains, 2 jars.

21. From Mr. J. SHUTE, Woburn Mass., 2 boxes of insects, from China, and biological specimens from Massachusetts.

22. From Mr. B. P. MANN, insects, collected in Brazil, and some biological specimens. Also white ants, from California.

23. From Mr. EDWARD BURGESS, 3 species of wood lice, from Massachusetts.

24. From Mr. J. A. ALLEN, several jars of insects, in alcohol, collected in Utah.

25. From Dr. T. HILL, insects, in alcohol, collected in Utah, 2 jars.

26. From Mr. N. PIKE (U. S. Consul), a rich lot of insects, dry and in alcohol, collected in the Island of Mauritius.

27. From Dr. H. DOHRN, Stettin, insects, from Elmina, Africa, 70 species, *Goliath Druryi*, *Polyphemus*.

28. From Baron OSTEN-SAKEN, a lot of insects, in copal (gum animé), partly determined by Dr. Staol, of Stockholm, Sweden.

29. From Mr. F. SANBORN, 2 American species of *Boreus*, living.

30. From Rev. M. M. CARLETON, a very large collection of butterflies and other insects, dry and in alcohol, from the Himalaya Mountains, about 10,000 specimens.

31. From Mr. J. A. ALLEN, insects and fresh-water crabs, from Nebraska.

32. From Prof. L. AGASSIZ, butterflies, from St. Thomas, West Indies.

By Exchange.

33. From Prof. KAUP, of Darmstadt, a lot of Coleoptera.
34. From the Imperial Museum, in Vienna, a series of 180 genera and species of European Diptera, types of Mr. Schiner.
35. From Dr. SCHLEISH, of Stettin, Germany, a lot of European Tineina, in very fine condition.
36. From Mr. C. A. DOHRN, of Stettin, 278 species of European Coleoptera, all new to the collection, some of them first-class varieties.
37. From Mr. WEHNKE, of Hamburg, 212 species of European Coleoptera, all new to the collection.

By Purchase.

38. From Mr. J. BOLL, Lepidoptera, raised in Europe, from cocoons collected in Dallas, Texas, and valuable biological specimens.
39. From Prof. MENGE, in Danzig, Prussia, a collection of spiders, from Prussia, types to his work, in alcohol, 60 species of both sexes, 250 specimens in all.
40. From Mr. BRISCHKE, Danzig, a biological collection of about 180 species, in very fine condition.
41. From Prof. ZELLER, in Stettin, a rich lot of European Microlepidoptera, all new to the collection, and in very fine order.
42. From Prof. LOEW, in Guben, Saxony, a rich lot of European and American Diptera, types of his works, and genus types. Also, a complete series of his works on Diptera.

Deposited.

43. By Baron OSTEN-SACKEN. His entire collection of North American Diptera, with the published types.

Crustacea and Worms.

44. From Dr. MAACK, Crustacea and worms, collected by the Darien Expedition, in different localities.
45. From Mr. W. HOLDEN, Crustacea, in alcohol, collected in his trip from California to the Isthmus of Panama.
46. From Rev. M. M. CARLETON, Crustacea and Myriapoda, from Northern India, 15 jars.
47. From Prof. SHALER, fresh-water crabs, collected in Virginia.
48. From Prof. ESMARCK, of Christiania, Sweden, Crustacea, from Europe, in alcohol.
49. From Mr. RAMON M. FORNES, Havana, 14 Crustacea, from Cuba, dry, mounted for exhibition.

50. From Mr. PIKE, U. S. Consul at Mauritius, a very rich lot of Crustacea, dry, from Mauritius.

51. From Mr. J. A. ALLEN, a very valuable lot of *Astacus Gambali*, and other Crustacea, from Colorado and Utah.

52. From Mr. J. SHUTE, Woburn, Mass., fresh-water crabs, from South Carolina, in alcohol.

The additions to the Museum have been placed in secure boxes, and carefully labelled. The newly received additions occupied a large portion of the working year. The Texan Lepidoptera purchased from Mr. Boll were carefully revised, a collection for the Faunal department made, the duplicates introduced in the United States collection, and in the general collection, and a full set of all species sent to Prof. Zeller, of Stettin, for a scientific monograph. All new or doubtful species of the Rhopalocera were sent to Mr. W. A. Edwards, of Coalburgh, West Virginia, now so successfully occupied with a Monograph of the United States Lepidoptera. The Hemiptera from Dallas, Texas, have been in the same manner revised, and a full set sent to the well-known American monographer, Mr. P. R. Uhler, of Baltimore. The same work has been done with the greater part of the Texan Coleoptera, and a set sent to Prof. C. A. Dohrn, in Stettin.

The scientific arrangement of the collection of Curculionidæ presented by Mrs. A. Hemenway is progressing. This work, including a careful labelling of every species, takes time for its completion, especially as a part of the collection is still in the hands of European monographers.

The biological collection is progressing. The additions partly purchased, partly presented, and partly raised by myself, have been unusually rich. The collection from Mr. Brischke of Danzig, is arranged, and fills, alone, nearly the whole of one cabinet. The plan adopted by Professor Agassiz could be carried out in several boxes containing the whole history of an insect. The history of *Calosamia Prometheus* alone, fills a box, showing every stage of the insect from the egg, and the young caterpillar, to its perfection as the imago, with a full series of caterpillars in intermediate and full-grown stages, the chrysalis and cocoon of both sexes, the cast skins and the structure of the cocoon; also, the enemies of the caterpillars in the various

stages, and the abnormal forms of cocoons spun by diseased caterpillars.

Equally complete, as far as possible, is the series of the other American silkworms: *S. cecropia*, *S. columbia*, *A. Polyphemus*, *A. luna*. The series of the latter species is very instructive, showing the difference in cocoon and imago produced from specimens raised in Europe, upon food different from that of the Texan specimen. Other cases, arranged after the same principle, contain American galls with their producers and enemies. There are also more or less complete series of other species of insects. Such collections of course grow slowly, because the materials come to hand only occasionally. Many of these are raised by myself.

A new arrangement of several parts of the collection of Neuroptera has been completed, viz.: the Ephemera, the Psorua, the Myrmelionina, the Ascalaphina, and in part the Termitina. The latter family, without doubt the most complete collection now existing, has lately been enriched by interesting Brazilian specimens, presented by Dr. Fritz Müller of Itajahy, Brazil.

The collection of European Lepidoptera, consisting throughout of first class specimens, is considerably increased, chiefly in Micro-lepidoptera, by the specimens from Professor Zeller, Dr. Schleich and others. Before this, the collection contained about one-thirtieth of the known species; it has now about two-fifths, in excellent and typically-determined specimens. Generally, it is difficult, without heavy expenses, to form a collection of three-fourths of the published species of any given order; and to go beyond this involves extraordinary expense. Considering these facts, our collection is very well advanced.

The collection of European Coleoptera is unusually complete, chiefly through the liberality of Professor C. A. Dohrn of Stettin. The Museum catalogue was sent to him to show our desiderata; consequently the whole lot presented by him is new to our collection, and consists, for the most part, of type-species of rather difficult genera, many of them first-class varieties even in Europe. This lot contains Micros, and rare insects in very fine condition.

The order of Diptera, before very defective, has unexpectedly received a great accession. The whole collection of North American Diptera deposited by the Baron Osten-Sacken, is well

known for its typical value, and is unrivalled in America. The Diptera received from Professor Loew, comprise chiefly genustypes, and a number of types of his American Diptera,—a real treasure to the Museum.

The collection of New England insects, I am sorry to say, is one of the weakest parts of the whole, particularly as the specimens are more or less badly set. Professor Agassiz, considering this defect as one of the most important, invited Mr. J. Boll, an experienced collector, to come to Cambridge; during the autumn, Mr. Boll collected in and around Cambridge several thousand specimens. Some Micro-Lepidoptera have been raised, and a great number are stored in rooms arranged for the purpose, to be raised in the spring. It seems beyond doubt, that the superior manner in which Mr. Boll arranges the specimens will soon render the Museum of Comparative Zoölogy, a pattern for every entomologist. The winter will be employed by Mr. Boll in spreading and setting in a new manner the whole collection of Lepidoptera, which will give it a twofold value, and allow a scientific study and determination of specimens, which hitherto, and particularly in the Heterocera, has been an impossible undertaking.

Concerning the general state of the entomological collection, the work goes on in a steady, but necessarily a slow manner, according to the plan adopted by Professor Agassiz. The principal object of this plan is to keep safe all specimens acquired by the Museum; the second, to arrange them scientifically; and the third, to work them up as standard types. The first has been done throughout, a labor of great extent, as every specimen has to be labelled. The second is done for a small part: for three-fourths of the Lepidoptera, for one-third of the Coleoptera, and for some parts of the Neuroptera. The third is yet to be done. Considering that an experienced worker may be able to finish thoroughly one species a day, or, if he is well acquainted with his material, perhaps two species; considering further, that some families alone, consist of more than 10,000 species, it is evident how slowly such a work must advance if carefully done. The Berlin Museum, the Museum at Vienna, the British Museum, and the Museum of the Jardin des Plantes, have been working for seventy years, and nowhere is the task finished. Such a work is not to be bought for any money in the world;

it is the result of the labor of years by the most experienced and most faithful students.

The collection of Crustacea was revised by Dr. William Stimpson, just before the great calamity in Chicago, and arrangements were made to improve this interesting order, by his valuable aid. The numerous additions are still stored until he has leisure to use them scientifically.

The collection of spiders has been gone through, and determined generally by Mr. Emerson, and in some parts by Mr. Holden.

The new room to which this department has been transferred is considerably more spacious, and more convenient for work. It will now be possible to have the aid of more workers, and to give convenient working-places to more students.

Mr. Hubbard has been partly occupied with the family of the Longicorns, and Mr. Austin with the family of Tenebrions. The monograph of the immature stages of the Gomphina, by Mr. Louis Cabot, is in print, the first part having been already published. The monographs of the Arachnidæ will be ready very soon.

Exchanges are made with several entomologists in the United States and in Europe, and parts of the collections sent out to monographers have been returned determined. In the same manner the Passalini by Dr. Kaup in Darmstadt, the Cordulina by the Baron de Selys-Longchamps in Liège, Belgium, and some others, are to be returned from time to time.

Report of N. S. SHALER, Assistant in charge of instruction.

During the last year my whole time has been given to instruction, except some work in the field. The arrangement which has been made with the University, whereby the instruction in Zoölogy and Palæontology, in all its departments, except the Bussey School, is given at the Museum, has much increased the number of students. During the year, ninety-seven (97) persons have received practical instruction in this department. This number does not include those who have merely attended lectures, but only those who have been taught in the laboratory room in a practical way.

All these students have been taught the outlines of Zoölogy, by the study of typical forms from the most important groups of animals. Those who were fitted for more advanced study, have been put in the way of making special investigations.

Instruction in my department in microscopy, under the superintendence of Mr. Tuttle, has also been provided for beginners and for advanced students. This teaching extends over one-half of the year, and enables the student to become master of the practical detail of microscopic work, so far as is required in all ordinary investigations.

A course of elementary instruction in the study of insects has been given by Mr. Edward Burgess, who has acted as college instructor in this branch.

The following courses of lectures have been given as a part of the above-mentioned instruction :—

A course of about one hundred lectures on Zoölogy, by Mr. Shaler.

A course of lectures on Palæontology, by Mr. Shaler.

A course of Readings, with commentary, intended as an introduction to the history of modern Zoölogical opinions, by Mr. Shaler.

A course of lectures on the use of the Microscope, by Mr. Tuttle.

A course on Entomology, by Mr. Burgess.

I am also indebted to Dr. Hagen, Dr. Maack, and Mr. A. R. Crandall, for assistance given to particular students in the prosecution of especial parts of their work.

During the summer an excursion of two months duration was made, from Cambridge to the James River, in Virginia. Students in the Zoölogical department were allowed to join this expedition, in which opportunities were afforded for becoming familiar with palæontological and zoölogical work, as conducted in the field.

Report of J. B. PERRY, on the Palæontological Collection.

The earlier portion of the year was mainly devoted to the re-organization of the Museum library. Attention to this interrupted, of course, my more special work, viz., the systematic arrangement of the Tertiary Gasteropods.

During the spring, however, considerable labor was devoted to them. Several groups were carefully mounted on tablets, all the specimens accompanied by labels having been closely compared with original descriptions or with the earliest figures, such as bore no names but belonged to described species having been critically identified, and such as belonged to undescribed species put into a condition to be named or described at leisure. The remaining Tertiary Gasteropods are also, to a large extent, ready, as fast as they can be revised with discrimination, to be mounted and placed on exhibition. In many parts of this labor I received valuable assistance from Miss Annie Cutler.

The fossil Corals have likewise received some attention. Many have been cleaned and numbered, while increased preparation has been made for the mounting of the whole collection on tablets. In this work, and in various other ways, I have been aided by Miss Atkinson.

The course of instruction on the Geology of Massachusetts, began during the preceding autumn, was duly completed in the winter term, extending to thirty-six lectures.

The vast palæontological stores of the Museum having been intrusted to my care by the Director, it was found convenient to divide them, at the start, into three portions, all of the Palæozoic age going into the first, those of the Secondary or Mesozoic age, into the second, and those of the Tertiary or Cainozoic age, into the third, each portion being destined for a separate room. Accordingly, it has been the aim, as separations have been made, to convey, with a few slight exceptions, all the Tertiary animal remains to the Cainozoic or Recent room, all the Secondary to the Mesozoic, and all the older to the Palæozoic. The Tertiary fossils being, in numerical proportion, predominantly Mollusca, occupy a room in connection with the recent Mollusca, for convenience of comparison.

In addition to this separation of fossils, according to age, subdivisions have been attempted in each room. For instance, the Palæozoic remains are primarily divided into three general sections, accordingly as they belong: 1st, to the Taconic; 2d, to the Silurian; and 3d, to the Devonian, Carboniferous or Permian; the exact time of demarcation between the latter formations not being as yet clearly defined. The Museum fossils, however, belonging to the later Palæozoic times have been

already, for the sake of convenience provisionally separated into sub-divisions, answering in a general way to the three above-named eras. So the aim has been to separate the Secondary material into two distinctly recognized parts; 1st, the Triassic, and 2d, the Jurassic and Cretaceous, the line of division between the two last-named eras being by no means yet exactly drawn. Still, in this instance also, for the sake of convenience, as the work has gone on, the Jurassic and Cretaceous fossils have been, for the most part, provisionally separated into two sections.

A further step in the work of arrangement has been attempted; viz., the disposition of all the material in each of these horizontal sections, according to zoölogical relations. To take a single case as an illustration: having separated the fossils of the lower Silurian age from those of the upper Silurian, I aimed to arrange them according to orders, beginning with Polyps, and proceeding upward by regular gradations to the highest forms represented in this portion of the collection. I did the same with the Taconic fossils, and with the upper Silurian. A similar work is in progress, and has been carried forward to a very considerable extent on the fossils of each of the other great geological eras.

In order to aid the memory, and to serve other purposes, these materials have been, so far as circumstances would allow, arranged in each room in regular sequence—the succession of life in time being, in a measure, represented under relations of space. For instance, in the Palæozoic room, one may start from the Taconic, in a remote corner, and pass to the lower Silurian, the upper Silurian, the Devonian, the Carboniferous and the Permian, advancing from lower to higher, by successive steps. Nor is this all: a like ascending sequence may be already observed in the arrangement of zoölogical orders, and even of many minor divisions of the orders. The same thing is true of the arrangement in the Mesozoic and Tertiary rooms.

The material set apart for exchange is also receiving its share of attention.

The statements which have been made may serve to give some general impression of the work attempted, and already in many respects well advanced. Indeed, it has been carried out, in some instances, more minutely than indicated. Of course, the

zoölogical arrangement of the fossils has been pushed in many sections of the work to genera and species.

I should add that I have been efficiently assisted, in a portion of the general work of preliminary arrangement, particularly of the fossils of the later Palæozoic times, by Mr. St. John, who is to devote himself especially to the identification and arrangement of these fossils, with a view to the more exact determination of the several horizons to which they belong, and of other kindred points.

In carrying out the plan which has already been noticed at some length, I have perhaps taken more than usual pains to make a complete separation of the Tertiary fossils from all the others in the Museum. Having previously brought together nearly all the Tertiary Gasteropods, I have recently made an especial effort that no Corals nor Acephala might be left out; consequently, I have now nearly all the Tertiary invertebrata, not only brought together, but, for the most part, arranged zoölogically, not merely according to orders, but according to genera and species as well. From indications furnished by the investigations thus far made on these fossil forms, it seems probable that the Tertiary formations will naturally fall into five general periods, consisting, on an average, of two or three well marked subdivisions or horizons.

While various groups of the Lamellibranchiates of the Tertiary have been worked up to about the same point, the oysters on the whole, are the most advanced. They have been examined with great care; there has been a thorough verification of the names of all such as have labels; those remaining, without accompanying names, have been for the most part identified, so far as the means have been at my disposal; so that the Tertiary oysters, as a group, promise to be soon ready for the exhibition room. In this part of my work I have found constant occasion for Miss Sarah Cutler's intelligent and careful handiwork.

With a view to supplying deficiencies, but especially to investigating more thoroughly and intelligently, not only the Museum collection of Tertiary Shells, but of the American Tertiaries generally, extensive explorations of the Tertiary strata of the southern Atlantic and Gulf States were made last summer. Tertiary Fossils were gathered at various points, and occasionally some belonging to the Cretaceous and other ages. As soon

as they are identified, specimens which are needed are mounted, and intercalated in the permanent collections of the Museum, and those remaining are set aside for exchanges and other kindred purposes.

It should be added that Mr. Bicknell has been engaged at intervals on the microscopic forms contained in the Tertiary sands and clays, which have been gradually brought together, as the work on the Museum collections has gone forward. He will continue, as he has leisure, to work up these clays and sands, some of which are very rich in minute Foraminifera, and other organic forms, and promise a rich store of material for the microscopist.

During the past year the Museum has secured the fossil collection of Dr. L. Schultze, illustrative of the Devonian formations of Europe. This addition, which is very full, and perhaps unique as a representation of the European Devonian, brings the Museum collection of this era much nearer completeness, and greatly enhances its value, by furnishing permanent and authentic means for comparison.

The Museum is indebted to the Darien Expedition for a collection of Tertiary Fossils from Central America, made by Dr. G. A. Maack, Geologist and Naturalist of the Expedition, who has been recently engaged upon them with a view to his report.

The Allegany Expedition, the expenses of which were borne by Professor Shaler and the Museum, has brought in a large number of fossils, principally of the Silurian and Devonian ages. Mr. Shaler passed his vacation in collecting, having gone out with a number of students on a geological excursion, which extended through New York, Pennsylvania, Maryland and Virginia into Kentucky and Tennessee. Mr. A. R. Crandall, who was connected with the expedition, spent about six months in collecting, and is now busily engaged in identifying the specimens and bringing the collection into order.

The following list indicates the addition made to the department of Palæontology during the year:—

AGASSIZ, Prof. L. Drift specimens from the Valley of the Connecticut.

ALLEGHANY EXPEDITION. Sixty (60) boxes of fossils from the States of New York, Pennsylvania, Maryland, Virginia, Kentucky and Tennessee.

BOLL, Mr. J. Twelve hundred and sixty (1,260) specimens, principally Cretaceous, from Texas. By purchase.

BROWN, Mr. J. C. J. Seventy-five (75) Tertiary Shark-teeth from South Carolina. In exchange.

DARIEN EXPEDITION. Tertiary Shells and Lignite from Central America. Gift.

FULLER, Mr. L. A. Ninety (90) specimens representing (23) species from the Coal Measures of Alton and Springfield, Illinois. Gift.

GOULD, Mr. (of the Harvard Scientific School). A Silurian Orthocerate from Minnesota. Gift.

HOPKINS, Dr. F. V. A lot of Tertiary and Cretaceous Fossils from Louisiana and Texas. In exchange.

HURLBURT, Mr. W. D. One hundred and fifty (150) Silurian specimens, and casts of two (2) Silurian Trilobites from Minnesota. Gift.

MILLS, Mr. CHARLES H. A box of Nobular Granite from Greensborough, Vermont. Gift.

ORDWAY, Mr. ALBERT. Thirty (30) specimens of Devonian Plants from Virginia. Gift.

PERRY, Mr. J. B. Twenty-three (23) boxes of Tertiary Fossils from Virginia, North and South Carolina, Georgia, Alabama, and Mississippi. Also, Cretaceous specimens from North Carolina; Silurian specimens from Missouri; Carboniferous specimens from Indiana and Illinois; Silurian and Devonian specimens from Ohio and Michigan; Taconic specimens from New York; Taconic and Carboniferous specimens from Massachusetts.

QUIMBY, Dr. H. C. A lot of Crag Fossils, representing all the great branches of the animal kingdom, from Suffolk County, England. Gift.

SCHULTZE, Dr. L. A unique collection of European Devonian specimens. By purchase.

SPILLMAN, Dr. W. A lot of Eocene Fossils from Mississippi. Gift.

WILTSE, Mr. CHAUNCEY. Two (2) Ammonites (*Scaphites*) from Nebraska. Gift.

WINSLOW, Dr. J. C. About three hundred (300) Carboniferous specimens from Danville, Illinois. In exchange.

[B .]

TRUSTEES OF THE MUSEUM OF COMPARATIVE ZOOLOGY,
1872.

THE GOVERNOR OF THE COMMONWEALTH,
WILLIAM B. WASHBURN.

THE LIEUTENANT-GOVERNOR,
JOSEPH TUCKER.

THE PRESIDENT OF THE SENATE,
HORACE H. COOLIDGE.

THE SPEAKER OF THE HOUSE,
JOHN E. SANFORD.

THE SECRETARY OF THE BOARD OF EDUCATION,
JOSEPH WHITE,

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

LOUIS AGASSIZ.

THEODORE LYMAN.

NATHANIEL THAYER.
SAMUEL HOOPER.
JAMES LAWRENCE.

CHARLES W. FREELAND.
SAMUEL ELIOT.
MARTIN BRIMMER.

OFFICERS OF THE MUSEUM OF COMPARATIVE ZOOLOGY FOR
1872.

His Excellency WILLIAM B. WASHBURN, Governor of the Commonwealth
President.

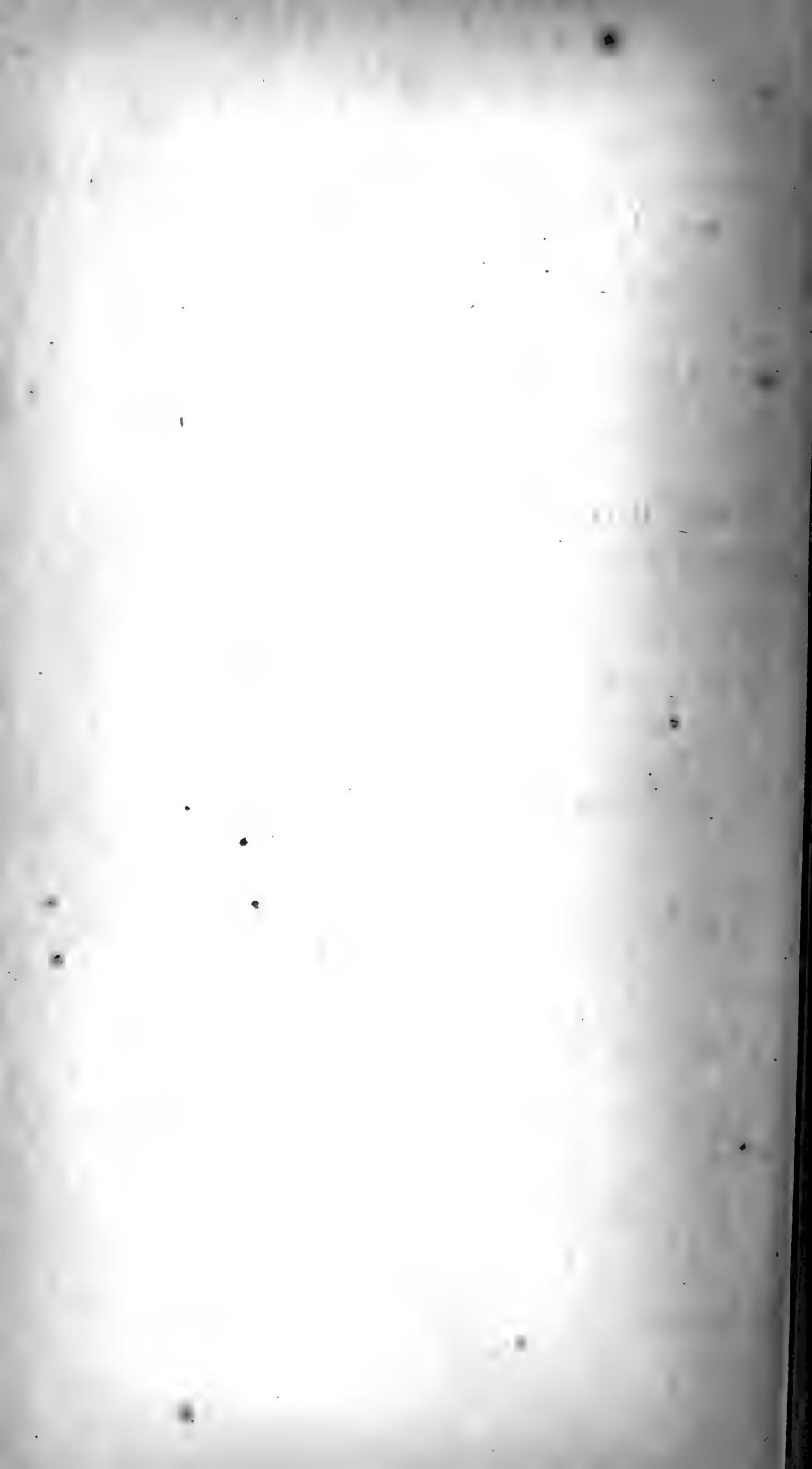
CHARLES W. FREELAND, *Treasurer.*

MARTIN BRIMMER, *Secretary.*

LOUIS AGASSIZ, *Director.*

SAMUEL HOOPER, JOSEPH WHITE, NATHANIEL THAYER, JAMES LAW-
RENCE, *Committee on Finance.*

LOUIS AGASSIZ, SAMUEL ELIOT, CHARLES W. FREELAND, *Committee on
the Museum.*



ANNUAL REPORT

OF THE

TRUSTEES

OF THE

MUSEUM OF COMPARATIVE ZOOLOGY,

AT HARVARD COLLEGE, IN CAMBRIDGE:

TOGETHER WITH

THE REPORT OF THE DIRECTOR

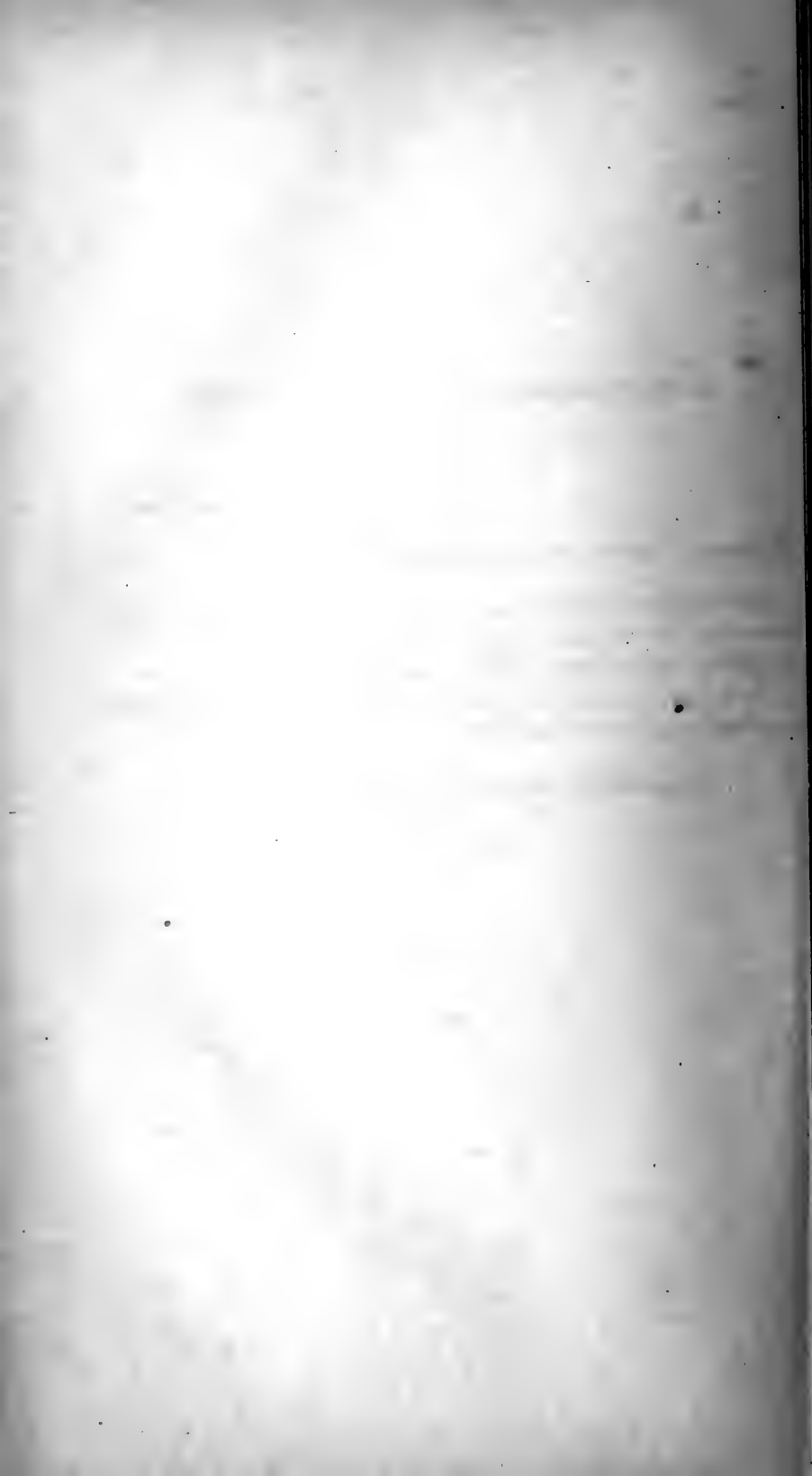
FOR

1872.

BOSTON:

WRIGHT & POTTER, STATE PRINTERS,
19 PROVINCE STREET.

1873.



Commonwealth of Massachusetts.

BOSTON, MASS., June 4, 1873.

To the Hon. GEORGE B. LORING, *President of the Senate.*

SIR :—The Trustees of the Museum of Comparative Zoölogy have the honor to present to the Legislature the Annual Report of the Director, for the past year, marked [A].

The paper marked [B] contains a list of the Trustees, officers and committees for 1873.

Respectfully submitted, for the Trustees,

MARTIN BRIMMER, *Secretary.*

[A.]

REPORT OF THE DIRECTOR

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY,

FOR THE YEAR 1872.

It gives me the greatest pleasure to state that my absence, though extended to nearly a year, has not in the slightest degree interfered with the progress of the Museum. Mr. Cary, the Superintendent, has directed the business of our Institution with so much ability, forethought and diligence, anticipating and providing for the needs of each working department, that there have been no unnecessary delays or interruptions. His special Report contains the details of his administration. The scientific officers of the Museum have shown the utmost zeal and fidelity, carrying on the work of the separate laboratories so efficiently that I can truly say the results of the year have far exceeded my most sanguine expectations. There is one inference to be drawn from this statement which is of great importance, though few perhaps can value it as highly as I do myself. I have heard it said repeatedly that the organization of the Museum was too comprehensive, that it covered a wider range than was useful in the present state of science among us, and that since it must collapse whenever I should be taken away, it was unwise to support it on so large a scale. The past year has proved beyond question that the Museum is now so organized (vitalized as it were with the spirit of thought and connected work) that my presence or absence is of little importance. It will keep on its course without any new or repeated stimulus

beyond the necessary appropriations for its maintenance. As to the expense I cannot feel that it is disproportionate, because when I compare it with that of institutions of the same character I see that they spend much more for smaller results. The only question now is whether a Museum of first order is needed in Massachusetts, or not. If the legislature will favor us with a visit I would gladly submit our institution to the most critical examination of its organization. I think I can satisfy any competent visitor, that by her liberal support of the Museum, our State has earned the right to say that among civilized communities there is not a purely scientific establishment of higher character or distinguished by more active, unremitting, original research in various departments of knowledge. If the same pecuniary support it has had in the last two years can be continued in the coming years it will not be long before the scientific world will acknowledge that the Museum of Comparative Zoölogy in Cambridge has no superior, nay, no equal in the world.

Now that the newly erected addition to the building is available it may be interesting to you to learn what disposition is made of the whole, for purposes of work, instruction and exhibition.

True to the aim I have constantly kept in view and in conformity with the spirit of the institution, the space allowed for work is proportionally much larger than in any other Museum; the object of this arrangement being to facilitate the rapid growth of our collections.

The lecture room is, as before, open to all who choose to attend the general instruction given within the walls of the institution. Lectures on different subjects of Natural History are delivered during the whole year and have been attended by students of the University, teachers of the public and private schools of the vicinity, and ladies and gentlemen of every class of the community. This kind of instruction has always been given free of any charge. Next to the lecture room is the student's laboratory; there the practical instruction is given to beginners by Prof. Shaler, as set forth in his special report, while the more advanced students work in the private laboratories of the different departments, according to their particular branches of study.

The private laboratories are eight in number, each devoted to a specialty of the wide range of topics embraced in the organization of the Museum. It would lead me too far were I to describe these laboratories in detail, but I shall in my next report submit a full account of them and the objects for which they were instituted. I would only state now that the books relating to the different specialties are kept in the laboratories, an arrangement which greatly facilitates the work of all.

The exhibition rooms have been more than doubled, owing to the addition of one story to our building; unfortunately they cannot yet be thrown open to the public, our means being insufficient for the present to provide the necessary wall cases and other appliances to protect the specimens from injury by ignorant or careless visitors.

The time has not yet come for a full report on the results of the Hassler Expedition, especially on that part of the work which concerns the Museum of Comparative Zoölogy in Cambridge. Only a portion of the collections forwarded from various ports have arrived, and of these but a small part has been unpacked. I can, however, state that the contributions of this expedition to Natural History have even exceeded my hopes, and that the Museum is enriched by a vast amount of material, covering the whole field of Zoölogy, including the Natural History of Mankind, that of marine mammalia, marine birds, reptiles and fishes. Especially are our collections of fishes, mollusks, crustacea and radiates enlarged, and though I have spoken particularly of marine animals, because our opportunities were better for collecting at sea than on land, yet we have not neglected fresh-water and terrestrial specimens whenever it was possible to obtain them. All these collections, so far as that mode of preservation was suitable for them, have been put up in alcohol, and it may give some idea of their magnitude if I state that more than 3,500 gallons of alcohol have been consumed in packing them. Any enumeration of these objects is impossible at present. The mere examination of the collections and placing them in such a condition as to ensure their permanent safety will be a six months' labor for our whole corps of workers at the Museum, and even the possibility of this initiative work

is dependent upon a special appropriation for the purpose; but I trust that the means will not be wanting, and that at my next annual report I shall be able to state with precision the scientific value and importance of the collections from the Hassler Expedition. My impression is, and I believe I am rather understating than overstating the truth, that if I am allowed to make these collections available by the proper means of preservation, we have now the greatest working Museum in the world; the one, that is, which supplies the most extensive and varied material for special and comprehensive zoölogical research. I do not exclude the oldest and largest Museums of Europe from this statement, believing as I do that the time has passed when the value of a Museum is to be measured by the number of its stuffed birds and empty shells.

I should say a few words of the Expedition which has been so beneficial to our Museum, of the circumstances under which it was organized, and of what I have been able personally to do for the institution during the year of my absence. About two years ago Professor Peirce, Superintendent of the United States Coast Survey found it necessary to build a vessel especially for the work of the survey on the Pacific Coast. When she was nearly ready for sea it occurred to the Superintendent that it was a pity to send her empty around the continent, the more so since a great part of her track would be especially interesting for scientific research. He proposed to me to join the vessel with some assistants and to make such explorations as might not interfere with the progress of the voyage and with the regular work of the survey. At the same time he appointed Count de Pourtalès, whose dredgings in the Gulf of Mexico have had such valuable results for science to take charge of the dredging operations for the whole voyage. The opportunity thus offered to me and my younger friends, while it gave us the means of making the voyage from Boston to San Francisco, did not provide in any way for the expenses incident upon the making of collections, their preservation or their transportation to Cambridge. For these objects I made an appeal to the liberality of the citizens of Boston, whose generous good-will toward the Museum I had so often before experienced in the hour of

need. But for their aid I could not have availed myself of the rare chance offered me. With it I may truly say that I have been able to give the Museum such an impetus as even great institutions rarely receive. I add here the list of these contributions, with the total result:—

Subscriptions to Hassler Expedition.

Nathaniel Thayer, . . .	\$6,000	G. Baty Blake, . . .	\$200
Mrs. G. Howland Shaw, . . .	2,000	W. T. Andrews, . . .	200
Martin Brimmer, . . .	1,000	W. D. Pickman, . . .	200
John A. Lowell, . . .	1,000	W. S. Bullard, . . .	200
Samuel Hooper, . . .	1,000	L. Hollingsworth, . . .	200
Mrs. Samuel Hooper, . . .	500	Amos A. Lawrence, . . .	150
John M. Forbes, . . .	500	Robert M. Mason, . . .	150
Gardner Brewer, . . .	500	George B. Emerson, . . .	100
Theodore Lyman, . . .	500	George B. Upton, . . .	100
George F. Parkman, . . .	500	F. B. Crowninshield, . . .	100
Henry P. Kidder, . . .	500	Miss Alice Hooper, . . .	50
S. Salisbury, . . .	500	Greely S. Curtis, . . .	50
H. H. Hunnewell, . . .	500	G. W. Warren, . . .	50
Abbott Lawrence, . . .	250		
J. L. Little, . . .	250		
James Davis, . . .	200		
			\$17,450

Of this sum there remains a surplus of \$1,200, all I can draw upon for the care and preservation of these magnificent collections. It is not pleasant to ask for new supplies at the very moment of expressing my gratitude for the generosity which made these collections possible. All I can say is that unlooked for success leads to new expenditures, and that I hope the Commonwealth and all those able to help us will do so when it is understood that the proper care and distribution of these new treasures will actually put our Museum in advance of all existing institutions in zoological research. Students from other lands must come to us to prosecute their investigations, for we alone have the material in such quantity as to allow of comprehensive and exhaustive comparisons. I should be ungrateful did I not add that but for the assistance given us at every step of our journey by private individuals and private companies, as well as by officers of the governments of the several countries visited by us, we could not, with the means at my command, have accomplished one-half our actual results. The Secretary of State had sent out

instructions to all political and consular agents of the United States Government, as well as to all naval officers, to render any assistance to the expedition not inconsistent with their regular service, and I had constant cause to acknowledge their cordial good-will and coöperation. But we were no less indebted to private mercantile companies, railroad and steamboat corporations and to private individuals. As soon as the special returns are handed in to me by the assistants in charge of the different collections, I shall publish a nominal account of all these favors.

It was, however, to the captain and officers of our own vessel that I was especially indebted. Not only did they put at my disposition every facility for the work of collecting, but they were untiring in fishing, hunting and dredging, and to their individual efforts I owe many of the most valuable specimens we have brought home. I wish every naturalist might have as valiant co-workers as I found in my friend Capt. P. C. Johnson, Lieut. Charles Kennedy, executive officer of the *Hassler*; Lieut. Day, navigator of the *Hassler*, Lieut. Mansfield, Lieut. Remy and Dr. Pitkin, U. S. surgeon. To Dr. White and to Dr. Hill, physicists, I was also indebted for most important assistance. Under all the difficulties of photography at sea they succeeded in getting some illustrations of scenery and of specimens which will be valuable in the working up of our results, and Dr. Hill was indefatigable in the collecting of seaweeds and plants, and has brought back to Cambridge a very interesting and rare botanical collection.

I cannot close this Report without an expression of my deep sorrow at the loss of the Rev. J. B. Perry, assistant in the Palæontological Department. Mr. Perry was one of the most devoted and industrious collaborators I ever had; and his attainments were so comprehensive that his place will never be filled in the Museum.

Report of the Superintendent, Mr. T. G. CARY.

[Transmitted to Prof. Agassiz on his return from the Hassler Expedition.]

The matter of most importance which required attention after your departure, was the alteration in the interior of the oldest part of the Museum. The staircase which led from the working-rooms below, through the exhibition-rooms to the attic, was taken out and the apertures closed. The removal of these stairs adds very much to the available space, both in the rooms for exhibition, and in the working-rooms, and enables us to close all the doors which were formerly necessary as a means of communication from one side of the building to the other, all the rooms in the building being now reached by the central staircase. This secures privacy in the working-rooms, and keeps the students' room, and the lecture-room and library free from intrusion.

The library was found to be too small for the increasing number of books, but the floor was so strengthened by an iron brace in the middle of the room, as to allow the addition of three sets of shelves, which gives ample room for the library in its present state. The light in the room has been much improved by painting all the woodwork and the iron supports white.

The unfinished state of the new portion of the Museum has made an economy of room very necessary, and a number of partitions of rough boards have been put up for the reception of such specimens as were ready for exhibition, but could not be displayed for want of proper cases. These enclosures are unsightly, but great care is taken to keep them clean, and for the present they cannot be dispensed with.

The raising of the roof in the older part of the building has given a very large room for storing dry specimens, books, materials for our publications, &c., &c., and it would be very desirable to have this room kept especially for this purpose.

The attic of the new building, with the exception of the two rooms used for fossil plants and for South American palms, is used as a store-room for the collection of skeletons in Dr. Maack's charge. Much valuable room is lost here by the necessity of having the car of the elevator always in the attic, while not actually in use. The same loss of room

occurs on every floor below, and I would suggest that the elevator in its present position is inconvenient on account of loss of room, and would be very dangerous in case of fire.

Much care has been taken in the arrangement of the cellars, which were very much crowded until the new building was erected. All the packages of specimens have been examined, and many of the specimens have been removed from the wooden barrels, or the earthen jars in which they have been kept, and have been transferred to copper cans with screw tops, in which the specimens cannot be injured either by leakage or evaporation. There can be no doubt that the only sure way of preserving alcoholic specimens (especially the fishes), is to put them in vessels of glass or copper, and to use the very best quality of alcohol. These materials are undoubtedly expensive at first, but specimens once properly packed are safe for many years, whereas the use of inferior materials involves the risk of losing the specimens, with the time, labor and money which has been spent upon them. An especial room has been arranged for the proper care of the glass jars and alcohol used in the establishment. By having these expensive articles under the charge of one person, I find the waste and breakage is much less than formerly.

A carpenter has been at work for a year past making models of cases for the exhibition rooms in the new building, but, for the present, there is no possibility of making any additions to the show-cases. The expenses of keeping the Museum on its present footing, without adding to the capacities for exhibition or attempting to furnish any of the rooms in the new part of the building, will require an addition of at least fifty thousand dollars to our regular income of ten thousand five hundred dollars. And in expending this apparently large sum, the strictest economy would be required to enable the Museum to retain the position which it has gained.

Much pains has been taken to give an appearance of neatness and order to the grounds adjoining the Museum. These improvements have been made at a very trifling cost. I found it necessary to have two men to assist the janitor in moving boxes of specimens, receiving collections, and in doing all the drudgery of the establishment; and as the

services of these men were not always required in the Museum, I set them to work on the improvement of the grounds, when they were not otherwise engaged. I mention this because a casual observer might think that money had been spent on flower-beds and gravel-walks, which could have been used to greater advantage in the interior of the Museum. The actual money expended on the grounds during your absence has not been more than one hundred dollars.

Report on the Mammals, by J. A. ALLEN.

To the collection of mammals few additions have been made since the last report. A considerable number of the skins and skeletons of the large ruminants, obtained last year by the Rocky Mountain Expedition, have been mounted and will be placed on exhibition as soon as the cases in the large hall are ready for their reception. All the unmounted skins are now catalogued and safely and conveniently stored in the tightly closing cans mentioned in preceding reports. The alcoholic collection has been carefully revised, and no loss of specimens has as yet occurred. It is to be hoped, however, that all now stored in barrels may be soon removed to copper cans. As the necessary cans have already been ordered, and some are just coming to hand; it seems probable that during the ensuing year the whole collection will be placed in copper or glass receptacles, so that in future their liability to injury by the decay of kegs and the consequent escape of the spirits will be wholly obviated.

The greater part of the large number of skeletons sent to Prof. Ward last year for preparation has been returned to the Museum, and generally in a highly satisfactory condition. Much material of this character still needs a similar treatment, in order to render it available to its fullest extent for scientific examination. It is to be hoped that this work may be continued for the entire osteological collection.

A few alcoholic specimens have been sent out in exchange, and a skeleton of *Bison Americanus* has been forwarded to Dr. H. Dohrn, of Stettin, Prussia.

The subjoined schedule indicates the sources from which additions have been received during the past year:—

By Donation.

BICKNELL, EDWIN. Several lots of embryos and gravid females of white mice.

CARLTON, REV. M. M. One bat in alcohol and several skulls, from Northern India.

CHAPELL, R. H., New London, Ct. A fine large walrus skull from Alaska.

GARMAN, W. S. One skin of a bat and several mice in alcohol, chiefly from the vicinity of the Great Salt Lake, Utah Territory.

LOCKWOOD, SAMUEL, JR. Several mice, in alcohol, from Hamilton Co., New York.

MANN, B. P. 4 skulls, 2 species, from Massachusetts, from the collection of the late Horace Mann, Jr.

MULLER, BARON VON, Melbourne, Australia. One specimen of *Echidna*, in alcohol.

SCAMMON, Capt. C. M. Baleen plates from several species of Cetacea of the Pacific Coast of North America.

By Exchange.

JEITTELES, L. H. Several jars of small mammals, chiefly *Vespertilionidæ*, from the vicinity of Salzburg, Austria.

SCOTT, W. D. 25 skins of *Sciuridæ*, 3 species, from Massachusetts.

By Purchase.

A fine old male Rocky Mountain sheep, from Bozeman City, Montana Territory, mounted by Prof. Ward.

Report on the Birds, by J. A. ALLEN.

The chief additions to the ornithological department during the past year, has been the collection of over 1,500 specimens received in exchange from the Brown University, this being a portion of the collection of the late Mr. John Cassin, and containing many of his types. Another considerable invoice has also recently come to hand; namely, a collection of 116 species from Chili, through Professor Philippi. This is

especially important as being from a locality from which we had few specimens.

In addition to the labor of cataloguing and incorporating with the general collection, the 5,000 specimens received during last year and the early part of the present, the labelling of the collection of skins has been commenced, and some 10,000 specimens have already been supplied with labels, indicating their localities and the sources whence they were received, and generally also their systematic names. In this work I have been greatly aided by Masters Wing and Howe, who have both worked with great care and assiduity.

The alcoholic collection has been carefully watched, and the loss of specimens thus far prevented. The large earthen crocks, with screw-tops, introduced to some extent in this department as storage jars, as mentioned in previous reports, have proved, from their porosity, even more untrustworthy than the kegs they were intended to replace. Accordingly, as a final resort, copper cans have been adopted for the specimens too large to be stored in glass, and the transfer of the specimens to them has already been commenced. As we shall soon have enough of the copper cans for the whole collection of alcoholic birds, as well as mammals, it is expected that during the coming year all will be permanently arranged in them and thus secured from loss by the leakage or evaporation of the alcohol.

The only invoices sent out in exchange have been a lot of 67 specimens to Brown University, and 35 to Mr. W. D. Scott, and a smaller number to a few other parties. The whole collection of *Tyrannidæ* has been loaned to Dr. Elliott Cowes, U. S. A., for use in his revision of this group, a part of which have already been returned, with his identifications. A few alcoholic specimens have also been loaned to Professor O. C. Marsh, of New Haven.

The following schedule indicates the sources from which additions have been received during the past year:—

By Donation.

ALLEN, J. A. A skin and part of a skeleton of *Podiceps cornutus*, and several skins of native species.

GARMAN, W. S. One embryo, in alcohol, from Great Salt Lake Valley, Utah.

MANN, B. P. 46 skulls, 20 species, chiefly from the collection of the late H. Mann, Jr., and several embryos.

PIKE, NICOLAS, U. S. Consul at Mauritius. 10 skins, 8 species, and a large lot of eggs; chiefly from the Mauritius.

WEBBER, Mrs. M. One skin of *Colaptes auratus*, from St. Simons Island, Ga., and a box of eggs from Florida.

By Exchange.

FROM BROWN UNIVERSITY, Providence, R. I. 1,550 skins, chiefly from the collection of the late Mr. John Cassin.

FROM L. H. JEITTELES. Embryo of *Falco tinnunculus*.

FROM PROF. PHILIPPI, Santiago, Chili. 201 skins, 116 species; from Chili.

FROM W. D. SCOTT. 45 skins, 15 species; chiefly from West Virginia.

Report on the Fishes, by RICHARD BLISS, Jr.

Early in the year it became evident that our large collection of fishes stored in barrels and kegs in the cellar, would suffer great damage were there not found some fitter means of preserving them. The dampness of the cellar rapidly corroding the hoops of the kegs allows the staves to spread and the alcohol to escape, thus quickly spoiling the specimens. To obviate this, in consultation with the superintendent, Mr. Cary, it was decided to substitute copper cans with screw tops, in which the specimens could be preserved without the possibility of the loss of alcohol by leakage or evaporation. As fast as the cans were furnished the specimens in the barrels were transferred to them and supplied with fresh alcohol. At present nearly all the specimens in barrels have been changed to cans, and in two or three weeks it is expected that the work will be completed and the collection in a state of perfect safety.

The whole collection in the cellar has been arranged according to families, the cans numbered and the contents of each duly registered in the record book, so that ready access can be had to any specimen.

The specimens identified and labelled by Dr. Steindachner

prior to his departure on the Hassler Expedition, together with some others, have been placed in the temporary enclosure in the large exhibition room, in order to avoid the defacement of the labels which would occur if stored in the cellar. Here the specimens have been arranged according to their localities; certain shelves containing the fishes of Europe, others those of Asia, Africa, North and South America.

The specimens in the glass cases in the exhibition rooms as well as those in the cellar, have been thoroughly examined and fresh alcohol added whenever needed. In this work I have been assisted by Mr. Lockwood.

Many specimens have been added to the exhibition collection since last year; hence still more room is needed to properly exhibit them. Among these additions is a series of mounted skeletons received in exchange for certain specimens sent to the Vienna Museum.

Among the more important donations received at the Museum during the past year may be mentioned a very fine collection of fishes from Nicolas Pike, Esq., U. S. Consul at the Mauritius. The collection embraces many rare and several hitherto undescribed species, and is of great value as illustrating the ichthyological fauna of those islands.

A large collection of fishes from the rivers of North India, by the Rev. M. M. Carleton, is also very valuable, as the number of species sent furnishes valuable data regarding the geographical distribution of the fishes of the immense river basins of Northern India. Heretofore much difficulty has been experienced in obtaining specimens from this locality in good condition. Owing to the swollen condition of the rivers in that country during the cool season, it is impossible to collect fishes at a time when they would keep best, and in the dry season, when the rivers are low, the temperature of the air is so high that the specimens become softened, and the subsequent shaking they undergo during the passage is apt to destroy them. Since Mr. Carleton has become aware of this fact he has taken great care to avoid the difficulty, and the specimens received this year have arrived generally in a perfect state of preservation. Mr. Carleton informs me that the Rev. David Herron is, at my request, making a

complete collection of the fishes of Dehra Doon; a valley in the Sub-Himalayas, situated between the water basins of the Jumna and Ganges Rivers. A former collection sent by Mr. Herron having suffered complete destruction during the passage to America, he has kindly undertaken to gather another more complete one.

From Dr. Francis Day, Inspector-General of the Fisheries of India, we have received a valuable collection of fishes from the Ganges, being types of some of the species described by him in the Proceedings of the London Zoölogical Society for 1868 and 1869. Dr. Day offers to exchange with us types of his Fishes of India, as well as those of the Malabar Coast, for specimens of our North and South American fishes. This opportunity to add to the value of our collection is one which should not be lost.

The Museum, during the past year, has obtained by exchange and purchase valuable collections from Baron von Müller of the Botanic Gardens, Melbourne, Australia. From Dr. L. H. Jeitteles from Salzburg and from Dr. Tausch, through Dr. Jeitteles, a jar of fishes from the Pruth in Bukovina, Austria. A collection from C. L. Salmin of Hamburg. A collection containing many rare specimens from Dr. Steindachner of the Vienna Museum, and a large collection both of alcoholic and dry specimen from the Red Sea, purchased of Dr. Klunzinger.

A collection of American fishes has been sent to Mr. C. L. Salmin in exchange; and representatives of the North American Sparoids have been lent to Prof. S. F. Baird, of Washington.

In addition to the care of the collection I have identified and catalogued all the specimens sent by the Rev. Mr. Carleton, with the exception of the last invoice; besides pushing forward my work on the family Pomotis and allied genera, which is now approaching completion.

In doing this a series of specimens for the Systematic Collection has been set aside, and another series illustrative of the North American faunæ has been begun.

I subjoin a schedule of the specimens received during the year:—

By Donation.

From the Hon. NICOLAS PIKE, a valuable collection from the Mauritius; many species.

From the Rev. M. M. CARLETON, a large collection from Northern India; many species.

From BARON VON MULLER, of the Botanic Garden, a collection from Melbourne, Australia, 27 species.

From Mr. H. G. HUBBARD, one jar of young *Amiurus*, from Lake Erie.

From the collection of H. MANN, Jr., by Mr. B. P. MANN, two jars of young Pomotis and Bryttus.

From the Rev. D. W. STEVENS, one jar of *Clupea harengus*, and one jar of *Anguilla bostoniensis* from Martha's Vineyard.

From Mr. D. W. ATWOOD, one specimen of *Petromyzon marinus* from Barnstable, Mass.

From Mr. SAMUEL LOCKWOOD, Jr., several jars of fishes from Tupper's Lake, Hamilton, Co., N. Y.

By Exchange.

From Prof. L. H. JEITTELES, one jar from the Salzach at Salzburg, two species, and two jars from Ostende, Belgium, four species.

From Dr. TAUSCH, one jar from the Pruth near Czernowitz in Buckovina, four species.

From Dr. FRANCIS DAY, a collection from the Ganges River, India, 114 specimens, 40 species.

From C. L. SALMIN, a collection from Hamburg, Prussia.

From Dr. FRANZ STEINDACHNER, collections from Europe, Asia and Africa.

From the VIENNA MUSEUM, a series of skeletons.

By Purchase.

From Dr. KLUNZINGER, a large collection of alcoholic specimens and skins from the Red Sea.

From the Alleghany Expedition.

By Mr. A. R. CRANDALL, a collection from Eastern Tennessee and Western Virginia.

Nothing has been done during the past year for the improvement of the collection of reptiles, besides taking care of the new additions.

Report on the Mollusca, by JOHN G. ANTHONY.

My last report, made on the 31st December last, brought the transactions, in my department, up to that date, leaving therefore but a period of ten months to report on at this time.

During the early portion of the present year my health was so far impaired as to interfere very materially with my labors at the Museum, the severe cold weather rendering my attendance there very uncertain. I was able, however, to continue my work for the Museum at such times at home, and in the identification of species, as well as in mounting specimens, considerable progress was made. The correspondence, too, so necessary in keeping up our regular exchanges, was duly attended to, and several packages were at that time prepared at home ready for sending abroad.

Among other labors performed at that season, was the examination and identification of all the unlabelled shells belonging to Colby University at Waterville, Maine, which were brought to my house for that purpose. These specimens consisted mainly of that portion of the collections made by Mr. A. S. Bickmore, in the South Seas, which came to the University through the liberality of one of its most generous patrons, and in consideration of those services and the further promise of such of our duplicates as we can readily spare, we received all the duplicate shells belonging to that institution.

Soon after resuming regular labor at the Museum, I completed the final arrangement of all our land shells, adding to the several genera such species as had been accumulating for three years past, and the whole is now in complete order.

Having concluded this laborious task, so far as land shells were concerned, I have since followed the same plan with the marine genera, and am now busily engaged, when other duties do not prevent, in completing that desirable object, making at the same time a full catalogue in all the genera. As this work properly performed necessitates more or less identification of species, it is of course a slow process, but one which I hope to bring to a satisfactory conclusion within the coming year. When that desirable end is accomplished, the collection of shells will be in better condition than ever before.

During this period our exchanges have by no means been

neglected, and the proper preparation of the specimens, together with the correspondence growing out of these exchanges, have occupied much time.

Among the packages received by exchange, have been several contributions of more than usual importance and deserving of special mention. No one of our various benefactors in this way has been more assiduous and untiring in his efforts to enlarge and improve our collection than the U. S. Consul at Mauritius, Hon. Nicolas Pike. In this department he has sent us, from time to time, some of the most valuable contributions we have ever received.

Our constant friend Dr. Dohrn, has also continued his kindness by sending us two parcels of choice specimens of shells, which being rare species and of unquestioned correctness as to labels, possess unusual value.

From Colby University we have received two large packages containing not only species for our collection, but many valuable duplicates for other exchanges.

Governor Rawson, of Barbadoes, has favored us with a well selected series of marine forms of the West Indies, which materially improves our West Indian faunal collection. This is the more satisfactory as we had been previously quite deficient in marine forms from that quarter. The species sent by him are particularly rich in graduated series of the young and old individuals, which gives them an additional interest to our collection.

The disastrous fire at Chicago in October, last year, which destroyed the Museum of the Academy of Sciences, with all its contents, consumed nearly all our specimens dredged in the Gulf Stream, and was to us a serious loss which seemed at the time almost irreparable. Prof. Stimpson, however, who by that fire was temporarily deprived of his position as director of the Museum, was at once employed to resume those dredgings, and the result of his labors has mainly supplied the species lost by that conflagration.

We are also largely indebted to J. G. Jeffreys, Esq., who had been allowed to select from those dredgings shortly before the fire for the purpose of comparison with similar dredgings made for the British Government, and who has not only promptly returned the specimens loaned him for that purpose,

but has also, in consideration of our great loss, sent back all those which were given to him unconditionally. Such conduct deserves the highest praise.

Other contributions may be briefly mentioned and we desire to express our great obligations for them to the several donors.

Dr. W. Newcomb sends us four species and nine specimens of select Santo Domingo shells, which were much desired and add greatly to our collection.

R. E. C. Stearns, contributes forty-one species, one hundred and twenty-three specimens of California marine shells, some of which species proved new to our collection.

W. G. Binney has sent us 15 species and 70 specimens, which are of more value than the number would seem to indicate, being mostly types of new species.

T. Bland has also kept us constantly in mind, and sent us 51 species, 809 specimens of West India shells, desirable for exchanges.

From A. Sallé, of Paris, we derive 28 species, 44 specimens of rare and choice shells, from Mexico and Santo Domingo.

Through our constant benefactor, Col. Pike, we have received a box containing 131 species and 360 specimens of marine shells from Mrs. Lacroch; this contribution is particularly rich in *Mitra* and *Pleurotoma*.

Mr. H. Hemphill, of Oakland, California, has laid us under obligations by sending us an unusually satisfactory collection of 259 species and 1,300 specimens of California shells, which makes our representation of that faunal region almost a complete one.

In European species we have been favored with large contributions from Dr. Kobold, Dr. Boll and Mr. Sandberger.

Rev. Mr. Carpenter, missionary to Burmah, has brought us 30 species of land and fresh-water shells collected by him in that region.

J. G. Jeffreys has again favored us with a small but exceedingly satisfactory collection of Chitons, being all the species found in Great Britain.

The foregoing, with some minor contributions from various sources, make up a total of 41 packages, containing 1,763 species, 19,342 specimens received during the ten months to

which this report refers. This may seem but a small addition as compared with former years, but I hope to be able to chronicle a much larger increase next year, when the many packages brought or sent home by the Hassler Expedition shall have been opened and distributed.

The number of packages sent away during the same time from my department has been 17, and they contained 1,555 species and 7,104 specimens. Small as these figures may seem they leave us very nearly free from obligations on account of our exchanges.

My young lady assistants were engaged at the commencement of the year in cleaning and mounting specimens for exhibition, but more recently I have directed them to select and separate the duplicate shells of every description, belonging to the Museum, so as to render them more available in our exchanges, and for the preparation of special collections for our high and normal schools.

This work when accomplished will afford great facilities and economize much time.

Report on the Articulates, by Dr. H. A. HAGEN.

The additions to the department in the year 1872 are:—

1. From Prof. FR. SANBORN, two species of North American Boreus.
2. From Rev. M. M. CARLETON, a very large collection of butterflies and other insects, dry and in alcohol, from the Himalaya Mountains, about 10,000 specimens.
3. From Mr. J. A. ALLEN, insects and fresh-water crustacea from Nebraska.
4. From Prof. L. Agassiz, butterflies, from St. Thomas, West Indies.
5. From Prof. GERSTAEKER, in Berlin, a collection of 500 species of Hymenoptera and Diptera, representing types of his published monographs.—To be paid for.
6. From Mr. PIKE, U. S. Consul at Mauritius, a very rich lot of Crustacea, dry, from Mauritius; and valuable insects dry and in alcohol, from the same locality.
7. From W. H. EDWARDS, in Coalburgh, W. Va., 30 species of Lepidoptera from Colorado, types of his publications.

8. From Mr. HUBBARD, Cambridge, a lot of biological specimens of different insects.

9. From Mr. W. BASSETT, Conn., a complete set of his photographs of North American galls.

10. From (?)* a determined collection of European Coleoptera.

11. From Mr. W. H. EDWARDS, Coalburgh, W. Va., a complete series of *Papilio Marcellus* and new varieties.

12. From Mr. FOWLER, some insects and worms in alcohol from Florida.

13. From Mr. COMSTOCK, Ithaca, N. Y., biological specimens of insects.

14. From Mr. C. E. WEBSTER, of Binghamton, N. Y., a lot of biological specimens belonging to Bom. Yama-Mai.

15. American diptera and galls, also manuscript materials on the metamorphosis of diptera, and his scientific correspondence, deposited by the Baron OSTEN-SACKÉN.

16. From S. W. GARMAN, of Chicago, insects in alcohol and some fossils from Utah and Wyoming.

17. From Mr. NIC. PIKE, U. S. Consul in Mauritius, insects, spiders, centipedes and worms in alcohol, from Mauritius.

18. From Mr. SCOTT, Va., a rich lot of Lepidoptera, from Virginia, in papers, named.

19. From Prof. F. SANBORN, biological specimens and rare insects from New England.

20. From Prof. G. MAYR, in Vienna, Austria, 61 species of galls, types of his monograph; 30 species of gall producers; 36 species of ants.—By exchange.

21. From Mr. W. BRISCHKE, of Danzig, Prussia, a beautiful lot of 100 species insects (biological collections).—Bought.

22. From J. BOLL, of Bremgarten, Switzerland, a valuable lot of Coleoptera and Lepidoptera, and biological objects.

23. From J. BOLL, a collection of Neuroptera.—Bought.

24. From Mr. B. P. MANN, several interesting insects from Rio de Janeiro.

25. From Mr. TROUVELOT, of Cambridge, eggs of *Corydalis cornuta*.

26. From Mr. J. SHUTE, insects for the biological collection.

27. From Mr. HUBBARD, an interesting lot for the biological collection; insects and some Astacides.

28. From J. BOLL, a valuable lot of New England insects of all orders, and biological specimens.

* The collection arrived at the Museum without any indication by which it could be identified, or the donor ascertained.

29. Insects from New England, and biological specimens by the curator.

The most important fact for the department was the transfer to a new room, considerably more spacious and more convenient for work, giving convenient working places to more students and assistants. Indeed, most of the tables were occupied during the past year. The spacious glass-cases along two walls of the room allowed a convenient arrangement for the library of the curator, increased in a valuable manner by the entomological works deposited by Prof. L. Agassiz and Mr. A. Agassiz, and those of the library of the Museum. The arrangement is made alphabetically, and all the works relating to the North American fauna are separated for the use of the students. A complete catalogue on labels made by the curator renders it easy to find every pamphlet. The library contains about 3,000 volumes, and represents more than 6,000 numbers of the entomological papers, enumerated in the curator's *Bibliotheca Entomologica*. Special attention was given to complete the series of North American authors and of papers scattered in the different economical and horticultural periodicals. A fine copy of Curtis' *British Entomology* (old illumination), a complete copy of the *New England Farmer*, Lacordaire's *Coleoptera* and Harold's *Catalogue* are the most important additions. So far as possible the curator takes care to supply the library with European monographs and periodicals, but chiefly with those not bought by other libraries in Cambridge and Boston.

An addition of new boxes and cabinets was necessary and has partly been provided for.

Mr. J. Boll, from Bremgarten, Switzerland, appointed by Prof. L. Agassiz, as assistant for the entomological department, was obliged to return to Europe on account of serious sickness in his family. Though he could only work here for a few months, the unsurpassed beauty of the insects collected and arranged by him furnishes a standard of the manner in which insects should be handled and set up for a public collection. He arrived toward the end of October and was obliged to leave in March, and yet he was nevertheless able to collect several thousands of insects around Cambridge and

Boston, to form a biological set, an entomological herbarium, to spread one-sixth of the butterflies in the collections of the Museum, and to arrange a nursery for raising insects. Besides a lot especially selected and raised in his room in glass jars and boxes, he established in the Museum four closets filled with dry leaves and branches of wood to raise insects contained as larvæ in these plants. The greater part of these were taken with him to Europe, and he sent a short time ago a written communication on the result. There are raised Micro-Lepidoptera, 60 species in 300 specimens; Macro-Lepi, 120 specimens; Hymenoptera, 170 species. The Tineina are scientifically described by Prof. H. Frey, in Zurich, and now in the course of publication. Of course the long transfer from Cambridge to Zurich of so delicate, living animals has been injurious to a part of them, and if Mr. Boll had been able to stay here the result would have been surely several times greater for the number of species as well as specimens.

I am glad to be able to state the very good condition of the collection in the better closed boxes. For the first time, upon a revision in the spring, in none of the boxes were Museum pests to be seen. Newly arrived additions strongly infested with *Tribolium ferrugineum*, a pest never before observed in the Museum, have since given us hard work, and even now are not entirely overcome.

The curator's time was taken up for several months by the rearrangement of a considerable part of the biological collection and the collection representing the transformation of the insects. Especially the Lepidoptera, Neuroptera, Pseudoneuroptera, and the collection of North American galls, necessitated an entirely new arrangement.

The biological collections of the department have increased rapidly in number and species in the last year, in consequence of the plan adopted of representing the whole history of a species in full (*a plan not yet carried out in any other Museum upon such a comprehensive scale*). The collection now begins to form a very valuable part of the whole department. Even the non-entomological visitors of the Museum, formerly attracted in a special manner by the beauty of the butterflies, begin to show a decided preference for those parts of the collection; and, in fact, frequently additions more or

less important are sent by visitors who have been so interested to fill the blanks of the collection. The most advanced part of the biological collection are the Lepidoptera; the beautifully prepared specimens of European species by Mr. Brischke, are especially attractive. The North American silk-moths have been more or less completely worked out by the curator. The Lepidoptera fill more than two cabinets, and considering that many of the very common species are still wanting or to be more fully arranged, it may be presumed that in a short time twice as many cabinets will be necessary for this order alone.

The Pseudoneuroptera and Neuroptera, belonging mostly to the collection deposited by the curator, are exceedingly rich, and even without rival for some parts, as, for instance, the white ants, the Phryganids, the Odonata. The collection of white ants was considerably enlarged by Dr. Fr. Müller, of Itajahy, in the province of St. Catarina, in Brazil, who is now occupied with the study of this family.

The other parts of the biological collection are also in great need of a new arrangement, only prevented by lack of time. The appointment of two young ladies to help in the department will allow the curator to accelerate certain mechanical parts of the work, formerly done by himself.

The collection of galls is exceedingly rich for North American species, mostly in published types. By exchange of duplicates a similar collection for European species has been obtained from the newest monographer, Prof. G. Mayr, in Vienna, Austria. The biological collections of Brischke contain 400 species. The collection of galls, 400 numbers; galls' insects, 200 species, mostly types. The mines of Lepidoptera more than 100 species.

The publication of these parts of the collection is to be considered as the most important and most pressing work. Mr. L. Cabot, having published the immature state of the family of the Gomphina, has ready for publication, figures and descriptions of the Aeschnina. Both papers contains for the greater part entirely new forms, and are a very valuable addition to our knowledge of those insects. Such monographs advance scientific classification in the surest way, and the monograph of the Gomphina proves that the Gomphina and

Cordulegaster, formerly united, can no longer be included in the same family.

The immature states of Ascalaphus and Myrmeleon have been described by the curator, and contain 37 species in about 20 genera, two-thirds of them new to science. Mr. Konopicky, from Vienna, attached as artist to the entomological department by order of Prof. L. Agassiz during his absence from Cambridge, has figured the larvæ, nymphæ, cocoons and eggs, so far present in the collection, with superior finish, and the volume containing these drawings is really a valuable addition to the illustrations in the Museum library. It is intended shortly to publish the whole family of the Hemerobina in the Illustrated Catalogues. For the remarkable monographs of North American Lepidoptera by Mr. W. H. Edwards, in Coalburgh, W. Va., Mr. Konopicky has figured a number of eggs, caterpillars and chrysalids from the living specimens, to be published in the forthcoming parts of this work. Some scientific work was completed by the curator either for the benefit of correspondents of the Museum or in consequence of new publications. The Cordulinae of the Museum were sent to Baron De Sélys Longchamps in Liège, Belgium, and are published in his synopsis, forming an addition of about one-third of the species. The Ascalaphina were compared and studied after Mr. McLachlan's monograph, the Ephemerina after Mr. Eaton's monograph, and both families arranged upon the basis of this new knowledge. A monograph of the interesting genus Pteronarcys was given, and a scientific review of the Pseudoneuroptera and Neuroptera of T. W. Harris's collection made ready for publication. The Lepidoptera of Texas were sent to Prof. Zeller, in Stettin for publication. The Noctuina, Geometrina, and a part of the Micros are just published by him, and the Texan Tineina by Prof. H. Frey, in Zurich. The Texan Hemiptera are in the hands of Mr. Ph. R. Uhler, in Baltimore, for publication. The Hymenoptera from Texas are finished for publication by Mr. E. T. Cresson, in Philadelphia, and returned to the collection. The Coleoptera from Zanzibar are published by Dr. Gerstaecker, in Berlin, and returned to the Museum.

Mr. Hubbard finished the scientific determination and

arrangement of the Prionidæ of the collection. Mr. Comstock, of Ithaca, N. Y., spent his vacation time in studying the collection, and Mr. Garman, of Chicago, and Mr. Minot, of Cambridge, are now occupied some days of the week in a similar study. So far as possible the curator has tried to give to these gentlemen private instruction concerning general entomology.

In the arrangement of other parts of the collection progress has been limited to the work already referred to. However, the whole Pseudoneuroptera and nearly all the Neuroptera are in perfect order. Both of these collections are only rivalled by two similar collections in Europe.

The scientific correspondence to be done by the curator was, as usual, very extensive.

The collection of the Crustacea was the whole year stored in the upper galleries of the older part of the building, as the new rooms are not yet fitted. Shortly before the disaster in Chicago, the late Prof. W. Simpson did go through the collection and divided them in two parts. One, nearly one-third of the collection, was to be sent to him to Chicago for scientific publication just the day when the horrid news of the disaster reached the Museum. The collection is now far more important than it ever was before, as it contains a part of the published types of W. Stimpson, the remainder of which was destroyed in Chicago. A valuable lot of them is still in the hands of Mr. Alph. Milne-Edwards, in Paris.

The additions to the collection of the Crustacea are very numerous and valuable for the fauna of Mauritius by Mr. N. Pike, and for the East Indies by Rev. M. M. Carleton. The additions to the Astacides of the United States would allow an important supplement to the curator's monograph of new species or better and more numerous specimens of some described species.

Report of Professor N. S. SHALER, Assistant in charge of Instruction.

During the academic year 1871-2, one hundred and three persons have attended the instruction given in the Museum.

Ninety-five of this number have received practical teaching in the laboratory, as well as lecture-room instruction. The first year's course consisted of twenty-four lectures and ninety hours of practical exercise, under the supervision of the instructor. This was attended by the members of the junior class, scientific students and some teachers. The second year's course consisted of one hundred and twelve hours of lectures and discussions, and an equal amount of supervised laboratory work. This course was attended by members of the senior class, the divinity school, about half a dozen teachers and several university students. The first year's course is designed to furnish a course of practical instruction in accordance with the system pursued since the foundation of the department of Zoölogy in the Lawrence Scientific School. The student is compelled to come at once into the position of an investigator, receiving only such assistance as may be required to help him to help himself. The first year's lectures are designed only as an adjunct to the other work. When the students have been carried, in a practical way, through one group of animals, becoming acquainted with its outlines by the use of typical forms, the group is taken up in the course of lectures and reviewed. In the second year's course the same system of practical work is continued, but each student is now required to take up some limited subject and devote time enough to his work to attain a thorough knowledge of it. Besides this practical work, a course of lectures, readings and discussions has been used, to acquaint the students with the outlines of the history of Zoölogy, from Aristotle to the present day. In this course the original monographs and treatises of the great masters have been taken up wherever it was practicable. Every student has been required to keep a notebook with extended notes and drawings concerning the practical work he has done. This remains in the possession of the instructor, except when in use in the laboratory, and serves as a continuous test of the status of the student. Besides the above described instruction, which was given by the assistant in charge, Mr. Tuttle was employed by the university authorities, to give a course of instruction on the use of the microscope. This course, which was completed in one term, was sufficiently extended to enable the students to acquire a

practical working knowledge of the microscope. Mr. Edward Burgess was also employed by the college to give a course of instruction in Entomology during half a term. The care of this system of instruction has required about five hours per diem during the eight months of the university year; this has left little time for any other work. The first part of a monograph, on the Brachiopoda of North America, has been prepared for the press and will be issued during the current year, as a part of the Catalogue of the Museum, with eight plates and two maps to illustrate geographical distribution.

The second part is about half ready for the press. The condition of the collection of Brachiopoda has been materially improved. A lathe has been arranged in such fashion as to cut sections of the specimens; several hundred have been prepared, showing the internal structure, and about one hundred microscopic sections have been made and mounted by Mr. Crandall. These preparations have already given some important additions to our knowledge of the remains of this group of animals. With the hope of making important additions to our collections of fossils, a subscription was obtained to send Mr. Crandall on a collecting journey through the mountain region of eastern Tennessee, western North Carolina, northern Georgia and Alabama. At the present time this expedition is still in the field. Large collections have been made, however; those from near Chattanooga, Ga., and Huntsville, Alabama, having an especial value. Mr. Crandall will spend some time in Illinois, working upon the most important localities in that State.

The department is indebted to the following gentlemen for subscriptions to this exploration fund: A. E. R. Agassiz, Louis Cabot, John Cummings, C. W. Eliot, E. W. Gurney, Theodore Lyman, John E. Lowell, and N. S. Shaler.

During the summer months of 1872, arrangements have been making for the foundation of a Zoölogical station and summer school of Natural History on our coast. With a view to determine the best place on our shore for such a work, a careful inspection was made of the coast between New London, Conn., and Eastport, Maine. With the advice and consent of the director of the Museum, Nantucket has been selected for the site of the station and school. It is intended

that the school shall furnish an opportunity for students of Natural History, especially the teachers of our public schools, who may be engaged in giving instruction in that branch, to acquaint themselves with the methods of study which are used in the Museum. The summer term of three months will enable those who are earnest in such work, to acquire a knowledge of facts and methods which cannot fail to have a very important influence upon the ways of teaching in our public schools. Some liberal citizens of Nantucket have agreed to furnish a suitable building on the edge of the water, which will give a larger amount of room for the work of investigation and instruction than is afforded by any other existing school.

There are six rooms, each thirty by forty feet, and one of twice this size, which can be used for the purposes of the school. A number of the working naturalists have promised to aid in the work of instruction. It now seems reasonable to expect that there will be at least twenty-five investigators of ability, and a considerable number of students in attendance next summer. The U. S. Coast Survey and the commissioner of fisheries, have promised their coöperation in this work. Although like the existing department of instruction in the Museum, in connection with Harvard University, this school will be in fact the summer session in the educational department of the Museum. Under its general direction, it may prove a powerful means of extending the system of instruction which has always been followed in the Museum. It is to be hoped that the necessary arrangements may be made to enable the teachers of the State Normal Schools to attend this school during the summer vacation.

Report on the Palæontological Collections generally, by JOHN
B. PERRY.

The following account of the present condition of the palæontological collections, and of the progress made in the department during the past year, is respectfully submitted.

As to the condition of the collections a few words will

suffice. The plan adopted in the distribution of the vast store of material was fully set forth in the report of last year. The arrangement is such as to render the finding of any given portion of material a comparatively easy task. So far as I am aware, this task was never of so easy accomplishment as now. This is true notwithstanding the large additions made to the collection within the last few years, and the increase which is constantly going on. As the present plan is carried out in greater detail, the consultation of the collection, though the future increase of material should be great, will come to be more and more a matter of pleasure. One of the most serious difficulties now experienced in the way of consulting the entire collection is found in the fact, that many groups simply lie one above another in piles of drawers, instead of being arranged upon racks.

Of the work done this year in the palæontological department, the plan was exhibited at large in my last annual report. That report also gives the several sections of the work as it is now laid out, and in progress of gradual execution, with sufficient minuteness. In indicating the progress actually achieved, I have, therefore, merely to refer to that report, both as to plans and details, simply adding that the main labor during the past year has been expended in the carrying out in greater fulness what is therein indicated in outline.

The Taconic and Silurian fossils have received their share of attention. To the Devonian, Carboniferous and Dyassic, Mr. St. John has devoted himself with assiduity, and will report upon this portion of the work in detail. Considerable additional labor has been expended in efforts to bring together in completeness all the secondary material belonging to the Museum. Professor Hyatt has carried forward his special work on the Ammonites of the Mesozoic rocks. A large number of this group of Cephalopods is in readiness for mounting, and would have been mounted before this, had there not been uncertainty as to the exact colors to be adopted for the tablets of the Triassic and Jurassic fossils. The Tertiary organic remains have been constant objects of care. Full particulars in regard to them having been given in the last report, I may simply add that the work upon them has

been pushed with as great rapidity as circumstances have allowed.

. In the work upon the Tertiary shells, in which is included a large amount of previously unfinished details of a preliminary kind, I have been assiduously and greatly assisted by the Misses Cutler and Atkinson, who by their long experience have become efficient helpers in this portion of my labor.

A few words respecting the several different collections of Tertiary fossils, which are now in process of formation, may not be out of place in this report, especially as it is the intention to make like collections illustrative of all the other geologic formations, and as a brief statement of their character in this place should preclude the necessity for a frequent repetition of the same explanation. It is the aim, and work towards its realization is in constant progress, to make at least five Museum collections. These are called respectively the synoptical, the systematical, the faunal, the chronological, and finally the students' collection. To each of them may be devoted a word of explanation.

1. The Synoptic Collection. This is to consist of a few characteristic forms—choice being made of a single specimen of each of a few of the more marked species—of every considerable organic group, and is to stand as an epitome or synopsis of what will be exhibited in greater detail under other relations. It will thus serve to give at a glance the grand characters of the whole kingdom of nature.

2. The Systematic Collection. In this collection each species is to be represented usually by a single choice specimen, the individual selected being one of the best to be found, that all the characters of the species may be, to as large an extent as possible, exhibited in a unique example. Of course this collection is to be arranged according to systematic affinities, irrespective of geologic age, or of any other considerations.

3. The Faunal Collection. It is the aim to make this collection as complete as the material will allow—to give distinct prominence to every feature at all worthy of exhibition. Every locality should be represented, so far as may be, in order to the fullest indications of the natural limitation and distribution of species in each of the many successive live-periods. All the peculiarities of the individual and of the

species need to be brought to light, thus furnishing the most abundant means for the study at once of the permanency, and of the variability of organic characters. With the same end in view, it is the purpose to select specimens of both sexes, and of various stages of growth, that the whole truth may be known according to the facts of nature.

4. The Chronologic Collection. This is intended to comprise a single example of every distinct species found on each geologic horizon without regard to locality. It is thus suited to indicate as well the life-period of each species, genus and family, as the orderly succession of these groups in time.

5. The Students' Collection. This collection, equally with each of the other collections, has its distinctive aim. The end kept prominently in view in its formation is twofold, viz., to meet the wants of the teacher in furnishing suitable means for illustration, and the necessities of the pupil in supplying appropriate material for study.

It is scarcely necessary to add that, in the formation of these collections, specimens for sections illustrative of the internal structure of given organic forms, are in constant process of selection, while all the material which remains unused is set aside, after being duly labelled, for exchange.

In closing this report, reference might be fitly made to the additions to this department of the Museum during the year. The palaeontological collections have, however, been so greatly enlarged by the reception of specimens from other institutions, that a mere enumeration of them would unduly swell this report, and is therefore omitted.

Report by DR. G. A. МААСК.

The progress I have made since the writing of my last report concerns the osteological collection of the Museum. The examination and arrangement of this collection have at present advanced so far that I am able to report it as very complete in many points, while its general character stands in proper proportion to all the other collections of the Museum. As this collection had never been arranged when I took charge of it, but was packed up in a large number of boxes, which

had been handled over many times, I had to do a great deal of mechanical work in order to bring together the right parts and specimens and clean them in such a manner that they could be used for scientific studies. I have to mention this, that the employment of my time may be understood. There are altogether 448 skeletons and skulls of mammalia; 225 of birds and 120 of reptiles. The fishes are not yet in order.

Casts have been made: first, of a series of Mastodon skulls belonging to the anatomical museum of Prof. Wyman; secondly, of a large series of specimens lent to us by the Smithsonian Institution at Washington for that purpose; thirdly, of several unique specimens lent to us by Prof. Leidy, of Philadelphia; fourthly, of fish specimens for Mr. St. John. Collections have been sent to the Smithsonian Institution at Washington, to Prof. Leidy, to the Museum at Munich, and to Mr. Jeitteles at Salzburg, Austria.

[B.]

TRUSTEES OF THE MUSEUM OF COMPARATIVE ZOÖLOGY,
1873.

THE GOVERNOR OF THE COMMONWEALTH,	WILLIAM B. WASHBURN.
THE LIEUTENANT-GOVERNOR,	THOMAS TALBOT.
THE PRESIDENT OF THE SENATE,	GEORGE B. LORING.
THE SPEAKER OF THE HOUSE,	JOHN E. SANFORD.
THE SECRETARY OF THE BOARD OF EDUCATION,	JOSEPH WHITE.
THE CHIEF JUSTICE OF THE SUPREME JUDICIAL COURT,	REUBEN A. CHAPMAN.

 LOUIS AGASSIZ.

 THEODORE LYMAN.

 NATHANIEL THAYER.
 SAMUEL HOOPER.
 JAMES LAWRENCE.

 CHARLES W. FREELAND.
 SAMUEL ELIOT.
 MARTIN BRIMMER.
OFFICERS OF THE MUSEUM OF COMPARATIVE ZOÖLOGY FOR
1873.

His Excellency WILLIAM B. WASHBURN, Governor of the Commonwealth, *President*.

CHARLES W. FREELAND, *Treasurer*.

MARTIN BRIMMER, *Secretary*.

LOUIS AGASSIZ, *Director*.

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

LOUIS AGASSIZ, SAMUEL ELIOT, CHARLES W. FREELAND, *Committee on the
Museum*.

ANNUAL REPORT

OF THE

TRUSTEES

OF THE

MUSEUM OF COMPARATIVE ZOOLOGY,

AT HARVARD COLLEGE, IN CAMBRIDGE:

TOGETHER WITH THE

REPORT OF THE COMMITTEE ON THE MUSEUM,

FOR

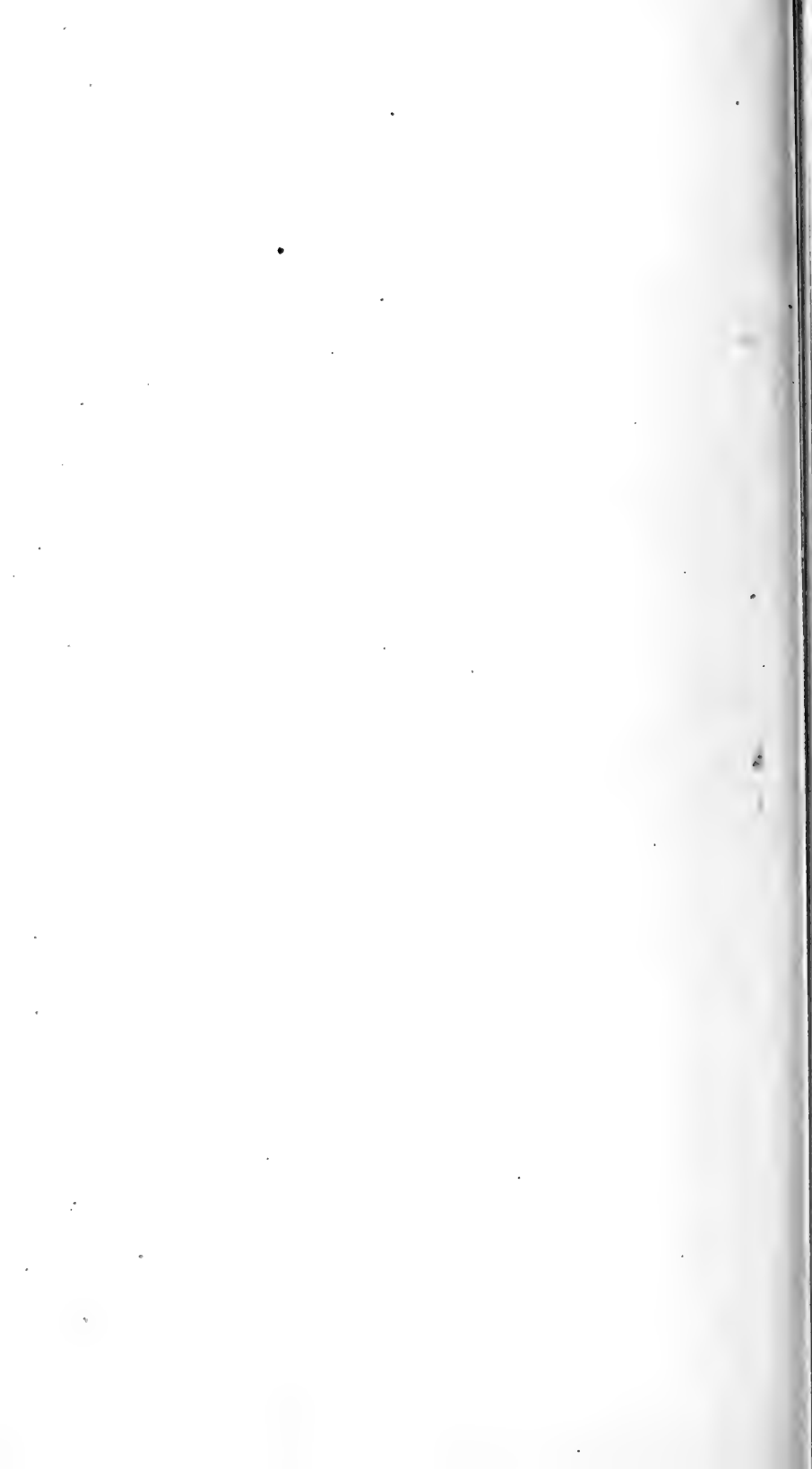
1873.

BOSTON:

WRIGHT & POTTER, STATE PRINTERS,

CORNER OF MILK AND FEDERAL STREETS.

1874.



Commonwealth of Massachusetts.

BOSTON, April 9, 1874.

To the Honorable GEORGE B. LORING, *President of the Senate.*

SIR:—The Trustees of the Museum of Comparative Zoology have the honor to present to the Legislature the Report of the Committee on the Museum for the past year, marked [A]; and a copy of the Resolutions adopted by them upon the death of Professor Agassiz, marked [B].

The paper marked [C] contains a list of the Trustees, officers and committees for 1874.

Respectfully submitted for the Trustees,

MARTIN BRIMMER, *Secretary.*

[A .]

REPORT OF THE COMMITTEE OF THE TRUSTEES
ON THE
MUSEUM OF COMPARATIVE ZOÖLOGY,
FOR THE YEAR 1873.

Early in 1873 it became apparent that the Museum could no longer be carried on with the means at the disposal of the Curator; repeated assistance from the State and from private sources kept the institution up to a standard of activity far beyond its own regular resources. As the time drew near when retrenchment seemed inevitable, Professor Agassiz made an appeal to the legislature for support, and with the generosity which has always characterized their action towards an institution in which the State of Massachusetts has so great an interest, the legislature appropriated \$25,000, on condition that a similar sum should be contributed by the friends of the institution towards its support. This sum was at once subscribed by friends of the Museum, and the appropriation of the State secured. Soon after this a further sum of \$100,000 was presented to the Museum by Mr. Quincy A. Shaw. These sums gave Professor Agassiz the means to reorganize the Museum on a very extensive scale. Additional assistants were employed, collections were purchased in every direction, and a large outlay made to place in safety the valuable alcoholic collections stored in the cellar of the Museum building. True to his policy of always using his present means as a lever for further improvement, nothing was laid up for the future, and by the first of April next the Museum will have to depend entirely upon its invested funds for its re-

sources. This will entail a very material reduction in the working force and running expenses, as the regular income of the Museum is somewhat less than \$15,000 annually, only half the sum needed to carry on the present scale of operations.

The instruction given at the Museum has been in charge of Professor McCrady, formerly of Charleston, S. C.; he has been assisted by Messrs. Faxon and St. John in the laboratory work. An important element in the educational features of the Museum is the establishment of a Summer School of Natural History on the Island of Penikese. From the terms of the deed of trust of Mr. Anderson, the trustees of the school are empowered to enter into such agreements with the Trustees of the Museum and the corporation of Harvard College as may be most beneficial in promoting the teaching of natural history.

The Museum is under great obligations to several volunteer assistants who have taken charge of special departments. In the first place, during the past year, Mr. L. F. Pourtales, assistant U. S. Coast Survey, has continued, under orders of the superintendent, to work up at the Museum part of the results of the Hassler Expedition, particularly the deep-sea corals and crinoids, the description of which is now in the press. During the summer he had charge of the yacht "Sprite" at Penikese Island, chiefly used to show the pupils of the Anderson school the process of dredging, and collect specimens for their instruction. Having resigned his position on the Coast Survey on the first of October, he has since then assisted Professor Agassiz in the general direction of the Museum and has made considerable progress in the arrangement of the systematic collection of corals in the exhibition room devoted to Radiates. Under his direction a fine collection of Foraminifera from the deep-sea soundings and dredgings in the Gulf Stream has been selected and mounted by Mr. James H. Logan of Jacksonville, Ill., at the expense of the U. S. Coast Survey. He has also selected collections of corals and fossils for the normal schools of the State, according to Professor Agassiz's plan. He has been assisted by Miss Bradbury, and part of the time by Miss Hyde, in the mounting of the specimens.

Mr. Theodore Lyman has, since his return from Europe, been engaged in arranging the collections of ophiurans he has brought together during his travels. The collection of ophiuridæ and astrophytidæ is now one of the best in the world, and may properly be said to have doubled in size and value during the past year. Besides the collections of Prof. Semper, made by him at the Philippines and presented by Mr. Lyman to the Museum, a great number of species have been received by donation or by exchange from the Jardin des Plantes, the Museums at Stockholm, Copenhagen, Leyden, Berlin, Pisa, Naples, Moscow, and from Professor Grube of Breslau, Kölliker of Würzburg, Dr. Fischer of Paris, and Mr. Trois of Venice. Mr. T. G. Cary has continued to superintend the business of the Museum, which has of necessity greatly increased with the expansion of the establishment, so that the numerous claims upon his time have greatly added to his disinterested labors.

Baron von Osten-Sacken, now residing in Cambridge, has kindly decided to take care of the collection of diptera. He has himself, on certain most liberal conditions, deposited his collections of diptera in the entomological department. Mr. A. Agassiz has continued in charge of the echinoderms, and has finished cataloguing the echini. He has added to his department the greater part of the collection of echinoderms made at the Philippine Islands by Dr. Semper.

Dr. Steindachner, who for more than two years has had charge of the ichthyological department, has returned to Vienna. The Museum loses in him an able and indefatigable as well as devoted worker, who has done much towards placing the most valuable, perhaps, of our collections in permanent safety.

The collections brought together by the Hassler Expedition have been generally distributed to the several departments. The principal addition made to our collections by donation, is a magnificent collection of invertebrates from Mauritius, sent to the Museum by Nicolas Pike, Esq., late consul of the United States at Port Louis. An important collection which it has been found necessary to suspend for the present, is a collection relating to the domestic animals. Upon this work, Prof. Wilder, of Cornell, and Prof. H. A. Ward, of Rochester,

were engaged. Very instructive materials have already been accumulated, much of which can be placed on exhibition at once.

The materials of the Museum have been, as usual, freely placed at the disposal of original investigators. The results have either been published in the Museum publications or in other scientific series. Prof. Smitt, of Stockholm, has completed his descriptions of the Florida Deep-sea Bryozoa, and published the results in the *Memoirs of the Stockholm Academy*. Prof. Allman and Prof. Ehlers have both nearly finished their reports on the hydroids and annelids of the Florida Channel for the Museum publications. To Prof. Kölliker considerable material has been sent for his monograph on the Halcyonarians.

In the entomological department Messrs. Cresson, Uhler, Professors Frey, Zeller and Dr. Hagen have received assistance from the Museum collections in preparing important papers.

The Museum publications have been kept up with increased activity. In the *Bulletin*, short papers have been printed during the past year by Professors Allman, Hyatt, Messrs. Allen and A. Agassiz. To Mr. W. G. Binney the Museum is indebted for the plate illustrating his communication.

Mr. A. Agassiz has published for the Museum, Parts I. to III. of the *Illustrated Catalogue*, containing a revision of the echini.

Mr. Bicknell has been mainly engaged in making sections of crinoids, corals and mollusca.

Messrs. Røtter and Konopicky have been engaged in making illustrations to accompany forthcoming publications of the Museum.

In accordance with the wishes of Prof. Agassiz, a part of his library (3,000 volumes) has been presented to the Museum Library. The remaining seven hundred volumes retained by Mr. A. Agassiz have, together with his own library of about twenty-five hundred volumes, been deposited in the Museum Building. These important additions, with the books presented, from time to time, by Prof. Agassiz, will form, with the existing library, an important nucleus for an excellent

natural history library, which will number about twelve thousand volumes.

It will hereafter be the main object of the committee of the Museum appointed by the trustees, to see that the views of Professor Agassiz so fully incorporated in the directions he was accustomed to give to his assistants* should be fully carried out, and they hope that his successors will faithfully complete the plans laid out with so much care and forethought by the founder of the Museum. Thus only can they hope to show to the public, who have thus far so generously aided him, what his aims were, and to erect to him a monument which will not only be a valuable historic record of the interpretation of nature by one of its most enthusiastic worshippers, but a monument of a lifelong and disinterested devotion to the best interests of science and of general education.

For the Museum Committee,

ALEXANDER AGASSIZ.

CAMBRIDGE, January, 1874.

* These directions will be printed in one of the forthcoming Museum Bulletins.

The reports of the assistants in charge of the various departments are herewith submitted.

Report on the Mammals and Birds, by J. A. ALLEN.

The removal of the alcoholic specimens of mammals and birds from kegs and barrels to copper cans, mentioned in the last report as then in progress, was completed early in the year, so that everything in the alcoholic series is now in a safe and satisfactory condition. At the same time the cataloguing of the alcoholic birds and mammals was completed, and the specimens systematically classified and arranged in the most convenient manner for access. During the year the labelling of the unmounted skins of both mammals and birds has been finished, and the collection placed in systematic order. The cataloguing of the collection of birds' nests and eggs has also been completed. In this work important aid was rendered by Mr. Ernest Ingersoll, whose time during the past year has been almost wholly given to this work. The labelling of the alcoholic collections is now in progress, as is also the work of marking and cataloguing the osteological material of the mammalogical and ornithological departments. The alcoholic specimens and the skins may now be reported as not only in a permanently safe condition, but as, in the main, satisfactorily arranged for ready access for purposes of study.

The most important additions to these departments during the past year, have been the collections received from the Hassler Expedition, and a series of mounted skeletons and casts purchased of Prof. H. A. Ward of Rochester, N. Y. The former include about 250 human crania from Ancon, near Callao, Peru; numerous skulls of *Otaria* and *Arctocephalus*; imperfect skeletons and skins of *Arctocephalus* and *Auchenia*, and many specimens of both birds and mammals in alcohol and skins. The alcoholic collection of birds includes over forty penguins, of several species. One of the alcoholic skins of *Arctocephalus Falklandicus* has been successfully mounted by Prof. Ward. Among the specimens purchased of Prof. Ward are mounted skeletons of the giraffe, camel, lion, several species of monkeys, and marsupials, of *Castor*, *Hystrix*, *Bassaris*, *Globiocephalus*, *Hydrochaerus*, *Dasyprocta*, *Echidna*, etc., and also of representatives of all the principal families of

birds. The collection of mounted skeletons has been further increased by the return of materials sent to Prof. Ward for preparation. Mr. Kappeler has also added many fine casts of rare or unique specimens of extinct mammals. To the series of casts have been added by purchase casts of the *Glyptodon*, of the remains of *Sivatherium*, of various species of *Elephas*, *Mastodon*, *Rhinoceros*, *Bos*, *Castoroides*. etc.

A portion of the cases in the large exhibition room having been completed, the arrangement of the systematic collection of mammals has been commenced, and in a few weeks will doubtless be completed as far as our present limited space will allow.

ADDITIONS TO THE DEPARTMENT OF MAMMALS.

By Donations.

ALASKA FUR COMPANY, five skeletons of *Callorhinus ursinus*, St. Paul's Island, Alaska.

ALLEN, J. A., three skulls of *Cervus virginianus*.

BRYANT, Capt. CHARLES, four specimens of *Callorhinus ursinus* in alcohol (3 quite young), from St. Paul's Isl., Alaska.

CHENERY, W. W., Belmont, Mass., one donkey, in flesh.

HASSLER EXPEDITION, 60 specimens, 15 species, in alcohol; numerous skulls and parts of skeletons of *Otaria Arctocephalus*, *Auchenia* and of cetaceans; 250 human crania, from Ancon, near Callao, Peru.

LINDEN, CHARLES, two skins and several specimens in alcohol, from Santarem, Brazil.

ROCKY MOUNTAIN EXPEDITION, two skins of Rocky Mountain Goat (*Aploceras montana*), from Idaho Territory.

SCAMMON, Capt. C. M., Baleen plates of cetaceans of the Pacific coast.

By Exchanges.

JEITTELES, Prof. L. H., one bat and one *Putorius*, in alcohol, from Salzburg, Germany; skulls of *Canis vulpus*, *Lepus timidus*, *Arvicola amphibius*, *Sciurus vulgaris*, *Talpa europæa*, *Vespertilio Daubentonii*, and casts of skulls of fossil *Canis*.

MARSH, Prof. O. C., New Haven, Ct., skeleton of Tapir.

By Purchases.

A large *Ursus americanus*, from Minnesota; skeleton of a fossil elk, from ARCHIBALD PRIDE. An extensive series of mounted skeletons and casts of fossils from Prof. WARD, and a few mounted skins.

ADDITIONS TO THE DEPARTMENT OF BIRDS.

By Donations.

BLAND, THOMAS, New York, one Humming-bird.

BRYANT, Capt. CHARLES, one Golden eagle in flesh, shot in Fairhaven, Mass., Nov. 21, 1873.

BUCKLIN, A. L., South Adams, Mass., one white Leghorn cock.

CABOT, W. R., Brookline, Mass., 71 skins, 62 species, 8 skulls and sterna, from eastern Massachusetts.

EINBECK, Dr. A. F., Warren Co., Mo., 9 specimens, 8 species, from New Haven, Mo.

FOLIN, Marquis de, Bayonne, France, skins of *Gallinago* and *Numenius*.

GRUHNER, Mrs., Conception, Chili, head of Albatross.

HASSLER EXPEDITION, 80 skins, 35 species; 22 dry eggs of *Rhea*; 385 specimens in alcohol, 75 species, from various parts of South America.

HUTCHINS, J. C., U. S. Consul, Callao, Peru, 27 specimens (skins), 20 species, of Humming-birds; from Guayaquil.

INGERSOLL, ERNEST, 154 specimens, 22 species, nests and eggs, collected at Norwich, Ct.

LINDEN, CHARLES, 210 specimens (skins), about 100 species, chiefly from near Santarem, Brazil.

PIKE, Hon. N., U. S. Consul, Mauritius, 7 skins of *Phæton*, from the Mauritius.

SCOTT, W. D., Cambridge, Mass., 365 skins, 70 species, from various localities in Eastern United States.

TRIPPE, T. MARTIN, 10 specimens of *Junco*, in flesh, from near Denver, Col.

WHITMAN, C. O., 7 mounted skins, 4 species, Penikese Isl., Mass.

YELLOWSTONE EXPEDITION, (through Smithsonian Institution), about 100 specimens, 40 species.

By Exchanges.

KAUP, Dr., 13 specimens, 12 species, from Pommern, Prussia.

MONTES-DE-OCA, RAFAEL, 190 birds in alcohol, including about 100 Humming-birds, from Jalapa, Mexico.

PHILIPPI, Prof., Santiago, Chili, 6 skins, 6 species, Chili.

By Purchases.

69 specimens, 37 species, skins, from the Island of Tobago, through Gov. R. W. RAWSON; 26 mounted skeletons, from Prof. WARD. A collection of nests and eggs and 32 skins, from Wisconsin, and another collection of nests and eggs from Colorado, through Dr. T. M. BREWER.

Report on the Fishes, by RICHARD BLISS, Jr.

Since the publication of the last report, the work of transferring the alcoholic fishes in the cellar from kegs to copper cans has been completed, and all of the Museum collection is now contained either in glass jars or copper cans, numbered and systematically arranged on the shelves of the fish cellar.

Dr. Edward Palmer of the Smithsonian Institution, has recently gone over the whole collection of fishes in the Museum, so that at present the collection is in as safe a condition as is possible.

The Hassler, Brazilian and Garrett collections were identified by Dr. Steindachner prior to his departure in June. I have continued the work of identifying and cataloguing. In this work I have been assisted by two special students, Messrs. Murdoch and Brooks. Mr. Garman has been employed in carrying out the arrangement of the Selachians, commenced under the direction of Professor Agassiz, who had brought together a very extensive collection of that class during the Hassler Expedition. A student's collection for the benefit of those who desire to take a special course in Ichthyology has been commenced. This collection will embrace the typical genera of each family, and certain jars of mixed specimens for practice in determining generic and specific differences.

Among all the collections of fishes received during recent years, none have exceeded in size and value that of the Hassler Expedition of 1872. Embracing upwards of four hundred species, many new to science, it includes representatives of nearly all the marine fishes from New York to San Francisco; while in respect to the number of specimens it is only equalled by that of the Thayer Expedition. Taken together these two expeditions have given to the Museum a very complete representation of the ichthyological fauna of South America.

The Museum is indebted to Hon. Nicolas Pike, United States Consul at Mauritius, for several large and valuable collections of Mauritian fishes, both dry and alcoholic. These, in addition to former donations from Mr. Pike, make our collection of fishes from the east coast of Africa remarkably complete. A small but very valuable collection of fishes from

Lake Baical, Siberia, has been obtained by purchase from Mr. J. D. E. Schmeltz, Jr. From Dr. Francis Day we have received a fine collection of types of his "Malabar Fishes." Mounted skeletons of fishes have been received from the Vienna Museum; they have been on exhibition during the past year.

The following additions have been received during the year:—

By Donation.

HASSLER EXPEDITION, over 400 species and several thousand specimens.

PIKE, Hon. NICOLAS, three large collections from the Mauritius.

CARLETON, Rev. M. M., a collection from Mooltan, Northern India.

LYMAN, THEODORE, 30 species, 200 specimens from Nice, France.

SNOW, Rev. B. G., 35 species, 69 specimens from Strong's Island, Micronesia.

ELDER, WILLIAM, 2 species, 18 specimens of *Salmonidae* from the Minas Basin, Nova Scotia.

COLLINS, G. H. and J. S., 5 species, 28 specimens from Omaha, Nebraska.

STURTEVANT, J. N., 10 species, many specimens from South Framingham, Mass.

WARD, S., 1 *Tetrodon lævigatus*, 1 *Micropogon undulatus*, from New York.

SUTHERLAND, J., 4 species, 4 specimens from Babylon Bay, N. Y.

POWELL, S., 1 *Ephippus faber*, 1 *Galeocerda arcticus*, from Newport, R. I.

ROGERS, J., 7 species, 12 specimens from Wood's Hole, Mass.

CLERK, A., 1 *Caranx sutor*, from New York, 3 *Solea achirus*, from Port Monmouth, N. J.

PEIRCE, Prof. B. O., 1 *Echeneis remora*, 1 *Tetrodon honckenii*, from the Pacific Ocean.

ABBOTT, Dr. C. C., 10 species, 130 specimens from Trenton, New Jersey.

JOHNSON, Capt. P. C., and PITKIN, Dr. H. S., 39 species, 86 specimens from Honolulu and Hilo, S. I.

RAND, ———, 3 species, 120 specimens from Lake Titicaca, Peru.

CLEEMAN, Th. M., 8 specimens of *Trichomycterus dispar*, from Oroyo River, 13,000 feet above the level of the sea; 4 specimens of *Haplochilus*, probably a new species, from Chachuará, 8,000 feet above the sea.

By Exchange.

DAY, DR. F., 57 species, 60 specimens from Malabar, India.

MONTES-DE-OCA, RAFAEL, 10 specimens of *Xiphophorus hellerii*, from Jalapa, Mexico.

By Purchase.

SCHMELTZ, J. D. E., Jr., 22 species, 44 specimens from Lake Baical, Siberia.

MILNER, J. W., 30 species, many specimens from Sandusky, Ohio.

STEINDACHNER, DR. F., a collection from San Francisco, Cal.

GREEN, SETH, several specimens and species from Western New York.

By Purchase and Exchange.

SALMIN, C. L., 79 species, 175 specimens from the North Sea and the Elbe River.

VIENNA MUSEUM, 33 mounted skeletons.

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

During the present year considerable activity has prevailed in this department, and much has been done to increase its usefulness.

During the earlier part of the year much attention was paid to exchanges, and a vast amount of material was thus added to our resources for augmenting the collection, and for still further exchanges for future increase.

The number of packages received by exchange since my last report has been twenty-eight, containing 3,266 species and 37,717 specimens.

Our resources for exchanges have been largely increased recently by the purchase of an extensive collection of shells, made by the late W. Harper Pease, in the Pacific Islands. This collection has only been in our possession for a few weeks, and hence has been but partially examined, but even that cursory examination has shown that besides adding several hundred species to our collection, it will afford the means of exchange, to a very great extent, by the large number of duplicates it contains, especially of *Partulas*, *Achatinellas* and other genera peculiar to the Polynesian group.

Since the first of September, last, I have had the valuable assistance of Professor Hamlin, late of Colby University, in rearranging our entire collection of shells from the beginning. Our progress has necessarily been slow, since much time has been given to identification as a proper preliminary, and so far scarcely a single species has been left without a name.

We have commenced, also, to arrange a series of useful shells for supplying the several normal schools with the means of instruction in our department, and hope to have them ready by the close of the present year.

Among the boxes received during the year, was one from R. McAndrew, since deceased, and it contained a very complete series of the shells once belonging to W. H. Benson, which, having been identified and named by him, possess unusual interest, and many are his own species, and partake, therefore, of the character of type specimens.

From Nicolás Pike, Esq., late U. S. Consul at Mauritius, we have received, as usual, a large number of species and specimens found in that region, and from no contributor have we received more valuable or more desirable contributions.

Nearly all the other contributions were by exchange, and have been duly paid for in the same manner. Among these, however, we may mention one box of upwards of 500 species from Polynesian localities, which was particularly desirable, and renders our series from that quarter almost a complete one.

During the year we have sent away, by exchanges, thirty-seven packages, containing 4,647 species and 18,449 specimens, leaving us indebted for only two parcels, received within a month past.

The alcoholic mollusca have been in the charge of Mr. J. H. Blake, who, with the aid of Dr. Palmer, has revised the whole collection, and has begun to arrange, systematically, the whole collection for future convenience.

The large collection of cephalopods has been especially selected for exhibition. The collection of eggs of mollusca has been carefully examined, and is now in a good condition.

The most extensive invoice of alcoholic mollusca is that of the Hassler Expedition.

Report on the Articulates, by Dr. H. A. HAGEN.

1. From Dr. C. A. DOHRN, in Stettin, Prussia, a large number of named Coleoptera.—By exchange.
2. From Prof. L. AGASSIZ, Lepidoptera from Panama and Acapulco, Mexico.—Hassler Expedition.
3. From Mr. TH. L. MEAD, of New York, specimens for the biological collection, Lepidoptera.—Presented.
4. From Mr. FR. SANBORN, Boston, specimens for the biological collection.—Presented.
5. From Mr. H. J. HUBBARD, Detroit, Mich., a large set of valuable biological specimens, all raised.—Presented.
6. From Mr. W. P. AUSTIN, larvæ of insects, from Utah.—Presented.
7. From Mr. BLAND, New York, cases of *Helicopsyche*.—Presented.
8. From Mr. RUST, of steamer Lagos, a Mantis from Demerara.—Presented.
9. From Mr. J. SHUTE, Woburn, Mass., insects for the biological collection.—Presented.
10. From Mr. B. P. MANN, Cambridge, Mass., *Cemostoma cofeella* for the biological collection.—Presented.
11. From Dr. TH. F. PERLEY, Naples, Me., a splendid lot of *H. Maja* in all stages, from the egg to the imago; also rare Phryganides from Maine.—Presented.
12. From E. DEYROLLE, Paris, France, a systematic collection of Longicorns Col., 4,500 species in above 7,000 specimens.—Bought.
13. From Mr. PIKE, U. S. Consul at Mauritius, valuable insects.—Presented.
14. From M. L. LESQUEREUX, Columbus, Ohio, insects from Ohio in alcohol.—Presented.
15. From Rev. A. E. EATON, England, 32 species of Ephemera in glycerine, types of his monograph.—Presented.
16. From Dr. Pitkin, U. S. Surgeon, Lepidoptera from Honolulu, and Nicaragua.—Presented.
17. From Rev. M. M. CARLETON, a very large collection of butterflies and other insects, dry and in alcohol, from Ambala, E. Ind., and from Koolloo, Sub-Himalya, above 10,000 specimens.—Presented.
18. From Mr. E. KONOPICKY, insects from Montana, dry and in alcohol.—Presented.
19. From Dr. H. A. HAGEN, rare biological specimens from several European museums.—Presented.

20. Mr. W. M. DAVIS, from Cordova, Argentine Republic, an exceedingly rich and beautiful collection of insects of all orders, dry and in alcohol, from Cordova.—Presented.

21. Prof. L. AGASSIZ, insects of all orders, from Patagonia, Magellan Straits, Chili, Panama, Mexico, dry and in alcohol.—Hassler Expedition.

22. A large amount of insects in alcohol from formerly arrived collections now unpacked and distributed to the different departments.

23. From Dr. LEWIS, Philadelphia, Pa., a collection of North American Coleoptera, including the late Dr. Zimmermann's collection from South Carolina, about 4,000 species named.—Bought.

24. From Mr. G. R. CROUCH, Coleoptera from San Domingo, 85 species; Australian Coleoptera including the genus *Omma*, 105 species.

25. From Mr. E. SCHWARZ, Breslau, Prussia, a set of rare European Coleoptera, 60 species.—Presented.

26. From Mr. H. ULKE, Washington, D. C., Coleoptera from Alaska named, 7 species.—Presented.

27. From Baron von OSTEN-SACKEN, Cambridge, North American insects, some rare species.—Presented.

28. From Mr. T. HENSHAW, Cicindela Puritana and various Dytiscidæ.—Presented.

29. From Mr. P. S. SPRAGUE, Boston, Mass., North American Coleoptera new to collection, 4 species.—Presented.

30. From Mr. J. DIMMOCK, *Cyllodes* and *Donacia* new to collection.—Presented.

31. From Mr. W. P. AUSTIN, Cambridge, Mass., *Brathinus* new to collection, 4 species.—Exchanged.

32. From Rev. M. M. CARLETON, a very large collection of butterflies from Ambala, Kooloo and Yallore Pass (about 12,000 feet), above 10,000 specimens; also Coleoptera and Hymenoptera in alcohol.—Partly bought.

33. From S. W. GARMAN, Cambridge, Mass., a collection of fossils from Humboldt River.—Presented.

34. From Dr. H. HAGEN, Prussian amber, a large collection concerning the different varieties of the amber and fossil remains contained in amber; also samples of the different strata, wherein amber is found and palæontological remains of the strata; also a set of amber from Sicily.—Deposited.

35. Insects in alcohol collected at Penikese Island in the summer term.

36. From Mr. C. S. MINOT, Boston, Mass., a collection of Neuroptera and Hymenoptera from Massachusetts.—Presented.

37. From Mr. R. L. DAVIS, Newtown, England, a set of prepared European caterpillars and other objects for the biological collection, above 100 specimens.—Bought.

38. From W. C. BEECHER, New York, Coleoptera collected at Fort Bridger, 300 specimens.—Presented.

39. From S. H. SCUDDER, Cambridge, Mass., Pseudoneuroptera and Neuroptera from the White Mountains.

Miss Harris and Miss Clark worked through the year in the department, spreading about 4,600 butterflies and labelling insects, and arranging Coleoptera for the collection.

Mr. W. J. Hubbard, Mr. C. S. Minot, and Mr. A. Sheriff worked through the winter and spring in the department, partly for the collection, partly for their own instruction.

Exchanges are made chiefly with the naturalists publishing materials belonging to the collection, and with several entomologists in the United States and Europe.

The arrangement of the collection was carried on in an extensive way for the biological collection only, now far the largest existing. It was the chief subject for study in my voyage during the last summer. Several important collections of this kind, bought by Prof. L. Agassiz, are very soon to arrive.

Since November Mr. G. R. Crotch has taken charge of the Coleoptera. The mounting and arrangement of the large Pacific coast collection, made by himself, is completed. To accomplish this extensive work, the whole time of gentlemen and ladies in the department was given. In the beginning of March, Mr. Crotch was obliged to leave the Museum on account of his poor health.

Mr. E. Schwarz, from Breslau, has been working since December in the department, has mounted the Pacific coast collection, and arranged a large amount of alcoholic vials for the biological collection. His collections of winter insects for the Museum, around Cambridge, has given the surprising number of about 400 species, mostly Microcoleoptera, a number of them new for the North American fauna, even several new genera.

Mr. Faxon has taken charge of the Crustacea. He has been mainly occupied in making preparations illustrating the struc-

ture of the class, and a good number of excellent preparations are already on exhibition.

Our collection of annelids still remains abroad in the hands of Professor Ehlers, but he is making good progress with them, and in the meantime they could not be in better hands.

Report on the Palæontological Collections, by O. ST. JOHN.

On the removal of the Palæontological collections to the attic, occasion was taken to bring the invertebrate fossils into more convenient general order, with especial reference to the periods and epochs which they represent, and in a general way their distribution has been further carried into classes and subordinate groups; this arrangement extending through the entire collection, from the Primordial to the Tertiary, inclusive. Some conception of their extent may be formed when it is understood that they are contained in above three thousand trays.

All vertebrate fossils, so far as they have been eliminated (and, it is believed, little of this material remains in the collections referred to above), have been transferred to the charge of Mr. Allen. In like manner, the fossil fishes have been collected together in the same room; so that, at the present time, with the exception of the comparatively small number of these remains now on exhibition, probably nearly all the resources of the Museum in this department are lodged in the same apartment and readily accessible.

Special work has been performed on the Devonian and Carboniferous divisions, and in the latter the final arrangement of the Lamellibranchiata has been carried to an advanced stage, and at this date the class is nearly ready for the exhibition cases. In the progress of the work, much has been accomplished towards preparing the other classes for a similar disposition. In these two great periods, therefore, the collections are ready for the more critical work of identification and preparation for exhibition. I have been assisted by Miss Cutler and Miss Atkinson in the prosecution of the work in this department.

During the past season, under the auspices of the Museum, a critical examination of the stratigraphy of our carboniferous formation was begun, with the view of determining the character of the physical conditions which prevailed during their deposition, and how and to what extent these influences affected the life of the successive epochs. Through the interest of Mr. W. C. Van Horne, to whom our best acknowledgments are due for the large understanding and aid which he so generously contributed towards furthering the undertaking, the work was commenced in the St. Louis division of the Lower Carboniferous, embracing a thorough study of the formation in the environs of St. Louis, where it presents its typical development and where especially favorable facilities are afforded for its investigation. The result of the season's exploration was the acquisition of a valuable collection, presenting almost a complete representation of the life-history of that particular sub-epoch, exhibiting the chronological relations of the fossils and many important facts bearing on their faunal association. These collections are at present in process of arrangement,—the method adopted intending to show the stratigraphic distribution of the species. It may be added, that, a full record of the operations of the survey was made, of which a complete copy has been deposited in the library.

Accessions to the collections, extending back two years, comprise the following:—

LEO LESQUEREUX, Jr., a specimen of *Conocardium* from the Devonian, Columbus, Ohio.

E. A. STRONG, in exchange, miscellaneous fossils from the Upper Helderberg of New York, and a collection from the Lower Carboniferous formation of Michigan; in all, 31 species and 175 specimens.

WM. ELDER, a slab specimen with crustacean trails, carboniferous of Nova Scotia.

Capt. A. M. HARRISON, U. S. Coast Survey, shells from beach deposits, Florida.

Prof. N. S. SHALER, miscellaneous fossils, Post-tertiary, Martha's Vineyard.

Dr. G. A. WILLIAMS, in exchange, a fine collection of carboniferous fossils, comprising about 135 species and 2,500 specimens, from the vicinity of Boonville, Missouri.

ROBT. DRINKWATER, 65 specimens of English coal-measure fossils, including some very interesting fish-remains.

J. M. ALLEN, in exchange, 25 specimens of *Dictyophyton*, from the Chemung of New York.

W. R. LIMPERT, 20 specimens, representing 10 species of cretaceous fishes and molluses, from Central Kansas.

O. ST. JOHN, four cases of miscellaneous fossils, from the Cretaceous, Upper and Lower Carboniferous and Devonian formations, Western States.

By Purchase.

MR. CHARLES WACHSMUTH, the magnificent collection of fossil crinoids, the result of fifteen years' arduous research, together with a miscellaneous general collection of foreign and American fossils.

C. D. WALCOTT, a collection of Lower Silurian fossils, including a valuable collection of Trenton Trilobites, from Trenton Falls, New York.

RICHARD RATHBUN, local collection of the fossils of the Hamilton and Chemung formation, Central and Western New York.

Professor Hyatt has been engaged in arranging the collection of fossil Cephalopods.

Dr. Maack, who has had charge of the Fossil Vertebrates, died during the last summer, from disease contracted while in the Isthmus of Panama. His attainments in his special department were very considerable; by his devotion to his work he was gradually bringing the collections under his care into excellent order. By his untimely death the Museum loses an efficient ally.

[B.]

In Memory of

PROFESSOR ACASSIZ.

A meeting of the Trustees of the Museum of Comparative Zoölogy was held at the council chamber at the state house on Wednesday, December 24. His Excellency Governor Washburn presided, and the Hon. Martin Brimmer presented the following Resolutions :—

Resolved, That we desire to record our sense of the irreparable loss which the Museum has to bear in the death of Louis Agassiz, who conceived the plan of it, who made the first gift which led to its foundation, whose thought directed its whole organization, and whose enthusiasm, kindling the public feeling, created all its resources.

Resolved, That much as we value his scientific achievements, we value even more the disinterested devotion to science and education, the high and broad aims and the generous sympathies which gave him such beneficent power as a teacher and a man, and the fine nature which made every one who knew him his friend.

Resolved, That the president of the Board be requested to send a copy of these resolutions to the family of Mr. Agassiz, in testimony of our sympathy and sorrow.

Governor WASHBURN then spoke as follows :—

Whether these Resolutions ought to be adopted without any remarks of my own or not, I have but a simple word to offer, and that is that I feel that the relations of Professor Agassiz to the Commonwealth were such that we meet with an irreparable loss by this sudden stroke which has fallen upon us ; that it is not simply the position which he occupied as the manager and the head of this institution, but the position which he occupied was such that a gap has been made which it seems to-day impossible to fill. I feel that the influence which he has exerted in almost every department of science, and particularly with reference to his own branch of the agricultural institutions of this State, gave such impetus as we

cannot expect to derive from any other source, and that his influence and the power and honor which he conferred upon those institutions and the State to which he belonged were not by any means confined to our own domain, but extended throughout the country, so that he was recognized as the leading scientific man of the land, and perhaps few in the world would be considered his equal, and if any are considered his superiors I do not know who they are. Certainly we have felt that the work he has done for us was most valuable; but I wish to say, in relation to the passage of these Resolutions, that, as an individual, I have learned to admire the energy and strength and the enthusiasm which he brought to bear to all the subjects to which he gave attention. As a representative of the State I feel that a blow has come upon us, and to-day we cannot see how it is to be obviated and who is to fill the great gap which has been made.

SPEECH OF HON. GEORGE B. LORING.

MR. PRESIDENT:—I feel grateful to the accident of this public station, for the opportunity it affords me to contribute to the universal and world-wide expression of eulogy and sorrow at the death of Agassiz. The unbounded recognition of his greatness, the deep lament caught up where he died and borne by the circling hours around the globe, the reverent tribute to his genius, the affectionate tribute to his great love, all belong to that spontaneous outburst of grief and adoration which mankind always bestows upon the great and good. For ourselves, however, we have a closer duty to perform, a tenderer feeling to express, a more intimate relation to recognize, a more sacred obligation to obey. When the great naturalist passed away he left in our hands the monument to his genius still incomplete, to the erection of which he devoted the best years of his life, the best powers of his mind and body, and around which centered his highest hopes and aspirations. He made great contributions to science, roused the cultivated thought of his day, opened many new paths to knowledge, explored and completed many old ones, was a great investigator and a great interpreter;—but it was in the Museum of Comparative Zoölogy that he proposed to learn and record the profound lesson of creation, which he

gathered from the "heavens above, and the earth beneath, and the waters under the earth." His designs with regard to this institution were not only that it should be the largest and most complete collection of the kind in the world, but that it should be the most significant; not only the most amazing to the common eye, but the most conclusive and instructive to the eye of science; not only the most carefully arranged, but the most expressive and striking record ever made of the processes pursued by an All-wise Creator in his handiwork. With this masterly design of Agassiz we have all been more or less intimately acquainted,—some permanently, others temporarily; some through the medium of large liberality, others by means of civil position; some from the initial step all through its fascinating and radiant progress, others for an hour in the fullness of its prime; but all in such manner as to know the ecstatic enthusiasm, the majestic intellect, the untiring force, the keen perception, the vast memory, the sweeping gaze, the almost divine comprehension, which the great master brought to his work—and the gentle, and affectionate, and elevating, and purifying influence which he exercised over those who were fortunate enough to be connected with him in his lofty service. To be deprived of Agassiz as an official associate is a grievous loss; to resign him also as a friend and companion, is a deep and overwhelming sorrow.

When Agassiz came to this country, to commence this work, which he has so sadly and so prematurely laid down, he brought with him a contribution to American institutions which has never been equalled. He came from the intimate companionship of Cuvier, and Oken, and Martius, and Döllinger, and Schelling, to whom, as his teachers, he had already, while a youth, opened his "little academy" at Munich, and with whom he established an early rivalry in rapid investigation and analysis. He had been inspired by the companionship of the great Humboldt, with whom he soon learned to keep pace in the breadth of his survey, and the grandeur of his explorations. His unanswerable arguments, based on the glacial movements, had arrested the attention of the scientific world. He brought with him all the scientific honors of Europe: a member of the Academy of Sciences in Paris; of the Royal Society in London; a recipient of the

Monthyon prize, the Cuvier prize, the Wollaston Medal from the Geological Society in London, and the Medal of Merit from the King of Prussia. He brought with him the blood of the Huguenots, and a character moulded under the influences of a Protestant clergyman's home in the rural simplicity and purity of the valleys of Switzerland.

He came here as a popular lecturer. The two first institutions which extended their hands to him were the Lowell Institute and the Salem Lyceum—the former having invited him hither with the temptation of its ample endowment, and the latter having enlisted his services with that spirit of earnest inquiry which had opened its doors to every progressive thinker from the day of its foundation. This was his temptation here, and this his patronage.

We should remember, sir, that when this great man turned his attention hither, he was familiar with the encouragement lavished upon the great scientists of Europe. He had seen Goethe provided with honor and royal companionship by the Duke of Weimar, under whose genial influences he had found time to develop his great scientific theory of the unity of structure in the bony frame of all the vertebrates, and to lay the foundation of the morphology of plants. He had seen Humboldt almost overlaid with the means of pursuing his scientific travels and investigations by the crowned heads of Europe, and at last raised to diplomatic honors by the King of Prussia. He had witnessed the distinctions lavished upon Cuvier, made Councillor of State, by Napoleon; royal commissary, by Louis XVIII.; Chancellor of the University, member of the French Academy, Grand Master of the University, baron, by Louis XVIII.; President of the Council of State at the coronation of Charles X.; grand officer of the Legion of Honor; and Peer of France. But he knew also that Goethe, in his genial, active, useful and distinguished of old age," wailed like a distracted woman when Napoleon approached Weimar and "spitefully used" Charles Augustus; and that he afterwards accepted Napoleon's flattery and the cross of the Legion of Honor, because the great conqueror had given Werther seven imperial readings. He knew that he himself had corrected many of the errors of Cuvier's classification, based on the invariable character of

anatomical structure ; because Cuvier, of whom it is said that he was "the best of men, the most brilliant of writers, the soundest of thinkers, the most far-sighted of philosophers, the purest of statesmen, and the greatest naturalist of modern times," grew dogmatical under the adulation of court life. And he found it necessary, later in life, to apologize for the bad taste of Humboldt who, while holding a place in court at Berlin, "criticized and satirized severely everything connected with it." The patronage, the splendors, the titles, and the temptation of courts were all before him and within his reach, when he came to America as a popular lecturer, educator and investigator.

Now, sir, we are all grateful for the scientific wealth which Agassiz brought to our shores, and lavished upon our people. We admire the imperial march of his mind through all the realms of philosophical knowledge. We accept the cosmical laws which he found written all over the earth's surface by the moving glaciers ; we follow his classifications, which pointed out to each animal group its place in creation, and made zoölogical order out of speculative and theoretical chaos ; we are subdued into entire submission by that mental power which could arrange the long and intricate and half-hidden record of palæontology, and point out where this ends and anatomy begins, in the great continuous line of a fossil and living animal kingdom. The rapid and patient industry to collect facts—the grasping and judicious comprehension to classify them—the lofty survey which deduces the general law,—who can measure the scientific genius of him who possesses all these faculties in healthy combination? These Agassiz had, and more.

When he assumed the duties of a popular teacher, he also took upon himself the duties of a learner—an untiring, honest, unassuming searcher after truth. To secure knowledge was his first impulse ; to convey it, the next. He was a good teacher of youth, because he felt that every scholar had a right to demand of him a thorough knowledge of what he taught, and because he knew how to draw from the humblest something worth adding to the store which he already possessed. He took part in public education, not because he felt the high importance of what he was to bestow, but because

he had an irresistible impulse to join hands with all who were pursuing the paths of knowledge, and because he felt that his own enthusiasm might operate as a new incentive to his associates. Whoever has listened to his conversation with those who surrounded him at agricultural and educational assemblies, must have been struck with the prominence which he gave in his own inquiries for the views and opinions of others, even of those who hung upon his lips, eager for the knowledge which he might impart. And so he encouraged every effort after knowledge; was impatient of a pretence—but was warm-hearted and paternal towards a genuine effort and a reality; was grateful to the farmer who stated a fact in embryology drawn from observation; rejoiced over every successful endeavor of the agricultural college; could travel side by side with the humblest explorer; and could at a moment's warning, with a wealth of knowledge and a fervid eloquence unequalled, sweep away the fallacies of an antagonist. He was indeed the genius of a scientific American; for whether engaged in the most elaborate investigations at the Museum, or in discussions before the board of education, or in a popular lecture, or in a thousand-times debated question in the board of agriculture, he always displayed the same modesty, the same desire to learn, the same vast knowledge, the same fascinating power of conveying his knowledge to others. The influence of this unceasing effort and this manifold faculty it is difficult to estimate. But we do know that he engrafted science upon our republic, put it into all our colleges, introduced it in familiar form to our people, gave existence to scientific schools everywhere, sent his pupils into every corner of our land, brought its mysteries into our schools, brought the spirit of our rulers up to a just appreciation of its life-giving influences, and taught the world that the tribute which an educated people are ready to bestow upon their great teachers and guides, cannot be eclipsed by the patronage of kings.

But there are those who cannot forget the influence which Agassiz exerted by the force and quality of his character alone. Actuated by high motives himself, he always appealed to the high motives of others. He expected to be forgiven, and so he was always ready to forgive. He carried with him

an elevating and refining and cheering influence and an overflowing sympathy with his friends in all their joys and sorrows. His countenance beamed with the light of triumphant endeavor, and with the warmth of a kind and generous and understanding heart.

Carlyle says of Goethe: "A French diplomatic personage contemplating Goethe's physiognomy, is said to have observed: '*Voilà un homme qui a eu beaucoup de chagrins.*'" But no man could say this of Agassiz. His countenance bore the marks of many joys. The calmness of great faith resting on great knowledge; the consciousness of duties well performed, of inquiries honestly made, of investigations candidly pursued, of a purpose based on honor and right, of a desire to shed light upon the faith of man, of a fraternal regard for all the sons of men, of a belief in right as superior to authority, of a lofty recognition of the grandeur of truth when compared with the glittering accidents of life,—this gave him an inspiring force and a charm which will never be forgotten by those who enjoyed his teachings. I dare not speak of my own loss, but I may urge upon this board a faithful observance of the duties which the great founder of the Museum has imposed upon it. And believing as I do, sir, that the Resolutions express not only the sentiments of every gentleman present, but also those of the great body of lovers of sound learning throughout the world, I trust they will be warmly and unanimously adopted.

The Resolutions were adopted by a rising vote, and the meeting adjourned.

A P P E N D I X .

The following sums have been subscribed for the Museum in addition to the regular income in 1872-1873:—

Alex. Agassiz and Q. A. Shaw, land on Oxford Street,	§9,314 71	
Alex. Agassiz, for publication, etc.,	7,796 13	
	<hr/>	§17,110 84
In 1873,—		
State grant (conditional on same amount being raised by the Museum),		25,000 00
Subscriptions in 1873,—		
Former pupils of Prof. Agassiz Young Ladies' School,	§4,060 00	
Cash from friend,	5,500 00	
Q. A. Shaw and Alex. Agassiz,	6,937 20	
Alex. Agassiz, for publications, etc.,	10,301 57	
Mrs. G. H. Shaw,	5,000 00	
Martin Brimmer,	2,000 00	
	<hr/>	33,798 77
Donation of Quincy A. Shaw May, 1873,		100,000 00
		<hr/>
Total for 1872-1873,		§175,909 61

ANNUAL REPORT

OF THE

TRUSTEES

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY,

AT HARVARD COLLEGE, IN CAMBRIDGE:

TOGETHER WITH THE

REPORT OF THE COMMITTEE ON THE MUSEUM,

FOR

1 8 7 4 .

BOSTON :

WRIGHT & POTTER, STATE PRINTERS,

79 MILK STREET (CORNER OF FEDERAL).

1875.



Commonwealth of Massachusetts.

BOSTON, March 5, 1875.

To the Honorable GEORGE B. LORING, *President of the Senate.*

SIR :—The Trustees of the Museum of Comparative Zoölogy have the honor to present to the Legislature the Report of the Committee on the Museum for the past year, marked [A].

After the death of the Director of the Museum, Professor Agassiz, it was found expedient by the Trustees and by the President and Fellows of Harvard College, to alter the articles of agreement between the two corporations. A copy of the articles of agreement, as amended, and of those of the original articles which were rescinded by concurrent vote of the two corporations, will be found in the paper marked [B].

The paper marked [C] contains a list of the present Trustees, officers and committees.

Respectfully submitted for the Trustees,

MARTIN BRIMMER, *Secretary.*

[A.]

REPORT OF THE COMMITTEE OF THE TRUSTEES
ON THE
MUSEUM OF COMPARATIVE ZOÖLOGY,
FOR THE YEAR 1874.

It has been found necessary, notwithstanding the generous response of the friends of the Museum to the Agassiz Memorial Fund, to curtail, for the present, very materially, the operations of the Museum. It was with great regret that the Curator found himself compelled, by circumstances beyond his control, to dispense with the services of many valuable assistants. The amount of work accomplished is, of course, lessened in comparison, and the field of activity considerably diminished, as will be seen by the accompanying special reports of the assistants in charge of the different departments. The volunteer work accomplished has been, as formerly, very great, and the Museum is deeply indebted to Mr. L. F. Pourtales, to Baron Osten-Sacken, and to Thomas G. Cary for the supervisions they have taken of their departments. Mr. Pourtales having been appointed by the Faculty of the Museum keeper of the collections, it is mainly due to him and to the Superintendent, Mr. Cary, that the executive details of the Museum have been carried on. Baron Osten-Sacken, to whom the Museum owes the accession of an invaluable collection of diptera, has very generously increased the scientific value of this collection by spending the greater part of one year in identifying the materials already in the Museum collection. This collection of diptera will be hereafter still more valuable, as it will eventually include the whole collec-

tion of Dr. Loew, of Guben, which has now become the property of the Museum, and contains the best collection of American diptera in existence. The biological collection of insects has also been increased by the purchase of a very large collection of Dr. Rosenhauer, of Erlangen. The late Mr. Crotch was engaged for a part of the past year on the collection of coleoptera; important accessions had been secured from his Californian collections, but his death has deprived the Museum of this material.

The alcoholic collections were never in as good a condition, nor as accessible, as at the present moment. The storage in copper cans, commenced three years ago, is now completed, and, from experience, it is evident that nothing, in the end, will stand the test of time as well for the preservation of bulky alcoholic collections as copper cans with metallic screw tops. Thanks to the happy suggestion of D. F. Becker, a very important progress has been made in ultimately securing the safety of the insect biological collections kept in small glass vials, to which reference is made in Dr. Hagen's report.

Mr. Garman has very successfully adopted the card system, in use in libraries, for the purpose of showing the geographical range, and the material on hand of each species. These cards of species advantageously replace the faunal and systematic sheets introduced by Professor Agassiz, which, like all fixed sheets, were not capable of indefinite expansion.

The publications of the past year were limited to the issue of Part IV. of the Revision of the Echini, by Alex. Agassiz, and the first part of the Scientific Results of the Hassler Expedition, by Messrs. Agassiz and Pourtales. Considerable progress has also been made to the preparation of the plates for a first part of the catalogue of the Agassiz Collection of Fishes, by Mr. Putnam.

The Museum has made provisions for the room needed by the College for the instruction in zoölogy and geology. The instruction in zoölogy has been for the past year in charge of Professor McCrady, assisted by Mr. Walter Faxon in the laboratory work. The advanced students have worked at the Museum under Professor McCrady's charge.

The present term the instruction in geology has been

resumed by Professor Shaler, for whom a convenient work-room and laboratory have been fitted up in the Museum. The calls upon the Museum to furnish facilities for teaching, by the college, both to undergraduates and special students, have been very urgent, and show how far behind the requirements of the Professors the facilities at the disposal of the Curator are, both in the way of room and of material, models, diagrams and apparatus generally. The deficiencies for more advanced students are still greater, and are especially marked with the present reduced staff of the Museum assistants. It is hoped, however, that by making use of the assistants, for instruction in the different departments, that the difficulty will be removed to a certain extent.

It was deemed advisable by the trustees of the Museum and the corporation of the college, to simplify somewhat the organization of the Museum. The office of Director was consequently abolished, and the trustees are now represented in the care of the Museum, and its property by the Museum Committee. A copy of the amendments to the original articles of agreement is added to this Report. To Messrs. N. Thayer and Geo. B. Emerson, the Museum is deeply indebted for assistance, generously tendered in times of need.

For the Museum Committee,

ALEXANDER AGASSIZ.
THEODORE LYMAN.

CAMBRIDGE, January, 1875.

The details of the business of the Museum will be found in the accompanying reports of the various departments.

Report on the Mammals and Birds, by J. A. ALLEN.

Since the report of last year the large exhibition-room has been finished, and the cases of the lower part filled with mammals and birds, the collection embracing not only stuffed skins, but mounted skeletons and fossils, arranged together in as nearly a systematic order as their size and the limitations of the cases will allow. Much of this material has not before been on exhibition. The stands of the specimens previously on exhibition have been repainted, and the whole uniformly labelled with neatly printed labels. The room proved much too small for the material that had accumulated for exhibition, and the floor cases in the north rooms of the older part of the building have been used to temporarily shelter the specimens that could not be arranged in the large room from dust, and protect them from the attacks of insects,—necessarily at the expense, however, of breaking in somewhat upon the systematic arrangement of the collections.

In addition to the work on the exhibition collection, the bones of the recent mammalia have been wholly catalogued, marked, labelled and systematically arranged, so that this material is now not only readily accessible but safe for use, as it has not been heretofore. While mixtures, and, to some extent, loss of labels, have occurred from the frequent removals to which the collection has been subject, it has in most cases been possible to repair these defects. This collection already numbers nearly two thousand specimens, a large proportion of which are skeletons. In the registering and marking of this material, very great assistance has been kindly rendered by Mr. Ed. A. Birge.

The additions during the year to either the mammals or birds have been, for obvious reasons, much fewer than usual, as shown by the subjoined schedules. Mr. Ward, of Rochester, has returned a considerable number of pieces sent him in former years, prepared with the usual skill and neatness that characterize his work. The collections received from the Smithsonian Institution are the only ones worthy of special mention, these consisting of the first dupli-series of the North American *Sciuridæ* and *Leporidæ*, and nests and eggs of North American birds. The former have special value as

being types from a recent critical revision of these families. Through the same institution we have also received a first series of duplicates of the mammals and birds, collected by the writer, on the Yellowstone Expedition of 1873, as per previous agreement.

ADDITIONS TO THE DEPARTMENT OF MAMMALS.

By Donation.

BACHELDER, C. E. (Harvard, '73), skeleton of *Arctomys monax*, from North Hampton, N. H.

CARLETON, M. M., 10 skins, 2 species; 18 specimens, 6 species, in alcohol, from Umbala, Northern India.

GARMAN, S. W., 1 *Blarina brevicauda*, from Cambridge.

PIKE, NICOLAS, U. S. Consul, Mauritius, 3 teeth of a cetacean.

RAWSON, GOV. R. W., 1 *Agouti*, in alcohol, from the Barbadoes.

SANBORN, F. G., 1 *Didelphys Virginiana*, from Smoky Creek, Carter County, Ky.

YELLOWSTONE EXPEDITION of 1873 (through the Smithsonian Institution), 8 skins, 7 species, from Dakota and Montana.

By Exchange.

LINDEN, CHARLES, 22 specimens, 7 species, mostly in alcohol, from Santarem, Brazil.

SMITHSONIAN INSTITUTION, 206 skins, about 40 species and varieties, and 24 skulls, 20 species, of North American *Sciuridæ*; 50 skins, 13 species and varieties, of North American *Leporidæ*.

VIENNA MUSEUM, 4 mounted skeletons and several skulls.

By Purchase.

2 skeletons and 7 skulls, 7 species, from Sweden.

ADDITIONS TO THE DEPARTMENT OF BIRDS.

By Donation.

CARLETON, M. M., 4 skins, 1 specimen in alcohol, a few eggs and young birds in alcohol, and 24 nests, from Umbala, Northern India.

MOUNT AUBURN CEMETERY CORPORATION, 1 swan, in flesh.

PINHERO, DR., 59 skins of humming-birds, 13 species, from Brazil.

YELLOWSTONE EXPEDITION of 1873 (through Smithsonian Institution), 122 skins, 54 species, and several sets of nests and eggs.

JACKSON, DR. J. B. S., preparation of sternum and trachea of swan.

By Exchange.

LINDEN, CHARLES, 3 young birds and eggs, in alcohol, from Santarem, Brazil.

SMITHSONIAN INSTITUTION, 63 nests, 58 species, 117 eggs, 50 species, of North American birds; 4 skins of *Leucosticte griseinucha*, from St. George's Island, Alaska.

VIENNA MUSEUM, 1 mounted skeleton of *Aquila*.

By Purchase.

95 skins and 34 skulls, from Sweden.

Report on the Department of Conchology, by JOHN G. ANTHONY.

My last report, which was made in January last, brought the business of my department up to the close of last year, and, consequently, leaves but the doings and changes of ten months to note at the present time.

Since then the usual outline has been observed. The Pease collection of shells, which at the close of the year had only just come into our possession, and had been but partially examined, and the species identified, has since demanded and received our almost undivided attention, and as we found it absolutely necessary to couple with it the entire revision of all our previous collection, has proved a long and most laborious undertaking. We have endeavored to do this in the most critical and thorough manner, sparing no pains to make the revision as perfect as possible, and have the satisfaction of believing that this has been so thoroughly done that no further labor in this direction will be required for many years. In all this work I have had the benefit of the valuable coöperation of my assistant, Professor Hamlin, who has been indefatigable in his efforts to aid me in every way possible.

The mounting of specimens for the purpose of properly presenting them to the view of visitors, and especially of students of this branch of natural history, has been steadily carried on during the year by my daughter, who is my only assistant for that purpose, and much progress has been made in that direction. And the large additions made to our collection from the Pease collection, and those received by exchanges,

which have from time to time been incorporated with those previously on hand in order to introduce those from new localities, or better specimens has rendered the requisite mounting of these specimens a task of no small magnitude.

The collections which were mentioned in the last report as having been prepared for the use of the normal schools in the State, have since been forwarded to each school, and, we trust, may be the means of extensive usefulness.

Our exchanges during the present year have been about as numerous as usual, and having been mainly restricted to such species as were really needed to increase our own collection, have resulted in our receiving fewer duplicates than usual, but still enough to keep up our stock for such purposes and to furnish our large and increasing list of correspondents with all that they require at our hands. We have received from all sources, in this way, during the current year, 27 boxes of shells, containing 1,477 species and 20,721 specimens; and among the specimens received have been some of rare beauty and excellence.

Our generous and constant contributor, the late U. S. consul at Mauritius, Hon. Nicolas Pike, has laid us under special obligation this year, as in former ones, by his kindness in sending valuable and interesting shells.

From Dr. Henry Dohrn we have to acknowledge several favors, and although his contributions have not been so numerous in specimens as many others, yet they have embraced some of the rarest and most interesting species and specimens we have ever received. Among these, we cannot omit mentioning a few which have been welcomed with peculiar pleasure,—such species as *Helix Cambodiensis*, *Euptychia æquivoca* and *Halia priamus* are seldom seen anywhere, and during fifty years which it has been my lot to study conchology, I have never found the last named in any collection.

Mr. Geale, Mr. Owen, Governor Rawson, and other friends, have proved not less mindful of us, and we cheerfully and cordially thank them for aiding so liberally in building up our collection.

Among the various objects which have received attention during the present year, our catalogue has not been

forgotten, and, I am happy to say that it is in a good state of progress, about one-third of our species having been critically reexamined and carefully identified by all the means in our possession, and arranged after an improved method for registry in a book which has long been waiting for the purpose. We still, however, need several books for the proper identification of species, and hope that before another year is completed we may rejoice in the possession of more ample means of conchological identification.

During the year we have packed and sent away 32 boxes, containing 3,890 species and 21,109 specimens. As evincing our ability to furnish our correspondents with species called for, I may mention that to one person we sent 900 species of terrestrial and marine shells alone, the recipient having expressly excluded fluviatile species altogether, and also species from Europe, India or Australia, so that our range of duplicates may fairly be set down as not less than 1,400 or 1,500 species.

Report on the Alcoholic Mollusca, by J. HENRY BLAKE.

During the past year not much has been done with this collection besides continuing the systematic arrangement, keeping everything in a safe condition. Although the arrangement for convenience, begun last year, is not fully completed, the collection is nevertheless in a condition easily accessible.

Many of the specimens contained in jars with cork stoppers were changed to glass-stoppered jars.

The many collections of mixed specimens which have remained in this condition for a long time, have been assorted, with a few exceptions, and the species properly labelled.

Donations for the year are :—

Mr. HENRY HEMPHILL, a collection from San Diego.

Dr. M. H. JAMES, 306 species from Honolulu.

Mr. J. BALL, 17 specimens from Texas.

Capt. P. C. JOHNSON, U. S. N., 150 specimens, California.

Dr. HENRY STANLEY PITKIN, U. S. N., 1 *octopus*, Honolulu, S. I.

Mr. CHARLES LINDEN, 6 specimens, Brazil.

ANDERSON SCHOOL, specimens from Penikese Island.

Mr. S. L. LANSBURGH, 25 specimens from La Paz, Mexico, collected by Capt. W. Clark.

Report on the Articulates, by Dr. H. A. HAGEN.

The following material has been received:—

1. From Mr. S. H. SCUDDER, *Acanthaclisis Americana*, hitherto the only specimen known to me.

2. From Mr. HENRY L. MOODY, from Malden, Mass., living Boreus.

3. From Mr. H. J. HUBBARD, a large lot of specimens for the biological collection, raised by him, and arranged in two of the Museum's boxes.

4. From Mr. B. P. MANN, 12 species of Diptera.

5. From Mr. W. P. AUSTIN, Diptera and Hymenoptera.

6. From Dr. H. A. HAGEN, insects of all orders, from Andover, Me.; from Manchester, Mass.; from West Point, N. Y.; and White Mountains.

7. From Count POURTALES, specimens for the biological collection.

8. From Mr. F. G. SANBORN, a very large lot of insects of all orders, from Kentucky.

9. From the Baron OSTEN-SACKEN, a large number of insects from the Catskills, N. Y., and Alexandria, St. Lawrence River, and from the White Mountains.

10. Duplicates of Neuroptera and Diptera, from the expedition of Prof. HAYDEN, in Colorado, Lieut. WHEELER, in Colorado, Dr. COUES, in Dakota.

The extensive biological collection bought from Prof. Rosenhauer, in Erlangen, was sent to Stettin, July 27, but is not yet arrived.

Since my last report, Mr. Schwarz arranged the Lamellicornia, Buprestidæ and Elateridæ, and the Coleoptera from Cordova, Argentine Republic, and Mr. Hubbard other parts of the Coleoptera. On the first of May both left the Museum. Baron Osten-Sacken has taken, as before, care of the Diptera, and delivered a separate report. Miss Clark worked the whole time in spreading butterflies and labelling insects.

I myself arranged the collection of European Lepidoptera, those of the United States, of the Himalaya and the general collection of the Rhopalocera, filling 26 cabinets. By the new arrangement of the exhibition rooms the insect cabinets, formerly scattered in all of the rooms, are transferred to a separate room.

The Neuroptera sent by the different United States expeditions mentioned before, are determined, and the reports delivered to the parties, to be published. Unfortunately the insects were nearly all in a condition unfit for a scientific collection.

The second part of the Lepidoptera from Texas in the collection, was published by Prof. Zeller. A large part of the Noctuidæ of the United States are identified and named by A. R. Grote, from Buffalo, N. Y., and the California Phalænidæ by Mr. A. S. Packard.

Several lots of duplicates of Lepidoptera were sent in exchange for North American species that were wanting in the collection.

Perhaps an interesting and important fact may be mentioned here. The alcoholic vials of the biological collection were a year ago all newly arranged with rubber stoppers, the cork stoppers not doing well here owing to the great changes of temperature. The whole collection is now perfectly safe. The corking of the vials was made in a peculiar way, suggested by Mr. D. F. Becker. In putting the stopper in the vial a fine insect-pin is introduced (to be removed later), allowing the air to escape, and preventing at the same time a strong compression of the alcohol. Formerly the compression of the alcohol was a principal cause for the want of safety of the filled vials.

A small test-vial, filled in this way a year ago, was kept purposely the whole year in the sunshine; the length of an air-bubble retained in the vial was measured carefully in millimetres, and shows now about the same length as a year ago. In summer the bubble was even much smaller, owing to the greater expansion of the alcohol, proving at the same time the close fitting of the stopper.

Report on the present condition of the Collection of Diptera of the Museum of Comparative Zoölogy, by C. R. OSTENSACKEN.

The collection consists of three groups: 1, North American diptera; 2, European diptera; 3, diptera which are neither European nor North American, and which I will call exotic.

I. Collection of North American Diptera.—Under North America, I understand the whole continent north of the Isthmus of Panama. The large majority of the diptera of the collection, however, are from the region north of Mexico and east of the Rocky Mountains. The Californian diptera are confined to a small number, sent by Mr. H. Edwards and Mr. W. Holden, or brought home by Mr. A. Agassiz. The Mexican diptera are represented by some forty species from my collection; the West Indian by the small collections made by P. R. Uhler in Hayti, and by Mr. Ch. Wright in Cuba, and also by specimens derived from my own collection.

The bulk of the scattered materials which I found in the Museum, consisted of a considerable number of specimens from Massachusetts, and principally from the immediate vicinity of Boston, collected by Mr. Uhler, and also contributed by other parties; collections from more distant localities were obtained from Mr. S. H. Scudder (White Mountains and British Possessions); S. I. Smith (Norway, Maine); A. S. Packard (Maine, Labrador); A. E. Verrill (Anticosti); J. A. Allen (Iowa, Illinois); J. Boll (Texas); A. Agassiz (Lake Superior). There were also some remains of the Melzheimer and Ziegler collections.

In pursuance of my intention to present my collection of diptera to the Museum, my work last winter consisted in incorporating the above-described materials with my collection; in naming, as far as possible, the unnamed specimens; in labelling and classifying the whole, and putting up a general collection in the cabinets reserved for that purpose. The collection of North American diptera thus formed is now arranged in three cabinets of eighteen drawers each. All the families are classified, with the exception of the group *Muscidæ calyptera*. The sum total of the *named species* is very

nearly one thousand (the number of undetermined species cannot be estimated with any degree of probability).

For the sake of comparison, I will state that the total number of the described species of diptera from North America, north of Mexico, is about 2,500; the number of those from Mexico, Central America and the West Indies is about 800.

It is important, at this place, to define exactly the degree of reliance which can be placed in the determinations of the collection. In this respect the thousand named species of the Museum collection can be referred to the following four classes:—

1. In the course of my correspondence with Dr. Loew, for many years, a considerable number of specimens were returned by him to me with labels in his handwriting. Most of such specimens are, therefore, if not the original types of his descriptions, at least may be called *author's types*. All labels of this description are preserved in the collection.

2. A still more considerable class of specimens are numbered duplicates, which I kept, while sending to Dr. Loew the identical species, labelled with the same numbers. After describing such species, Mr. Loew used to send me the name, with the number attached. Species thus named are almost as good as authors' types, the rare but not impossible cases excepted, where I may have been mistaken as to the identity of the specimens sent with those retained under the same number. This class of species,—there are some four hundred of them,—generally represented by a number of well-preserved specimens, are a very valuable, perhaps the most valuable, portion of the collection (especially in the difficult families of *Empidæ*, *Tachydromidæ*, etc.).

3. The original types of my own descriptions, embracing the whole family *Tipulidæ brevivalpi* and a small number of other species (about 160 types in all).

4. Species identified by me from the existing descriptions. The credit which these identifications deserve depends, of course, on the merit of the descriptions and the difficulties inherent to the identified subject.

It results from the foregoing statement that, for a considerable majority of the named species, the standard of trustworthiness of the identification is a very high one.

During my work of last winter, I was enabled to make the following additions to the collection:—Mr. Comstock, from Ithaca, N. Y., and Dr. LeBaron, State Entomologist of Illinois, sent me their collections for determination, and allowed me, in return, to retain some of the rarer species. Likewise, having prepared a report on the diptera from Colorado, collected by Lieut. Carpenter (Hayden Expedition), and on those from the Polaris Expedition, collected by Dr. Bessels, I added to the Museum collection some valuable specimens, derived from these sources. Other contributions received were from Messrs. F. G. Sanborn (a number of very valuable specimens from Massachusetts, and, latterly, from Kentucky), W. P. Austin (Massachusetts), E. Burgess (*id.*), G. R. Crotch (California and British Possessions west of the Rocky Mountains), B. P. Mann (Tabanidæ from South Carolina), C. E. Webster, Binghamton, N. Y. (metamorphosis of *Microdon trisbis* and *Trypeta solidaginis*), E. Palmer (Tabanidæ from Florida), the late Prof. J. Wyman (an apparently new Chrysops from Florida); finally, the specimens taken by me during my travels last summer, were also incorporated in the collection.

II. Collections of European Diptera.—They comprise:—

1. *Types of Genera*, named by Messrs. Loew, Schiner and Gerstaecker, the three European authorities on diptera. Dr. Loew's collection contains 355 genera, 707 species and more than 1,000 specimens. Dr. Schiner's, 180 species; Dr. Gerstaecker's, about 100 species. These types are of the utmost importance to the future work on the North American diptera, at the Museum. They are in excellent preservation.

2. The collection of European diptera acquired from Dr. Imhoff, in Bale. The collection is not large, but contains rather numerous specimens of each species, which is an advantage in the comparison of American with closely allied European forms. It is in a very good state of preservation.

3. The collection of Swedish diptera, acquired from Mr. Ljungh. It is not named, but rather rich in specimens, and quite well preserved, considering its old date.

The dipterous faunæ, of Europe and North America, are so much alike, and again, in some respects, so very different,

that the study of the latter cannot be followed without a continual comparison with the former; hence the importance of the European collection in the Museum.

III. Collection of Exotic Diptera.—This collection is as yet very small, and consists in specimens from the East Indies (Rev. M. M. Carleton), from Japan (G. J. Gulick), Brazil (Mrs. Munroe), Australia (H. Edwards).

Besides the collections already mentioned, the Museum possesses a considerable number of diptera preserved in alcohol. From want of time, I have not been able to examine them in detail. They contain, among others, valuable collections from Zanzibar, by Mr. C. Cooke, and from Cordova, in the Argentine Republic, by Mr. W. M. Davis. Unfortunately, diptera preserved in alcohol are spoiled as specimens, and may only occasionally contribute to the knowledge of the geographical distribution of the species. For the same reason,—want of time,—I have not put in order yet, the materials for a biological collection of diptera which the Museum possesses.

Report on the Crustacea, by WALTER FAXON.

When I took charge of the Crustacea of the Museum, last autumn, part of the alcoholic collection was packed in wooden trays, so as to be hardly accessible. The remainder was in kegs in the cellar, with no assortment beyond localities. The whole is now systematically arranged in the exhibition-room assigned to it, the duplicates being safely stowed in copper cans in the cellar. The large collections made during the voyage of the "Hassler" have been sorted according to species, but are kept apart from the general collection, for convenience, until the species shall be determined.

The dry collection—among which are valuable types of Dana and Le Conte—has also been overhauled and removed from its perilous place in the attic to drawers in the articulate-room.

In order to facilitate the study of the anatomy of the class, I have made and placed on exhibition a series of preparations

of the hard parts of different genera, from spider-crabs down to the horse-shoe. I was assisted in this work by Miss Cushing and Mr. Birge. I intend to add to this series dissections illustrating the internal organs. I am now working upon the fossil crustacea. A representative series will be put on exhibition, and the whole collection, it is hoped, placed in a condition of permanent safety.

Report on Selachians, Reptiles and Batrachians, by S. W. GARMAN.

Selachians.—The anatomical work laid out by Professor Agassiz occupied the earlier portion of the year. Afterward the entire collection received new alcohol, and much of it new labels. To clear the room for the use of the college, the anatomical preparations were removed to the room occupied by the fishes; about one-fourth of the sharks and skates were placed on exhibition, and the balance, changed from the barrels and kegs, were carried to the cellar. The number of specimens identified and catalogued during the year was about five hundred. This collection fills two large tanks and thirty-nine of the larger-sized copper cans, besides a great number of jars; it is in good condition.

Reptiles.—The reptiles have been sorted, catalogued, provided with fresh alcohol and placed in copper. The space allotted to the reptilia, in the exhibition-rooms, has been filled. In addition to the regular Museum catalogue, a second has been made on cards, similar to those in use in the libraries, for the identified specimens of each of the selachians, reptiles and batrachians, by means of which the geographical distribution, the genera of the family or species of the genus represented in the collection, the whole number of specimens and the position in the Museum can be readily ascertained.

Donations have been received from Col. Beddome, Rev. M. M. Carleton, Prof. Heller, Prof. Shaler, Mr. Whorf and others.

About thirty-three hundred articles were catalogued; with few exceptions, in good order.

Batrachians.—More than three thousand have been cata-

logued. It has taken much time and no little labor to attach numbers or labels to each of the majority of examples in these collections; but by so doing time will be saved, confusion avoided, and the value of the representations increased hereafter. Batrachians and reptiles together occupy forty-three of the larger cans, twenty-nine of the smaller, and a very large number of jars.

The alcohol was changed; as catalogued, the specimens were removed from the jars to the cans; by far the greater portion in excellent condition.

There is much material for exchanges.

Report on the Fishes, by RICHARD BLISS, Jr.

During the present year all the specimens in glass jars, with the exception of those needed for immediate work, have been removed from the cellar, workroom and old exhibition-rooms to the storeroom in the second story, where they have been arranged by families, as far as possible, on temporary shelves.

An examination of the specimens placed in copper cans a year ago, gives the most gratifying results, as by this method the loss of alcohol from evaporation is entirely prevented.

One of the cases in the gallery of the large exhibition-room has been filled with specimens pertaining to the systematic collection. As soon as possible, the other cases in the gallery will be occupied by the fossil, faunal and the rest of the systematic collections.

The work of identifying and cataloguing the large collection of Mauritian fishes is nearly completed. This collection now embraces upwards of two hundred and seventy-five species in alcohol, and many stuffed skins.

Dr. Klunzinger's collection, embracing one hundred and sixty species from the Red Sea, has been catalogued and prepared for exhibition.

The following additions have been made to this department during the year:—

By Donation.

PIKE, HON. NICOLAS, 50 species, 150 specimens, from the Mauritius.

CARLETON, REV. M. M., a collection from the Jumna Basin, and another from near the Thur Desert, Northern India.

PITKIN, DR. H. S., a collection from Panama.

JONES, DR. W. H., a collection from Honolulu, S. I.

WHERRY, REV. E. M., through Mr. Carleton, a collection from Loodianah, India.

BABCOCK, A. L., 9 species, 12 specimens, from British Guiana, S. A.

SANBORN, F. G., a collection from Carter County, Ky.

EDWARDS, H., 1 *Pomacentrus rectifrænum*, from Mazatlan, Mexico.

MURDOCH, J., 1 *Micropterus nigricans*, from Plymouth, Mass.

ASH, C. E., 1 *Monacanthus cuspidata*, from Newport, R. I.

GARMAN, S. W., 1 *Monacanthus cuspidata*, from Gay Head, Mass.

By Exchange.

HELLER, Prof., Innsbruck, a collection from the Adriatic Sea.

Report on Radiata, by L. F. POURTALES.

During the past year, the Corals in the exhibition-room destined to the Radiates, were arranged so as to present a systematic collection, comprising both fossil and living representatives. It has required considerable labor in selecting the specimens from the large store of duplicates, mounting them (slate tablets have been used with advantage for the purpose), revising their names or determining those which were new to the collection, and arranging them to the best advantage in the cases. At the end of the year, all but the Rugosa and Milleporidæ had been thus arranged, occupying more than three sides of the lower part of the room. Although the families having the closest affinities have been kept together as much as possible, a slight departure from the general plan has been, in some cases, unavoidable, on account of the necessity of exhibiting families of which the representatives are mostly small and delicate, in a better light than is necessary for those of large size. It is proposed to

place ultimately explanatory notices in the room as a guide to students. The duplicates have been partly sorted; a liberal portion of those too unsightly for exhibition or exchange, have been set apart for use in the department of instruction. Sets representing the principal families have been distributed to the normal schools of the State, to be used in connection with similar sets from the other departments of the Museum, in illustrating the lectures on natural history.

In this work I have been greatly assisted by Miss Hyde, who has mounted and arranged a large number of specimens, and made a card catalogue of those on exhibition.

The systematic collection of Ophiuridæ and Astrophytidæ has been mounted and placed on exhibition under the direction of Mr. Lyman, who has also prepared, for publication in the Illustrated Catalogue of the Museum, the species of these families brought home by the Hassler Expedition. This number of the catalogue will contain five plates, besides figures printed in the text.

The other alcoholic Echinoderms, with the exception of the Crinoidæ, have been placed in the gallery of the coral-room by Mr. Birge, under the direction of Prof. McCrady. The living pedunculated Crinoidæ I have prepared for exhibition. The fine specimens received from Gov. Rawson, of Barbadoes, form a marked feature of this set.

The accessions to the collection of corals have not been very large during the year; a few interesting ones were received from Mr. Arango, of Havana, and some fine specimens of Floridian forms, new or imperfectly represented in our collections, purchased from Dr. Palmer.

The collection of Alcyonarians remains still in the hands of Dr. Kölliker, of Wurtzburg, for determination.

[B.]

ARTICLES OF AGREEMENT

BETWEEN THE TRUSTEES OF THE MUSEUM OF COMPARATIVE ZOÖLOGY AND THE PRESIDENT AND FELLOWS OF HARVARD COLLEGE, AS AMENDED BY CONCURRENT VOTE OF THE TRUSTEES, JANUARY 28, 1874, AND OF THE PRESIDENT AND FELLOWS, JANUARY 30, 1874.

1. Each corporation shall retain and manage the funds now held, or which may hereafter be held by it, according to the trusts on which the same have been or may be given.

2. The property in the Museum, land, buildings, furniture and collections, present and future, shall be vested in said Trustees, in trust, to hold the same for the uses declared by these Articles of Agreement, and for such uses as may hereafter be declared, as hereinafter provided.

3. Each corporation shall retain the power to appropriate from the funds under its control such sums as it may deem expedient.

4. The duty and power of erecting buildings from funds appropriated and set apart for that purpose, and of adding to and extending the same hereafter, as funds shall be appropriated for that purpose, upon plans which shall render such buildings part of a complete and harmonious whole; and the duty of taking care of said buildings, and causing them to be kept in repair, shall devolve upon and vest in said Trustees.

5. The Committee of the Trustees on the Museum shall, by inspections from time to time, and by communications with the Faculty, assure themselves that duplicate specimens are distributed, by exchange or otherwise, among other colleges and institutions of learning, in this Commonwealth and elsewhere, so far as may be done consistently with the interests of the institution; that the Museum belonging to said Trustees shall, at all reasonable times, and under reasonable regula-

tions, be kept open to the public free of charge; and that the buildings, collections and grounds, are properly maintained.

6. The Professor of Zoölogy and Geology, in the Lawrence Scientific School of Harvard University, shall be entitled to give instruction in the Museum of Comparative Zoölogy, and shall have access to the collections for purposes of investigation, with such rights and privileges as the Faculty of the Museum may determine; and other professors or teachers, of Harvard University, may be licensed by said Faculty to give instruction at the Museum, with similar rights and privileges.

7. The Faculty of the Museum shall nominate one of its members to the Corporation of Harvard College, to be Curator of the Museum, and, if confirmed by the Corporation, such person shall become Curator; if rejected, new nominations shall be made by the Faculty to the Corporation. It shall be the duty of such Curator, under the direction and control of the Faculty of the Museum aforesaid, when funds shall have been appropriated and placed at the disposal of the said Faculty by either of the Corporations for the purpose, to make purchases of such articles as shall be necessary and suitable for the increase of said Museum in any of its departments, and to direct all necessary expenses for the transportation and other charges incident to their acquisition, and all necessary expenses for vessels and materials incident to the preservation and exhibition of such articles, and to have the entire charge and control of the classification and scientific arrangement of them.

8. Whenever it shall become necessary to employ any assistant or assistants to the Curator aforesaid, for the preparation, arrangement, classification, or scientific or educational use of the collections in the Museum, and any funds for the compensation of such assistants shall have been appropriated by either corporation, and placed at the disposal of the Faculty of the Museum for that purpose, such assistants shall be appointed and employed by the Faculty, or under their direction, in such manner as they shall prescribe.

9. It shall be the duty of the Curator, under the control and direction of the Faculty of the Museum, to fix suitable times, and also suitable places within the Museum, for persons duly authorized to give lectures and instruction therein.

10. No person officially connected with the Museum shall be permitted to make any private collection, or to trade in specimens of natural history, except for the Museum.

11. These rules and regulations, mutually agreed on and adopted by the parties, shall not be repealed or altered, except by a formal agreement between the parties, or by a concurrent vote, passed by each corporation, specifying such repeal or alteration, and entered upon the records of both said corporations.

The original articles repealed or altered by concurrent vote of the two corporations are:—

5. The Director of the Museum of Comparative Zoölogy, an officer appointed or to be appointed by said Trustees, shall make arrangements, under the supervision of the Faculty aforesaid, for the reception of visitors either upon special or general invitation, and of the public at large, at suitable times and under suitable regulations, to visit and examine the Museum; and such arrangements shall be made with a view to secure to the public the freest enjoyment of and access to the Museum consistent with its use for scientific and educational purposes.

6. The Lawrence Professor of Zoölogy in the Scientific School of Harvard University, or the officer charged with the instruction in that department of science for the time being, shall be the Curator and scientific head of the Museum, subject to the control and regulation of the Faculty of the Museum herein before mentioned, in whom the power to determine the use of the Museum for scientific and educational purposes, either by general regulations or by specific orders, is ultimately vested; and the compensation paid to such Curator as Professor in the Lawrence Scientific School shall be regarded as full compensation for instructions given and services rendered in the Museum, until further provision is made therefor.

7. It shall be the duty of such Curator, under the like direction and control of the Faculty of the Museum aforesaid, when funds shall have been appropriated and placed at the disposal of the said Faculty by either of the corporations for the purpose, to make purchases of such articles as shall be necessary and suitable for the increase of said Museum in any of its departments, and to direct all necessary expenses for the transportation and other charges incident to their acquisition, and all necessary expenses for vessels and materials incident to the preservation and exhibition of such

articles, and to have the entire charge and control of the classification and scientific arrangement of them.

9. It shall be the duty of the Curator, under the direction and control of the Faculty of the Museum, to fix suitable times, and also suitable places within the Museum, to give lectures and instruction to regular classes of students under his care, to classes of teachers of the public schools, and to classes of pupils in the Normal Schools in the Commonwealth, and to such special classes of students and persons desirous of availing themselves of his instructions and of the advantages of the Museum, as he may receive or invite for those purposes.

11. Whenever the office of Director of the Museum established by the Trustees, and that of Curator of the Museum as herein before defined, shall be held by different persons, the Faculty of the Museum shall, subject to these articles and such other articles as may be adopted by both corporations as hereinafter provided, define the relative duties of the incumbents, and superintend their execution.

[C .]

TRUSTEES OF THE MUSEUM OF COMPARATIVE ZOÖLOGY,
1875.

THE GOVERNOR OF THE COMMONWEALTH,	WILLIAM GASTON.
THE LIEUTENANT-GOVERNOR,	HORATIO G. KNIGHT.
THE PRESIDENT OF THE SENATE,	GEORGE B. LORING.
THE SPEAKER OF THE HOUSE,	JOHN E. SANFORD.
THE SECRETARY OF THE BOARD OF EDUCATION,	JOSEPH WHITE.
THE CHIEF JUSTICE OF THE SUPREME JUDICIAL COURT,	HORACE GRAY.

THEODORE LYMAN.	ALEXANDER AGASSIZ.
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NATHANIEL THAYER.	QUINCY A. SHAW.
MARTIN BRIMMER.	LOUIS F. POURTALES.

OFFICERS OF THE MUSEUM OF COMPARATIVE ZOÖLOGY,
1875.

HIS EXCELLENCY WILLIAM GASTON, Governor of the Commonwealth, *President*.
 THEODORE LYMAN, *Treasurer*.
 MARTIN BRIMMER, *Secretary*.
 JOSEPH WHITE, NATHANIEL THAYER, *Committee on Finance*.
 ALEXANDER AGASSIZ, THEODORE LYMAN, QUINCY A. SHAW, LOUIS F. POURTALES, *Committee on the Museum*.

ANNUAL REPORT

OF THE

TRUSTEES

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY,

AT HARVARD COLLEGE, IN CAMBRIDGE:

TOGETHER WITH THE

REPORT OF THE CURATOR

TO THE COMMITTEE ON THE MUSEUM,

FOR

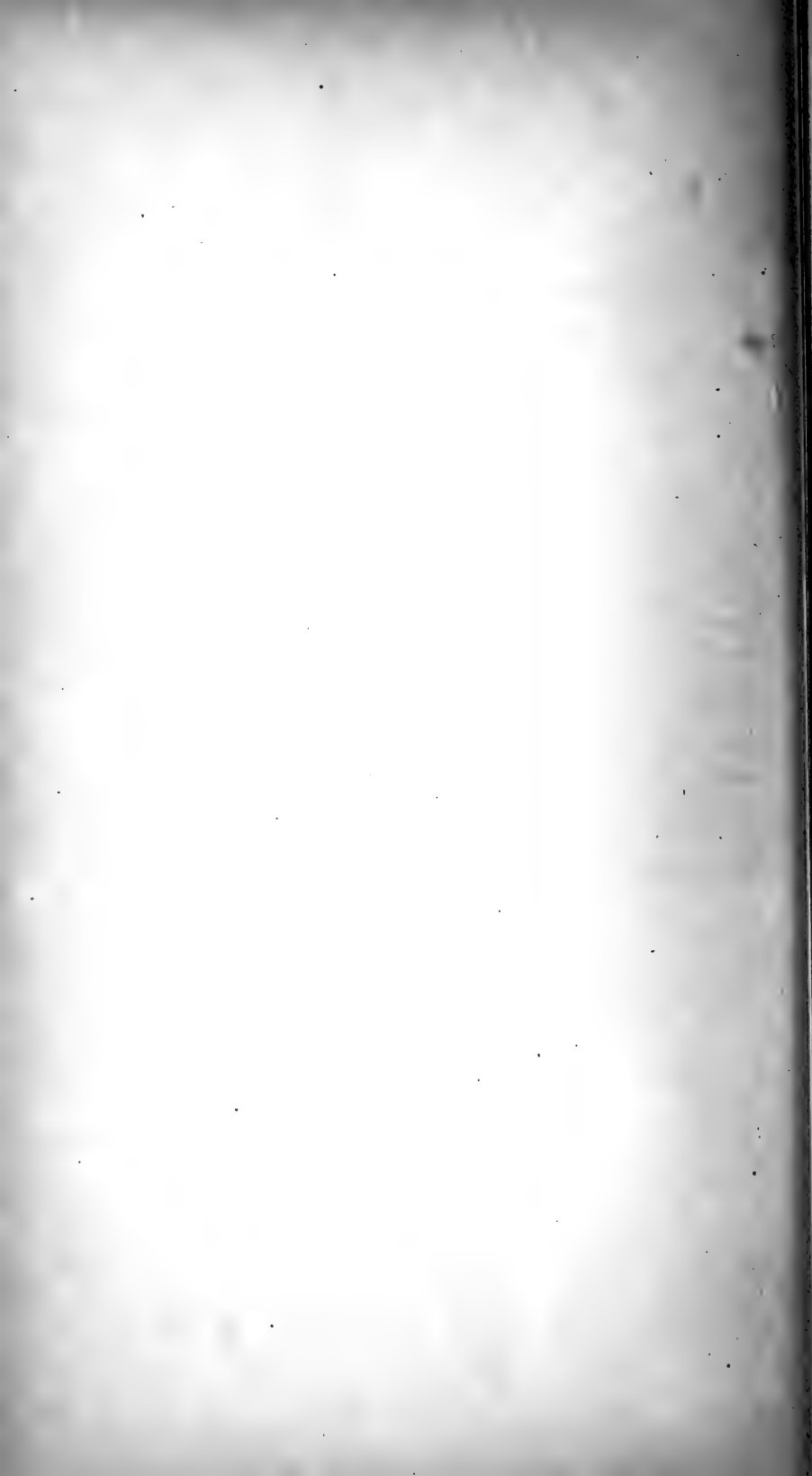
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BOSTON:

WRIGHT & POTTER, STATE PRINTERS,

79 MILK STREET (CORNER OF FEDERAL).

1876.



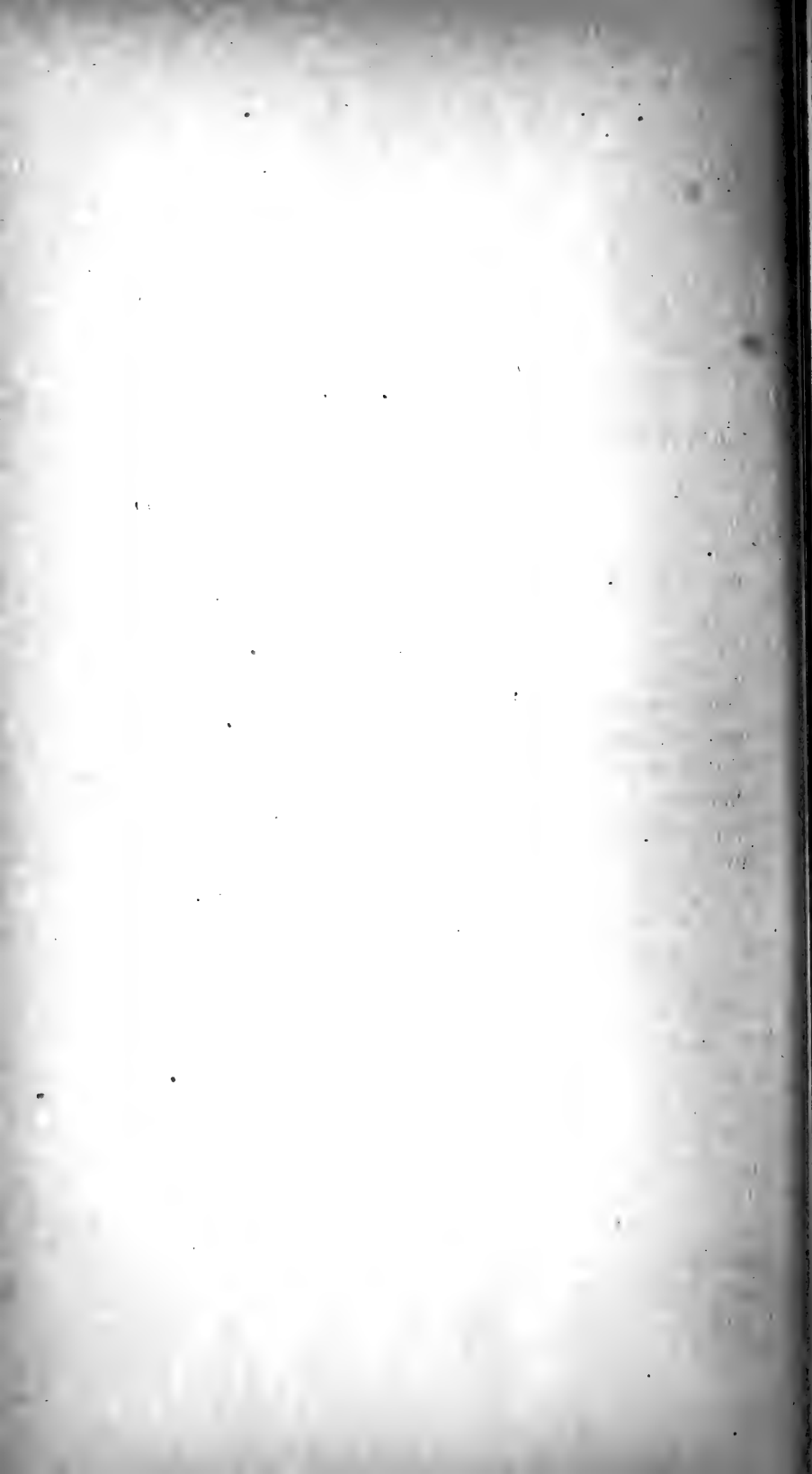
Commonwealth of Massachusetts.

BOSTON, January 26, 1876.

To the Honorable GEO. B. LORING, *President of the Senate.*

SIR :—The Trustees of the Museum of Comparative Zoölogy, have the honor to present to the Legislature the Report of the Cúrator to the committee on the Museum, marked [A]. The appendix thereto, marked [B], contains letters accompanying donations from Dr. John L. Leconte, Dr. T. M. Brewer, Mr. Temple Prime, and sundry votes of the corporation of Harvard College. The paper marked [C] contains the report of the committee of the Agassiz Memorial Fund. The papers [D] and [E] contain a list of the Faculty of the Museum and assistants appointed by them, and of the present trustees. The paper marked [F] contains the plans of the proposed addition to the Museum, as well as a general sketch drawn up from the instructions left by the late Professor Agassiz.

ABBOTT LAWRENCE, *Secretary.*



[A.]

REPORT OF THE CURATOR

TO THE

MUSEUM COMMITTEE.

The general work of the Museum assistants has, as usual, consisted mainly in preparing our material for exhibition and packing our duplicate collections for exchange. A number of collections have been sent to the schools of the State; these will be supplemented from our duplicates as rapidly as possible. For the last two years the reduced staff of assistants has compelled us to limit our collections to such additions as a blank in our exhibition-cases, or the need of fresh material for instruction made necessary, the working force at our disposal being fully occupied in distributing the perishable material not needed for our own use or for special study hereafter. The great difficulty of preserving alcoholic collections, the unpleasant nature and enormous expense of the work, make it imperative, not only for storage, but still more for exhibition purposes, that they should be restricted to a minimum, and limited, as far as possible, to those classes where no other mode of preservation is practicable. The constantly increasing facilities of travel, the comparative economy with which fresh specimens can be studied, the superiority of such work (with proper appliances) to that of the Museum, the daily increasing number of workers who are able, on the sea-shore or in the field, to produce results unat-

tainable by museum study alone, shows that the time has come when large collections must naturally be supplemented by zoölogical stations. These, when once established at properly selected localities, will enable museums to dispense with much that is now exceedingly costly. They will become, for certain departments at least, chiefly depositories where the record of work done at the stations—the archives of natural science, so to speak—will be preserved; so that, while their usefulness for the general instruction of the public and of our higher institutions will not be diminished, they must hereafter be useful to the original investigator in a somewhat more limited field.

The principal additions during the year consist of the collections deposited by Harvard College and of those made by myself, with the assistance of Mr. Garman, on the west coast of South America, from Valparaiso to Lima, and along the line of the railroad leading from the coast to Lake Titicaca. We thus brought together a fair representation of the fauna of the high plateau in which Lake Titicaca is situated. A preliminary account of the materials collected is now publishing in the "Museum Bulletin." The fishes and reptiles will be described by Mr. Garman, the fossils by Prof. O. A. Derby, the crustacea by Mr. Faxon, the birds and mammals by Mr. Allen, and I hope myself to be able to give a short account of the physical geography and geology of the district. Thanks to the generosity of the Pacific Mail Steamship Company in passing our baggage free, we took to Peru a large outfit in the way of ropes, dredges, sounding-leads, thermometers for deep-water temperatures, kindly lent us by Capt. Patterson, the superintendent of the Coast Survey, and all the necessary materials for preserving large collections. Though we were greatly disappointed in the variety of animal life found in the lake and the surrounding shore, we took some very interesting deep-water temperatures (to a depth of 154 fathoms), and completed a preliminary hydrographic sketch of Lake Titicaca, which has furnished valuable results, and done much to explain the poverty of its animal life. But while thus disappointed in our original aims, we made extensive archæological collections, which have been given to the Peabody Museum.

This exploration of Lake Titicaca would hardly have been

possible without the hearty aid of Col. E. A. Flint, the superintendent of the Mollendo and Puno Railroad; to his friendly interest we owe the success we have had. To the Messrs. Meiggs of Lima, also, I must return the thanks of the Museum for the generosity with which our bulky materials were transported free of charges from the lake to the coast, over three hundred miles of railroad, crossing a region accessible till within a few years only by llamas or pack-mules, the difficulties of which only a traveller in the rainless belt of South America can appreciate. Mr. Garman sailed round the lake in a small schooner (the only sail-boat on the lake), hired for the purpose, receiving from the prefects of the various departments, both in Peru and Bolivia, all possible aid in furtherance of his objects. Thanks to letters from the Secretary of State (Mr. Fish) to Mr. Thomas, our minister at Lima, President Pardo was kind enough to give us, through the Secretary of Home Affairs, circular letters to all the custom-houses of the coast, passing our boxes in and out of the country without delay or examination. Special instructions were also given by the President to Mr. San Roman, Prefect of Puno, to whose interest we owe the opportunity of crossing the lake several times, and circumnavigating it on the small government steamers plying thereon. The officers of the "Yavari" and "Yapura" did all in their power to facilitate my work, and it is mainly owing to them that I succeeded in making a great number of soundings, and visiting all the places of interest on the islands of the lake and its shores. During my stay on board, the steamers were placed at my disposal in every sense of the word; and I cannot close my list of acknowledgments without mentioning more specially Capt. Guerrero, of the "Yavari," who was indefatigable in our behalf.

The volunteer work of the Museum has, as usual, been carried on by Messrs. L. F. de Pourtalès, Theodore Lyman, T. G. Cary, and Baron Osten-Sacken.

The care of the business has been undertaken, as in former years, by Mr. Cary, while the direction of the Museum assistants has fallen upon Mr. Pourtalès for the greater part of the year, owing to my protracted absence.

Baron Osten-Sacken has continued to take charge of our collection of Diptera. I regret, however, to state, that, for the present, at least, his absence from Cambridge will deprive the entomological department of his services.

To Messrs. Nathaniel Thayer, Geo. B. Emerson, and Theodore Lyman, the Museum is indebted for means to carry on specific parts of the current work,

The publications of the past year have been limited to a paper on Ophiuridæ (No. 10, Vol. III. of the Bulletin), published by Mr. Lyman for the Museum.

The Museum collections have, however, formed the basis of several papers by Dr. Steindachner, issued in the Proceedings of the Vienna Academy. They were mainly devoted to the fresh-water fishes of Southern Brazil, the Characines and Chromids of the Amazons, and a shorter paper on some of the species of Doras.

A large series of the duplicates of the Thayer and Hassler expeditions were sent to the Vienna Museum to enable Dr. Steindachner to describe the principal novelties of these collections.

The collections (referred to above) forming a part of the late Prof. Wyman's Anatomical Museum in Boylston Hall, have been deposited in the Museum by the corporation of the College. It is particularly rich in isolated mastodon bones; it has also a fine series of skulls in different stages, and forms, with the nearly perfect skeleton of a mastodon, found at Hacket's Farm, Warren County, N. Y., an invaluable addition to our palæontological series.

The great pains always taken to secure the authenticity of original specimens in our collections, as well as the care in preserving intact our more perishable material, are beginning to be appreciated by specialists. During the past year we have received the promise of three separate collections, all of which have been accumulated during long-continued and successful scientific work. It is with great pleasure I am able to announce the donation, by Dr. John L. Leconte, of Philadelphia, of his collection of Coleoptera, under conditions of a most generous nature, showing a flattering appreciation of the aims of our institution. Dr. Leconte's collection must always form the basis of any extensive original study of

North American Coleoptera, and is the most valuable historical collection of the order in this country. The collection of North American birds' eggs, by Dr. T. M. Brewer, is second only to that of the Smithsonian; and from the high authority of Dr. Brewer in ornithology, the gift of his collection places us at once in a most enviable position in that department. Mr. Temple Prime has given us the types of his collection of Corbiculidæ, a family of Mollusks, to which he has mainly devoted himself. The letters of these gentlemen, accompanying their donations, are printed in the Appendix.

For the regular instruction given at the Museum, I would refer to the reports of Profs. Shaler and McCrady. In addition to this, Dr. Hagen has given a course of familiar lectures on entomology, which has been attended by seven students. He has also superintended the work of one special student in his laboratory. Prof. Hamlin has been detailed this term to take charge of the undergraduate instruction in structural geology and physical geography, formerly given by Assistant Professor Pettee. This has somewhat lessened the amount of his Museum work, but the Curator has cheerfully consented to this diminution in view of his increasing usefulness in another direction. I would call attention to the great advantages given to the Museum students from their opportunity to attend the Summer School of Geology at Cumberland Gap, inaugurated by Prof. Shaler in connection with the field work of the geological survey of Kentucky. Owing to the unfortunate closing of the Anderson School at Penikese, similar privileges could not be enjoyed by the special students of zoölogy. The field work and special investigations done by them in the summer was mainly left to their own resources, with the exception of two special students whom I was able to invite to work in my private laboratory at Newport. The necessary rooms and material have been placed at the disposal of Dr. James to enable him to give the college instruction of physiology and comparative anatomy to the undergraduates at the Museum. He has under his charge the present term about forty students, who are taught by lectures and laboratory work. Prof. Whitney has begun to collect, in the limited space

we have been able to place at his disposal, the materials for the proper illustration of the geological department. He also delivers a general course on geology at the Museum, attended by students. In connection with the instruction given at the Museum, I may mention that a considerable number of diagrams have been prepared for the use of the zoölogical department by Mr. Blake, and that during the coming term he will be mainly occupied in drawing for the geological department. The largely increasing classes in natural history have made us painfully aware of our deficiencies in the common apparatus necessary for instruction, which can for the present only be supplied by additional work on the part of the professors. This condition of things will be remedied as fast as practicable. The want of aquaria, as well as of proper space to keep live stock for the use of the students and professors, is felt daily. Unfortunately, we can scarcely hope to remedy this defect until the proposed additions to the building are completed. We shall then have suitable rooms, not only for the aquaria, in which to keep an abundant supply of the more common marine animals, but also the space to keep at hand animals needed for embryological as well as anatomical and physiological instruction.

During the present year the experiment, already carried on for one year, of gradually concentrating all the instruction in natural history at the Museum, has been enlarged most successfully. The combination of Museum work by the assistants with more or less instruction to beginners and advanced students, cannot fail to benefit the Museum, by making known the scope of its usefulness. Nor does it seem advisable that the instruction in natural history, and the care of the collections in the same department, should be intrusted to different sets of workers. The Museum, when once fairly established, can hardly be expected to provide entirely for all its assistants, while the practical knowledge to be gained from the care of a special department is a necessary requisite for a successful teacher.

It is therefore with great satisfaction that I am able to report the assent of the corporation to the connection of the instruction in several departments of natural history at the University with the Museum; this will hasten the accom-

ishment of plans which, even at a comparatively recent period, seemed far removed to the founder of the Museum.

The late Mr. Samuel Hooper gave his consent to the mechanical connection of the Sturgis-Hooper Professorship of Geology with the Museum, and, with the sanction of the corporation, the geological department of the Museum will hereafter be under the general superintendence of that professor. The addition of the physiological and anatomical departments necessarily adds much which could scarcely have been expected to receive proper attention in a zoölogical museum, even when understood in its widest sense. A large part of the material required for the instructions given in these departments is identical. The same is the case for the series needed for the exhibition-rooms, and by this close connection the materials needed for comparisons from one department to the other will always be readily accessible. A degree of concentration and efficiency can thus be secured by the cordial coöperation of the different heads, hardly to be expected from separate institutions, even when part of the same university, in which the instruction and exhibition do not come so directly under the notice of the various officers, and their general care is made a part of the duties of the Curator of the Museum.

The advantages of a common library, and all the minor details of supervision, are too evident to need comment.

The proceeds of the Humboldt Fund have been used in assisting several students to continue their work at the Museum and elsewhere.

The details of the different departments are given in the reports of the assistants in charge.

By the success of the Agassiz Memorial Fund,* the Trustees and Faculty will be enabled, as soon as the contemplated additions to the buildings are erected, to carry out the principal ideas of Prof. Agassiz for the arrangement of a Museum.

The foundation will then be laid of an institution in which the claims of college students, of teachers, of special students, of advanced workers, and of original investigators will be considered, as far as the means and space of the establish-

* For the details of the Memorial Fund see Appendix.

ment will allow. The public will find in the exhibition-rooms all that is likely to be of interest from the stores of the institution, labelled and arranged so as to be not only instructive, but suggestive. Of course time alone will enable us to fill out and complete this plan. We shall be compelled at first to make a very unequal exhibition; but as the blanks become apparent they will be filled. From our stores the necessary materials for the constantly increasing number of students are to be supplied, and one of the chief duties of the Curator must always be to meet the reasonable demands of those charged with the instruction, by supplying them with ample materials suited to the wants of the different classes engaged in study at the Museum. The special students will have at their command, under proper regulations, in the store and work-rooms of the assistants, the materials of the department in which they are interested. To the original investigator the resources of the Museum will always be available, under generous restrictions, with facilities for the publication of investigations made with Museum materials, as far as the means of the institution will allow. On the completion of the additions proposed at present, the Museum will thus consist of several departments of natural history, formerly separated in the University, and now all more or less intimately connected.

The number of exhibition-rooms will undoubtedly seem small, compared with the total amount of space, to those who are accustomed to wander through room after room of such museums as the British Museum, the Jardin des Plantes; and still smaller, when compared with the new museums contemplated in London, Vienna, and Berlin. This brings us to the fundamental difference existing between the two systems possible in museums: one of which is to place before the public everything in a single series; the other to make such a selection from the general collection, and also such other combinations and special expositions, that, while the Museum retains in its stores the archives of the science, the exhibition may place before the public an exposition of the problems of natural science in a condensed and easily intelligible form.

In the rooms reserved for special departments, the bulk of

our collections must be retained, and we can only hope to make them accessible under the most liberal regulations consistent with the safety of the collections. In these rooms the furniture will of course be of the most economical character, adapted to a proper preservation of the collections, and to their ready access. By prompt distribution of the materials received, everything should be at once taken to its place, and the confusion as well as difficulty of keeping track of materials separated by imaginary lines in large rooms entirely obviated.

The great defect of museums in general is the immense number of articles exhibited, compared with the small space taken to explain what is shown. The visitor stands before a case which may be exquisitely arranged, most carefully labelled, yet he does not know, and has no means of finding out, why that case is filled as it is; nothing tells him the purpose for which it is there. The need of general labels, and a small number of specimens properly selected to illustrate the labels, would go far towards making a museum intelligible, not only to the average visitor, but often to the professional naturalist. The instruction which could thus be given without a special guide is certainly very great, and a visit to a museum thus arranged becomes of value, and cannot fail to leave some impression. The advantage, therefore, of comparatively small rooms intended for a special purpose, and for that purpose alone, will overcome at once the objections to be made to large halls where the visitor is lost in the maze of the cases, which, to him, seem placed without purpose, and filled only for the sake of not leaving them empty. Of course, as will be seen from the plans of the Museum, a few large rooms are absolutely necessary for the proper display of the few colossal mammals which must find their way into every museum. The purpose to which a room is devoted should not be known to the officers of the Museum alone; the room itself is to be as distinctly labelled as a single specimen. There must, then, again be general subdivisions of cases, properly labelled, and of certain categories in the cases, until we come to the single tablet. Such an arrangement is of course laborious, requires constant attention and alterations to represent the existing and past condi-

tions of our knowledge ; but no museum where this is carried out can become fossilized and lose its usefulness from being buried in the arrangement made years before. There is always in every room blank wall-space enough not available for the exhibition of specimens, where such general information can be permanently placed,—where enlarged figures of animals, which can be exhibited in no other way, can be painted, and thus add to the general attractiveness of the Museum. The conditions upon which the bulk of the Memorial Fund was obtained limit its use for several years. It is hoped, however, that, even after the proposed addition to the Museum is completed, the endowment will still be large enough to carry on the operations of the Museum with something like their former activity. It has not been thought unwise to sacrifice a temporary brilliant existence to a permanent future ; and it must be remembered by the friends of the University, who have so often and so generously assisted us, that however large the funds at our disposal as compared to those of other scientific departments of the College, our resources are nevertheless meagre, contrasted with those of similar institutions abroad. I may mention here, that, to place the Museum on a level with corresponding establishments, each of its several departments should have an income equal to that provided for the whole institution by its present endowment. Until that is accomplished, we cannot hope to compete with, much less to rival, the scientific activity of kindred institutions in France, England, and Germany.

ALEXANDER AGASSIZ.

REPORT ON THE MAMMALS AND BIRDS.

By J. A. ALLEN, Assistant in Ornithology.

There are few changes to report in respect to the collections of mammals and birds. The additions received during the year have been duly registered and labelled, and the collections, both alcoholic and dry, continue in safe condition. During the year, the large Big-bone Lick collection of fossils (chiefly bison remains), collected some years ago by Prof. N. S. Shaler, has been assorted, marked, and catalogued. The same has been done for the greater portion of the other mammalian remains.

The additions during the year consist mainly of the collections made by Mr. S. W. Garman, about Lake Titicaca, in Peru, embracing about one hundred species of birds and several species of mammals, including skins and skeletons of the different races of *Auchenia* found in Peru. In addition to these is a valuable collection of monkeys, collected by Mr. Garman in Central America. These collections have all been presented to the Museum by Mr. Agassiz, under whose direction they were formed. The only other collections of note are an invoice of some thirty species of birds and mammals from India, presented by the Rev. M. M. Carleton, and an invoice of about twenty-five species from Queensland, Australia, received in exchange from Mr. Charles Coxen. Other small lots have been received from Dr. T. M. Brewer, who has given us a large series of eggs of birds, and from Messrs. Walter Davis and J. A. Allen.

REPORT ON SELACHIANS, BATRACHIANS, AND REPTILES.

By S. W. GARMAN.

Owing to the large amount of field work, since the last report, less than half the year has been devoted to the usual Museum work on the collections. The card catalogue, introduced as an experiment in these departments, succeeds admirably; its convenience, and the amount of time and labor saved by its use, are found to be considerable.

Selachians.—During the year, an excellent lot of specimens, from the North Sea, was added to this collection. Mr. F. A. Bell presented a fine example of the panther shark, from Natal. A series of the Rajæ was sent to the Smithsonian Institution, and a number of specimens of different genera and families have been given out to students. The duplicates are being prepared for distribution amongst the correspondents of the Museum.

Batrachians and Reptiles.—The institution is indebted to Col. Edward A. Flint of Peru, Allen Lesley, Esq., of Central America, Rev. M. M. Carleton of India, Prof. N. S. Shaler of Cambridge, Mrs. George E. Ryder of Cambridgeport, and Prof. W. M. Osband of Michigan, for valuable additions to these collections.

The explorations of Mr. Alex. Agassiz, in South America, 1874-75, secured many examples of species of which we had no representatives. By exchanges with the Boston Society of Natural History, animals new to the department are obtained. A collection was forwarded to Prof. Osband. Various specimens have been drawn by the college instructors for the students. A number of large reptiles, only fit for skeletons, have been withdrawn from the alcoholic collection.

The additions to the catalogue of identifications, include many Selachians and Reptiles, all of the European Batrachians, and those of North America.

It is with pleasure these collections are reported in good condition.

REPORT ON THE FISHES.

By RICHARD BLISS, Jr.

During the past year there have been no additions in this department, excepting a very valuable collection of fishes from Lake Titicaca, made by Mr. A. Agassiz and Mr. S. W. Garman. The collection has been identified by Mr. Garman. The fish skeletons, now stored in the attic, have been re-arranged according to families, and the work of cataloguing them has been begun. Mounted skeletons and stuffed specimens have been placed in four of the gallery cases of the large exhibition-room, the former having been selected and arranged with a view of affording students the best facilities for studying them as they stand in the cases. A small collection of typical specimens has been prepared for the use of Dr. W. James, in his lectures and instruction to the undergraduates.

Aside from a general supervision of the large collection, the work of identifying and cataloguing the specimens has been steadily carried on. The Thayer, Hassler, Garrett, and Pike collections, four of the largest in this department, are now identified, and the process of selecting duplicates for distribution and exchange has been begun. This work is rendered all the more necessary as the collection is too bulky to be properly cared for, and the loss of alcohol by evaporation from so many jars very great.

REPORT ON INSECTS.

By DR. H. A. HAGEN, Assistant in Entomology.

Additions to the collection : from—

1. Mr. J. H. HUBBARD, from Detroit, Mich. A large lot of specimens for the biological collection, and Odonata.
2. Mr. E. SCHWARZ, from Detroit, Mich. Lepidoptera.
3. Mr. W. P. AUSTIN. Specimens for the biological collection : Diptera ; Perlidæ from the White Mountains, N. H.
4. Mr. W. M. DAVIS, from Philadelphia, Penn. Biological specimens.
5. Rev. M. M. CARLETON, East India. A large collection of Lepidoptera from the Himalaya ; other insects in alcohol ; Water-Beetles and Hemiptera from Tanasur.
6. Mr. F. C. BOWDITCH, from Brookline, Mass. Neuroptera.
7. Mr. H. K. MORRISON. Lepidoptera and biological specimens ; Neuroptera from the White Mountains, N. H. (Exchange.)
8. Mr. H. K. MORRISON. Diptera and Neuroptera from Glen and Hermit's Lake, White Mountains, N. H. (Purchased.)
9. Mr. H. L. MOODY, from Malden, Mass. Parasites of *Diapheromera femorata*, and other biological specimens.
10. Mr. W. SAUNDERS, from London, Ontario, Canada. Lepidoptera, Diptera, Neuroptera.
11. Mr. H. STRECKER, from Reading, Penn. A large lot of Lepidoptera,—American and foreign. (Exchange.)
12. Mr. THOMAS BLAND, from New York. Zanzibar Copal, with insects.
13. Mr. A. AGASSIZ and Mr. S. W. GARMAN. Insects from Peru, Chili, and Ecuador,—dry and in alcohol.

14. Dr. R. W. HOOPER. Cocoon of Silkworms from Georgia.
15. Mr. FERNALD, from Orono, Me. Insects of several orders.
16. Mr. W. PUTNAM, from Davenport, Iowa. Neuroptera.
17. Mrs. M. de CHAUVIN, from Freiburg, Baden. Phryganidæ from Silesia.
18. Mr. L. LESQUEREUX, from Columbus, Ohio. Biological specimens of the potato-beetles.
19. Mr. LESLEY, from San Pablo. Insects in alcohol.
20. Mr. H. J. HUBBARD, from Detroit, Mich. A full set of the different stages of the white ant, including the queen.
21. Mr. R. THAXTER. Lepidoptera and Neuroptera from Florida and Nova Scotia.
22. Rev. THOMAS HILL, from Portland, Me. Coleoptera.
23. Baron V. OSTEN-SACKEN. Insects of different orders from New Jersey and the St. Lawrence River.
24. Mr. L. TH. HARVEY, from Buffalo, N. Y. Types of Noctuidæ published by him.
25. Mr. A. R. GROTE, from Buffalo, N. Y. Types of Noctuidæ published by him. (Exchange.)
26. Mr. C. E. WEBSTER, Binghamton, N. Y. Lepidoptera.
27. Dr. KIDDER, N. Y. Diptera and Psocus from Kerguelen Island.
28. Mr. S. H. SCUDDER. Biological specimens.
29. Prof. N. S. SHALER. Geological Survey of Kentucky; insects in alcohol.
30. Mr. Ph. R. UHLER. Neuroptera from Colorado, from Prof. Hayden's Expedition.
31. Dr. C. A. DOHRN, Zettin, Germany. A very large lot of Coleoptera. (Exchange.)
32. Prof. ROSENHAUER, Erlangen, Bavaria. A very large biological collection,—1,800 of all orders,—dry and in alcohol. (Gray Fund.)
33. Dr. H. A. HAGEN. Insects of several orders.

The additions to the collection have been unusually large and valuable. The biological collection from Prof. Rosenhauer, containing 1,800 species from all orders, arrived in

perfect condition. Together with the biological collections of the Museum, this branch of the collection is a very prominent one, and, so far as I know, unsurpassed,—I can say, unrivalled. With the help of Mr. Trowbridge, all alcoholic objects are arranged in vials, with rubber stoppers. The large addition by the collection of Prof. Rosenhauer, and the considerable addition of the last year, necessitates a new arrangement of the biological collection. The *Bombycidae*, *Noctuidae* and *Geometridae*, are arranged by myself, and fill more than two cabinets.

In January, Mr. E. Schwarz arranged some families of the United States *Coleoptera*.

The alarming and rather perplexing condition in which the collection of the *Longicorns* had been left by Mr. Crotch made a new arrangement of them unavoidable. It took nearly three months to arrange them. The collection of *Longicorns* of the United States was arranged at the same time. Instead of 3,500 specimens bought from Deyrolle, there are at present—including all that the Museum possessed before—only 1,850 determined, and about 600 species not named.

During the winter months a large number of *Himalaya Lepidoptera* have been spread by Miss Clark. At the present time she is pinning and labelling the alcoholic *Coleoptera*. The exchanges with a number of entomologists in the United States and Europe were quite considerable.

A synopsis of the *Odonata* of America was published in the Proceedings of the Boston Society of Natural History. A course of lectures on general entomology is given in the winter months.

The summer of 1875 has been a very favorable one for insects. It was one of those years which appear from time to time, often separated by intervals of many years, when a large number of rare species are taken. In the course of this summer the collection has been augmented by more rarities of North American insects than in several years put together.

In the exhibition-rooms the cabinets for the insects are nearly filled.

REPORT ON THE DIPTERA.

By R. OSTEN-SACKEN.

The principal work which occupied me during the past year was the working up of the *Tabanidæ* of the collection. The result of this work appeared in the Memoirs of the Boston Society of the Natural Sciences; as, *Prodrome of a Monograph of the Tabanidæ of the United States: Part I.* The second part is in type. All the typical specimens of this monograph are in the collection of the Museum. In a similar manner, a smaller monographic essay on the American species of the genus *Syrphus*, was prepared in putting in order the specimens of the collection. The additions to the collection were but few.

1. Dr. Kidder, who accompanied one of the United States Astronomical Expeditions in 1874, brought three remarkable species of wingless, or almost wingless, *Diptera* from Kerguelen's Island.

2. Mr. Bélanger, Curator of the Museum in Quebec, sent a considerable collection, consisting of numbered duplicates, for determination; they all remained for the Museum.

3. Mr. E. Palmer sent a small but interesting collection from the Island of Guadeloupe and the Pacific Ocean. (Inserted a notice about them in the Proceedings of the Boston Society of Natural History in October.)

4. A collection from the environs of Detroit, Mich., was presented by Mr. Hubbard.

5. Some interesting *Diptera* from the environs of Boston were given by Mr. Bowditch; from the White Mountains by Mr. George Dimmock.

6. I acquired a number of *Diptera*, collected by Mr. H. K. Morrison in the White Mountains, some of them new to the Museum; some useful duplicates.

Besides Mr. Bélanger's collection, I named several smaller collections, sent to me for that purpose.

REPORT ON THE CRUSTACEA.

By WALTER FAXON, Assistant in the Zoölogical Laboratory.

The early part of the year was employed in determining and arranging the fossil *Crustacea*. A set, including the principal genera represented in the collection, has been mounted on tablets, and is now exhibited to the public. This collection is especially rich in species from Solenhofen and in North American and Bohemian *Trilobites*.

The work of identifying the recent species has been begun and carried through the *Oxyryncha*. A collection of one hundred and thirty-seven species has lately been returned from the Jardin des Plantes. The *Maioids* from the dredgings of Stimpson and the "Hassler," sent to Paris in the spring of 1874, have also been returned. Among these are types of seven new genera and twelve new species, described by M. Alphonse Milne-Edwards.

The most valuable additions to the department during the year are the interesting forms dredged in Lake Titicaca by Mr. Agassiz, in Lake Superior by the United States Lake Survey, and the collection of Bohemian *Trilobites* from Barrande.

New material has been derived from the following sources :—

- AGASSIZ, A. Eight *Palaemon Gaudichaudii* from Arequipa, Peru ; Amphipoda and Cyprids dredged in Lake Titicaca ; mixed lot from the Isles of Pearls, Panama Bay.
- BARRANDE, J. One hundred and ninety species, 3,492 specimens of *Trilobites* from Bohemia. (From the Gray Fund.)
- BOLL, J. Five species, 27 specimens from Dallas, Texas.
- CARLETON, Rev. M. M. *Estheriæ* from Kooloo Valley, N. India.
- COMSTOCK, Gen. C. B. Five species from Lake Superior. (U. S. Lake Survey.)
- GABB, W. M. Nine fossil *Crustacea* from San Domingo.

KENTUCKY GEOLOGICAL SURVEY (through Prof. N. S. SHALER).
Astacidæ and Isopoda from Cumberland Gap.

SLADDEN, W. P. Fourteen fossil Merostomata from Upper Ludlow
Beds of Lesmahagow, Lanarkshire. (By exchange.)

SMITH, Prof. S. I. Eight species fresh-water Crustacea.

WALKER, J. A *blue* Homarus Americanus.

YARROW, Dr. H. C. Eleven Apus æqualis, 10 Estheria, from New
Mexico. (U. S. Exploring Expedition, west of 100th merid.)

REPORT ON THE DEPARTMENT OF CONCHOLOGY.

By JOHN G. ANTHONY, Assistant in Conchology.

In my last report, I mentioned that the Pease collection of shells, purchased some time previously, was then under a process of identification and incorporation with our previous collection. The plan pursued required a complete revision and reidentification of all the species then on hand, and was necessarily a slow and laborious undertaking. It was, however, thought advisable to make the work so critical and thorough that it would not be necessary to recur to it again for a long period.

The same plan has been pursued during the entire year now drawing to a close, and a very considerable progress has been made. I can now state definitely that upwards of eleven thousand species have been carefully examined, named, and roughly catalogued, preparatory to being copied into the Record Book which has been so long waiting for this purpose.

So far as we have proceeded up to this time, we have dealt with univalve shells alone, reserving our bivalves for next year's study. In this examination and identification I have had the assistance of Prof. Hamlin, all the marine gasteropods having passed under his revision, while my own labors have been mainly directed to the careful examination and revision of the fluviatile and terrestrial forms.

As fast as identified, the species have been mounted on glass or slate tablets by my daughter, whose skill in that line leaves nothing to wish for, and have then been arranged in genera and sub-genera, after the most approved plan known to me. The space allotted for shells will not admit of all being placed on exhibition; but so far as practicable, they have been made available for the purpose of study by those devoted to this branch of natural history, and by the public generally.

The plan adopted of placing our more delicate specimens in glass tubes before being mounted on tablets, has proved emi-

nently successful. It not only preserves the thin and tender shells from injury, but also obviates one great objection constantly brought against mounting shells on tablets, since this plan admits of all sides of a specimen being examined without removal, and is moreover particularly adapted to the minuter forms.

Our usual exchanges have been continued, though the number of packages and specimens received or sent away has scarcely been as great as in many previous years. Our collection being so large already, we have had no inducement or wish to solicit miscellaneous or indiscriminate exchanges, and hence we have in all cases restricted correspondents to such forms as would furnish us with new or specially desirable species, and have particularly sought for type specimens from authors engaged in describing new species. During the year we have received from 24 contributors 27 packages, containing 1,192 species and 13,683 specimens. Many of these were rare types, sent by authors, or else species seldom attainable, and hence of unusual value.

Some of the parcels received deserve more than a passing notice. Among these I may mention two packages from Mons. A. Morelet, containing mostly species described by him, and derived from localities seldom visited by collectors.

Our old correspondent, Dr. Dohrn, from whom we have hitherto received so many favors, has again laid us under obligations, by furnishing many rare and choice species from Morocco, the Red Sea, Bolivia, and Ecuador. His last box, just received, contained more than forty species entirely new to me.

Our friends, Messrs. Garrett, Geale, Bland, Count Kornis, and others, have also kindly remembered us from time to time, sending us valuable contributions, for which we desire to return them our sincere thanks. From the first named we received 340 species, all collected by himself, mostly in the Feejee Islands, and the localities being carefully noted renders them unusually valuable.

The number of packages sent to correspondents has been 32, containing 2,125 species and 7,328 specimens.

REPORT ON THE ALCOHOLIC MOLLUSCA.

By J. HENRY BLAKE.

A portion only of my time has been employed in the customary work of this collection; during the past year it has been concentrated in the basement of the building.

The Chitons in the collection have been forwarded to Dr. P. P. Carpenter, Montreal, for identification, and with the exception of those kept for a particular purpose, all have been identified and safely returned by him.

The collection from Mr. Henry Hemphill, mentioned in last year's report, has been identified and distributed.

There are still unassorted specimens belonging to different collections. They include mainly late invoices, and the collection dredged during the Hassler voyage, all of which are still in the bottles and small boxes in which they arrived at the Museum.

The collection, however, with the exception of the cases mentioned above, is in a safe condition, and the adopted temporary arrangement renders the whole quite accessible.

Few additions have been made to the collection; the most valuable being rare specimens from different parts of Lake Titicaca, South America, dredged by Mr. Alex. Agassiz, assisted by Mr. S. W. Garman; also by same party specimens from the Pearl Islands, Panama Bay.

REPORT ON THE FOSSIL CEPHALOPODA.

By Prof. A. HYATT.

Since the last time that the collection of fossil Cephalopods was noted in the Museum Reports, the condition of the collection has been considerably improved.

All of the Jurassic Ammonites have been prepared for mounting, and all of those belonging to the Liassic and Oolitic formations mounted and catalogued.

The work was then interrupted, and has not since been resumed. The specimens of the Upper Jura are all mounted, and ready to be named and catalogued.

Part of the collection has been placed on exhibition, and part stored in the loft of the Museum.

REPORT ON RADIATA.

By L. F. POURTALÈS, Keeper of the Museum.

During the last year the large quantity of duplicate corals on hand have been classified and put in order. A catalogue of them has been prepared, so that they are now more readily available for exchange or distribution. Several sets have been selected and sent to parties to whom the Museum was indebted for collections received.

From the catalogue, it appears that the Museum has now on hand, in the duplicate room, 6,463 specimens, representing 334 species. There are on exhibition 566 species of living, and 479 species of fossil corals. The alcoholic specimens and the *Alcyoniria* have not yet been placed on exhibition.

The general collection of fossil corals is now being revised, and a card catalogue of them is in preparation by Miss Hyde, who also catalogued and arranged the duplicates.

The collection of *Ophiuridæ* and *Astrophytidæ*, under Mr. Lyman, has been enriched by numerous preparations of the hard parts, which have been mounted by Miss Clark.

The horny sponges have been revised by Prof. Hyatt, and those which had not been named by Prof. Oscar Schmidt have been determined.

The additions to this department have not been large during the year. Mr. Gabb has made an additional donation of tertiary fossil corals from Santo Domingo, and Mr. Agassiz brought some interesting ones from Peru.

REPORT ON THE INSTRUCTION IN GEOLOGY AND PALÆONTOLOGY.

By Prof. N. S. SHALER, Assistant in Palæontology.

During the academic year 1874-5, two courses of instruction were given,—one in Geology, the other in Palæontology. The first of these was attended by thirty students; the second by six students. The instruction in geology was given by lectures based on Lyell's Principles of Geology, by field work on the geology of the environs of Cambridge, and by laboratory work. This latter included the drawing of geological models and the study of the principles of determining organic remains as applied to characteristic fossils.

The Palæontology was taught by lectures and laboratory work. In both these courses, at least nine hours a week of attendance was required.

In order to supplement this instruction, a summer school of Geology and Palæontology was organized in connection with the Kentucky Geological Survey at Cumberland Gap, Kentucky. This was attended by several students and by about twenty-five teachers from various schools and colleges. Ten teachers, including five assistants of the Kentucky survey, and the state geologists of Tennessee, North Carolina and Kentucky, took part in the instruction in this summer school. Large collections were made, a part of which will be deposited in the students' collection of the Museum. Considerable advance has been made in the preparation of the collection designed for instruction of students. About two hundred drawers of specimens for the illustration of the teaching in Geology and Palæontology have already been set aside and in good part arranged. Before the year is out, this collection will begin to crowd the teaching-rooms in a fearful manner.

A "question guide to the geology of the environs of Boston" has been prepared, and Part I., concerning the

geology of Cambridge and Somerville has been printed for the use of the students. It is desirable to have a question catalogue adapted to the students' collection prepared on the same general plan, the object being to give the student a clue and a stimulus to his inquiries. As soon as the collection begins to be sufficiently full, this question list should be prepared.

REPORT ON THE LIBRARY

By MISS SLACK.

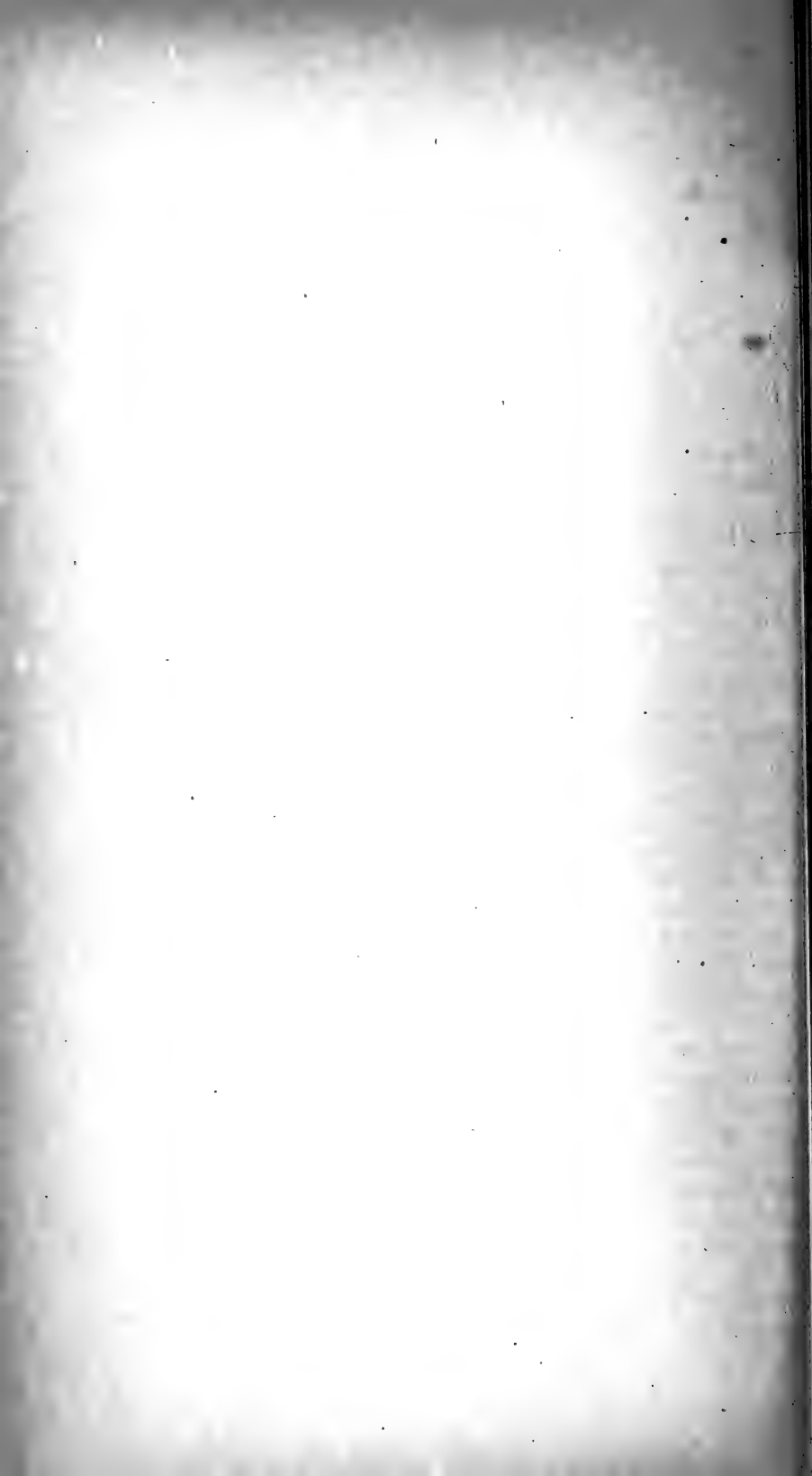
During the year there have been added to the library 964 volumes, parts of volumes, and pamphlets.

Complete works,	volumes, 159
Transactions, current and of past years,	" 106
" " " " "	parts, 381
Pamphlets,	318
	964

There have been received from the following sources,—

Mr. ALEX. AGASSIZ: 116 volumes, 140 parts, and 124 pamphlets,	380
Library of LOUIS AGASSIZ: 119 volumes and 135 pamphlets,	254
Bought: 3 volumes and 8 parts,	11
Societies: 93 volumes and 140 parts,	233
Mr. T. LYMAN: 6 volumes of photographs,	6
M. CH. DESMOULINS: 5 volumes,	5
Department of the Interior: Geological Survey,	4
Mr. L. F. POURTALÈS,	2
Profs. BAIRD, E. T. COX, and F. V. HAYDEN, each 1 volume,	3
W. H. DALL: pamphlets,	27
Dr. E. v. MARTENS: pamphlets,	8
Messrs. S. I. SMITH and HARGER: pamphlets,	4
Mr. F. W. PUTNAM: pamphlets,	3
The MARQUIS DE FOLIN, Mr. S. W. GARMAN, Mons. E. HESSE, Mr. GEORGE LAWRENCE, Mr. R. RATHBUN, Prof. A. E. VERRILL, Lt. G. W. WHEELER, and Bureau of Education, each, 2 pamphlets,	16
Messrs. J. A. ALLEN, N. BATEMAN, THOS. BLAND, Dr. ELLIOTT COUES, Prof. JAMES D. DANA, Count HUGO, Prof. O. C. MARSH, and Department of the Interior, each, 1 pamphlet,	8
	964

APPENDIX.



[B.]

PHILADELPHIA, April 28, 1875, }
1625 SPRUCE STREET. }

MY DEAR SIR:—For the better preservation of the types of North American Coleoptera contained in my collection, I wish to have it placed, after my death, in the Museum of Comparative Zoölogy, in Cambridge, Massachusetts.

I am moved thereto, not only by the belief that the organization of your Museum, and the climate of Cambridge, are favorable for the preservation of perishable objects of natural history, but also because I desire, in illustrating the Museum established by Prof. L. Agassiz, to testify the strong affection I had for him.

I need not mention the value which my collection has for the future study of the Coleoptera of the United States; for, besides type specimens of nearly all the species described by me, it contains specimens carefully compared with those described by Say, Harris, Melsheimer, Haldemann, and Ziegler, and all the unique types of the three last-named authors.

It has been also enriched by the extreme liberality and courtesy of many distinguished European entomologists, who have sent to me even the second specimens of many of the North American species, which were otherwise unattainable, at that time. I have thus a nearly complete series of those species described from the western coast by Eschscholtz, Mannerheim and Mäklin.

I trust that it may be consistent with the funds of the Museum to retain permanently the services of an experienced entomological curator, with sufficient assistance to keep in order and protect the vast collection now being assembled.

I would suggest that, for ordinary study, type collections should not be opened freely, but that, by accurate comparison with authentic types, a separate collection for easy reference should be formed as rapidly as by purchase, or otherwise, material may be procured.

When these separate collections become tolerably perfect, as must result after a moderate time, the typical collections would be seldom consulted, only by those who were engaged in monographic work, or in authenticating specimens for the more public collections.

It is also important, for the preservation of entomological collections, that a rigid inspection should be made of each box of specimens, at least twice a year; and I would therefore suggest that it should be a permanent and stringent rule of the Entomological Department, to have such an inspection regularly made, and its results reported to the Director of the Museum.

In addition to the recommendations above made, I would urge strongly the necessity of preserving, in type collections, all the original labels of the author; these are sometimes removed for the sake of producing uniformity of appearance, which, however pleasing to the eye, occasionally gives rise to confusion.

If these views be acceptable to you, please signify to me your approval, and I will, without delay, send you an order upon the executors of my estate, to deliver to you, or your successors in office, my entomological collection. This order will be available, in case of my death, if the collection is not sooner placed in the Museum.

I would mention, the boxes used by me are very convenient for constant study, and for permanent protection could be readily placed, by pairs, in tight glass-covered drawers, similar to those now in use in the Museum.

With my best wishes for the future extension and prosperity of the Museum, I remain, as ever,

Very sincerely yours,

JOHN L. LECONTE.

ALEXANDER AGASSIZ, Esq., *Museum of Comparative Zoölogy, Cambridge, Mass.*

PHILADELPHIA, May 13, 1875. }
1625 SPRUCE STREET. }

MY DEAR SIR:—I have directed my executors, in a clause of my will, to deliver to the Trustees of the Museum of Comparative Zoölogy, at Cambridge, my entire collection of insects, with the pieces of furniture in which the boxes are contained.

I send you this note, in order that when the time comes for the fulfilment of this bequest, you may designate, by proper indorsement, or other separate note, the person authorized to receive and transport to Cambridge, the collection, in such manner that it may receive no damage.

In regard to matters of general policy affecting the care and use of typical collections of such extremely perishable objects, I have expressed my views in a previous communication, and I am glad to

learn from your letter, on the 10th instant, that they have your entire concurrence, and that many of them have, in fact, been already provided for in the Museum.

Very truly yours,

JOHN L. LECONTE.

A. AGASSIZ, Esq.

Boston, May 10, 1875.

DEAR SIR:—I have no objection to your saying to your Trustees that I design my collection to your Museum, and that while I live I shall hold it only as its trustee, and moreover intend to do my utmost to increase its value. This intention on my part is known to and is approved by my family, and also has the cordial approval of Prof. Baird, who freely allows me to take from their collections to increase both the varieties and add to the new species. This intention I made known to your father about two years ago, and since then I have given a good deal of time to perfect the marking and cataloguing of the collection. This is now completed so that any one understanding the subject could arrange all my known species.

In numbers my collection is about as large as the famous Des Murs collection, but much richer in North American eggs, and second in that respect to the Smithsonian alone, while the latter has very few foreign.

It is my intention, if I live long enough, to have a series of cabinets made and so arranged that the eggs may be examined without injury from handling, light, or dust. If I am not able to do this, I will have to trust to your Museum to supplement my imperfections.

I take to Europe with me about 1,200 duplicates for exchanges, and hope to bring back with me both more complete series of what I have and many entirely new species. About two-fifths of my collection is North American, about two-sevenths European, about one-fourteenth, each, West Indian, South American, and African; the balance, Asiatic and Australian.

You may say, too, to your Trustees, that in the interim, all the nests of interest that may come into my possession, or that I can procure, go to supplement, as it were in advance, the collection of eggs to come, either with their eggs, or where I wish to retain them, the latter are marked to their connection.

For some years to come I shall need to use my collection in my

studies and writings, and I intend that my retention of them shall only add to their future value and interest.

Excuse the haste with which I have had to write this, but I think you will understand just how the matter stands, and that you are at liberty to claim a prospective interest in my collection.

Yours,

T. M. BREWER.

ALEXANDER AGASSIZ, Esq.

NEW YORK, April 30, 1875.

DEAR SIR:—I beg you will consider my collection of Corbiculidæ from henceforward as the property of the Museum, whether the affair of the catalogue come to anything or not. I make this donation to the Museum free of any conditions or restrictions whatever. If in a few years we do not see our way clear to the publication of a catalogue, I will then send the collection to Cambridge.

Yours, very truly,

TEMPLE PRIME.

TO ALEX. AGASSIZ.

At a meeting of the President and Fellows of Harvard College, in Boston, June 28, 1875,—

Voted, That the specimens belonging to the University, which remain in the Anatomical Museum in Boylston Hall, be *deposited* until the further order of this Board in the Museum of Comparative Zoölogy.

A true copy of record. Attest:

A. G. DAVIS, *Clerk*.

ALEXANDER AGASSIZ, Esq., Cambridge, Mass.

THE AGASSIZ MEMORIAL.

[C .]

THE AGASSIZ MEMORIAL.

BOSTON, Jan. 1, 1876.

TO ALEXANDER AGASSIZ, Esq., *Curator of the Museum of Comparative Zoology, Cambridge, Mass.*

DEAR SIR:—At a meeting of the Agassiz Memorial Committee, held December 11, 1875, it was voted that the Secretary, with the aid of the Chairman of the Finance Committee, be instructed to prepare and forward to the Curator of the Museum a full account of the doings of the Agassiz Memorial Committee, with a request that the same be inserted as an appendix in the annual report of said Curator to the Committee on the Museum.

I beg to hand you herewith the report called for by the above vote of the Committee, and to request that you will cause the same to be appended to the next annual report to the legislature made by the Committee of the Museum.

Respectfully yours,

ROGER WOLCOTT,
Secretary Agassiz Memorial Committee.



L. Agassiz



R E P O R T .

The following circular was issued in February, 1874 :—

DEAR SIR:—At an informal gathering of some of the friends of the late Prof. Agassiz, it was resolved to call a meeting to consider the establishment of a memorial to him.

You are invited to be present at this meeting, which will be held at Wesleyan Hall, No. 36 Bromfield Street, at 11 A. M., on Friday next, the 13th inst.

JOHN A. LOWELL, *Chairman.*
THEODORE LYMAN,
JOHN M. FORBES,
JAMES L. LITTLE,
JAMES M. BARNARD,
EDWARD H. CLARKE,
MARTIN BRIMMER,

Committee.

In accordance with the above circular, a meeting was held, at which a committee was appointed to take measures to raise a fund for the Agassiz Memorial.

The meeting was largely attended, and was called to order by Mr. Augustus T. Perkins. Hon. Robert C. Winthrop was called to the chair. At the request of the Chairman, Col. Theodore Lyman stated the purpose of the meeting to be the establishment of a memorial to the late Prof. Louis Agassiz. The most fitting memorial must be the completion of his life's work. The completion of the Museum in accordance with his plans, and its liberal endowment, would be of infinite value to the educational interests of the whole country. To do this, the sum of \$300,000 is required.

Prof. William B. Rogers spoke of the national importance of the enterprise, and expressed the hope that the Commonwealth of Massachusetts and the liberal men of Boston would carry the enterprise grandly and speedily to its consummation.

Hon. George B. Loring said that he did not doubt that the Commonwealth, proud of her adopted son, would gladly join her citizens in perpetuating the memory of one who had done so much in the cause of education and to honor the country of his adoption.

Mr. Ralph Waldo Emerson said that of the scientific eminence of Agassiz he could not speak of his own knowledge, but he, in com-

mon with all who knew Agassiz, could testify to the broad humanity, the genial charm, and true disinterestedness of his character.

Dr. Oliver Wendell Holmes compared the unfinished work of Agassiz to a cathedral left incomplete at the death of the architect. In each case the noblest memorial is the completion of the work. Like St. Paul's Cathedral, this would be the truest and most lasting monument to him who had planned it.

On motion of Mr. James M. Barnard, the Chair was requested to appoint a committee of not less than thirty, with power to add to their number, whose duty it should be to take measures to raise a fund for the Agassiz Memorial.

The Chair announced the following-named persons as constituting the Committee:—

John A. Lowell.	J. Ingersoll Bowditch.
Nathaniel Thayer.	Edward H. Clarke.
George T. Bigelow.	H. Cabot Lodge.
John M. Forbes.	Lewis Cabot.
Abbott Lawrence.	William Gaston.
Theodore Lyman.	Prof. Benjamin Peirce.
Sebastian B. Schlesinger.	Charles Francis Adams.
Martin Brimmer.	Henry P. Kidder.
James M. Barnard.	Augustur Flagg.
E. R. Mudge.	T. G. Cary.
James L. Little.	Prof. James Hall, Albany.
Moses Kimball.	Prof. James D. Dana, New Haven.
George B. Loring.	Prof. A. Guyot, Princeton.
John Cummings.	Dr. J. H. Rauch, Chicago.
George C. Richardson.	Pres. Gillman, San Francisco.
Prof. William B. Rogers.	Dr. H. Wheatland, Salem.
Roger Wolcott.	Pres. A. S. White, Ithaca.
Alpheus Hardy.	Pres. Caswell, Providence.
Otis Norcross.	Prof. Joseph Henry, Washington.
Francis E. Parker.	Prof. N. S. Shaler, Cincinnati.
Edward J. Lowell.	Pres. Barnard, New York.
Alexander H. Rice.	Prof. J. P. Lesley, Philadelphia.
O. W. Holmes, Jr.	Dr. George Engelman, St. Louis.

To this Committee were subsequently added the names of Geo. P. King, E. P. Whipple, Chas. L. Peirce, Thomas G. Appleton, and William S. Appleton of Boston, Prof. Joseph Leidy and Prof. Fairman Rogers of Philadelphia, and George Davidson and Thomas S. Hoyt of San Francisco.

The Chair announced that \$65,000 had already been promised by four subscribers.

The meeting was then dissolved.

The Committee appointed as above held a meeting immediately after the general meeting, and completed their organization by the choice of Hon. George T. Bigelow as permanent Chairman, S. B. Schlesinger as Treasurer, and Roger Wolcott as Secretary.

Col. Lyman, Dr. Clarke, and Prof. Rogers were appointed by the Chair a sub-committee to prepare and issue an address explaining the urgent need of a large fund, in order to insure the permanent usefulness of the Museum, and inviting subscriptions from all parts of the United States, and from all persons in Europe interested in the advance of science.

Mr. James M. Barnard, referring to Prof. Agassiz's modest recital of himself in his will as "Teacher," suggested that the teachers and pupils of the public schools of the United States should be invited to join in the establishment of the Memorial, as the best means of giving to it a national character, and that whatever sum might be raised in this manner should constitute a separate fund to be called the Teachers and Pupils' Fund.

The Chair appointed Messrs. James M. Barnard and Edward J. Lowell a sub-committee, with full powers to carry out this suggestion.

The Addresses issued by these sub-committees were widely circulated. A copy of each is given herewith.

"It cannot be too soon understood that Science is one; and that, whether we investigate language, philosophy, theology, history, or physics, we are dealing with the same problem, culminating in the knowledge of ourselves."—L. AGASSIZ.

In removing LOUIS AGASSIZ, death has deprived us of one who, for the last quarter of a century, has done more than any other person to stimulate in this country the study of Nature, and a spirit of scientific investigation. Twenty-eight years ago he left Switzerland, his native land, for the United States, and became an American citizen. Those twenty-eight years he gave to unremitting labor in behalf of that higher education, which, by the public at large, was little understood. His interest was confined to no town or State, to no individual or class. He journeyed much; and, wherever he went, there his pupils were. He might have rested on the reputation he brought from Europe, and, by lecturing and writing, have made a fortune. Such a life, however, he would not, or perhaps could not, live. At the age of sixty-seven his brain gave way, and he died, leaving no wealth but his name, his example, and his works.

It would not be grateful for the country, nor would it be for the country's interest, that Agassiz should pass away without a fitting memorial. Such a memorial can be made out of the great Museum which he began

and partially built, and for the completion of which he has left full directions. Completed, it would be a perpetual fountain of knowledge, and a monument quick with his spirit.

"Museum," a word that commonly suggests little more than a collection of curious objects, is scarcely an appropriate name for the memorial that Agassiz ought to have. The Museum he labored for is a presentation of the animal kingdom,—fossil and living,—arranged so as to picture the creative thought. The study of such a subject is the highest to which the human mind can aspire.

At the end of the nineteenth century, no nation, least of all the American, may dare to lag in science; for science is only another word for knowledge, and knowledge is the source of power, and of whatever contributes to power. All knowledge springs from one root; and the sap matured in the root flows through every twig of the tree: what is elaborated in the leaf in its turn nourishes the roots. Few distinctions are so groundless as the popular one between "practical" and "scientific."

Three or four generations since, learned men wondered why the rubbing of sealing-wax should make it pick up scraps of paper; what lightning was; and why the muscles of a frog's leg should twitch without apparent cause. What, to-day, has resulted from the study of these observations? The electrotype of the printer, the plated-ware on our tables, the telegraph across the Atlantic, the determination of longitude, the knowledge of the nervous system,—these, and a hundred other things, so important to our modern civilization, have resulted from the abstract studies of Volta, Franklin, and Faraday.

Not long ago the silk-worms, a main source of wealth to Southern France and to Lombardy, were dying; nobody knew why. Prof. Cornalia said: "The worms are destroyed by a mouldy growth on their bodies. The spores, or germs, may be seen by the microscope in the blood of the parent moth. Here is the remedy: each moth's eggs must be collected separately; then the blood of the moth must be examined, and all eggs of unhealthy parents must be destroyed." So the microscopists saved the silk-growers of Italy and France.

Every workman must have his tools: the tools of a zoölogist are collections of natural objects systematically arranged. Such an arrangement means the exhibition of the animal creation in its natural order. This is one of the prime difficulties of science, which taxes the powers of the greatest genius. So difficult is it, indeed, that no two leaders of zoölogy have ever exactly agreed in their views; and it is only by comparing these views that the student can judge for himself. Of what incalculable value would collections be, if such had been arranged by Linnaeus in Sweden, by Oken in Germany, by Cuvier in France! But such museums do not exist. Even the great collections of Cuvier are mingled with those of his opponents, like a book culled from the works of many authors. In this country we may have such a museum, if we choose. The celebrated System of Nature of Linnaeus can be studied only in books. We may and should have Agassiz's System of Nature illustrated by the specimens which his own hands have set in order. It is for our people to say whether they will neglect this magnificent oppor-

tunity to secure a means of education which money cannot buy, and the future may not give.

The Museum of Comparative Zoölogy at Cambridge is an independent establishment, governed by a faculty of its own. It was founded fifteen years ago by Agassiz, and has grown to its present large proportions under his hand. In connection with it is the newly-established School of Experimental Zoölogy on the Island of Penikese, endowed by Mr. Anderson of New York. The system of instruction has the widest character, and includes elementary teaching, as well as the highest investigations. The exhibition-rooms are free to the public. Large sums have already been expended in bringing this national museum to its present condition. Its collections, in several branches, are superior to those of the British Museum or the Garden of Plants. To make such an establishment useful, it must have a large building, and a considerable annual income for the payment of professors and assistants. To perfect the grand plan conceived by Agassiz will require at least three hundred thousand dollars, of which about one-third would be used in enlarging the building, and two-thirds would be funded.

It is to be hoped that the people of America, for whom Agassiz unselfishly labored, and among whom he spent the best portion of his life, will not hesitate to carry on the work he began. His example and his teachings have benefited every section of the country. The Museum he planned and founded will, if suitably endowed, become an ever-increasing source of scientific and practical usefulness to the nation and the world. We cannot doubt, therefore, that this appeal will be answered by the public in the same generous spirit in which Agassiz devoted his genius to the furtherance of science and to the advancement of education among us.

But we would not appeal to the friends of liberal culture in this country alone. The works and the example of Agassiz are the precious legacy left by him to all nations; and we feel sure that in the great centres of scientific activity in the Old World, where his genius received its first impulses and achieved its earliest triumphs, there will be felt an earnest desire to aid in a work, which, while commemorating the labors and influence of Agassiz, will be an enduring source of scientific discovery and inspiration.

Agassiz Memorial Committee.

JOHN A. LOWELL.	FRANCIS E. PARKER.
NATHANIEL THAYER.	EDWARD J. LOWELL.
GEORGE T. BIGELOW.	ALEXANDER H. RICE.
JOHN M. FORBES.	O. W. HOLMES, Jr.
ABBOTT LAWRENCE.	J. INGERSOLL BOWDITCH.
THEODORE LYMAN.	E. P. WHIPPLE.
SEBASTIAN B. SCHLESINGER.	Dr. EDWARD H. CLARKE.
MARTIN BRIMMER.	H. CABOT LODGE.
JAMES M. BARNARD.	LEWIS CABOT.
E R. MUDGE.	WILLIAM GASTON.
JAMES L. LITTLE.	Prof. BENJAMIN PEIRCE.
MOSES KIMBALL.	CHARLES FRANCIS ADAMS.

GEORGE B. LORING.
 JOHN CUMMINGS.
 GEORGE C. RICHARDSON.
 Prof. WILLIAM B. ROGERS.
 ROGER WOLCOTT.
 ALPHEUS HARDY.
 OTIS NORCROSS.

HENRY P. KIDDER.
 AUGUSTUS FLAGG.
 T. G. CARY.
 GEORGE P. KING.
 THOMAS G. APPLETON.
 WILLIAM S. APPLETON.
 CHARLES L. PEIRCE.

Prof. JAMES HALL, Albany.
 Prof. JAMES D. DANA, New Haven.
 Prof. A. GUYOT, Princeton.
 Dr. J. H. RAUCH, Chicago.
 Pres. GILLMAN, San Francisco.
 Dr. H. WHEATLAND, Salem.
 Pres. A. D. WHITE, Ithaca.
 Pres. CASWELL, Providence.
 Prof. JOSEPH HENRY, Washington.

Prof. N. S. SHALER, Cincinnati.
 Pres. BARNARD, New York.
 JOHN ANDERSON, New York.
 Prof. J. P. LESLEY, Philadelphia.
 Dr. GEO. ENGELMAN, St. Louis.
 Prof. JOSEPH LEIDY, Philadelphia.
 Prof. FAIRMAN ROGERS, "
 GEORGE DAVIDSON, San Francisco.
 THOMAS S. HOYT, " "

N. B.—Subscriptions may be sent to Sebastian B. Schlesinger, Esq.,
 Treasurer of the Committee, 6 Oliver Street, Boston.

THE AGASSIZ MEMORIAL TEACHERS AND PUPILS' FUND.

Boston, March 10, 1874.

LOUIS AGASSIZ, TEACHER. This was the heading of his simple will; this was his chosen title: and it is well known throughout this country, and in other lands, how much he has done to raise the dignity of the profession, and to improve its methods. His friends, the friends of education, propose to raise a memorial to him, by placing upon a strong and enduring basis the work to which he devoted his life,—the Museum of Comparative Zoölogy, which is at once a collection of natural objects, rivalling the most celebrated collections of the Old World, and a school open to all the teachers of the land.

It is proposed that the teachers and pupils of the whole country take part in this memorial, and that on the birthday of Agassiz, the twenty-eighth day of May, 1874, they shall each contribute something, however small, to the TEACHERS AND PUPILS' MEMORIAL FUND, in honor of LOUIS AGASSIZ; the fund to be kept separate, and the income to be applied to the expenses of the Museum.

JOHN EATON, *Commissioner of Education, Washington, D. C.*
 JOSEPH HENRY, *Sec'y of the Smithsonian Inst'n, Washington, D. C.*
 JOSEPH WHITE, *Sec'y of the Board of Education of Mass., Boston.*
 W. T. HARRIS, *Superintendent Public Schools, St. Louis, Mo.*
 EDWARD J. LOWELL, *Boston.*
 JOHN S. BLATCHFORD, *Boston.*
 JAS. M. BARNARD, *Treasurer Teachers and Pupils' Fund, Boston.*

All communications and remittances for the "Teachers and Pupils' Fund" of the "Agassiz Memorial" may be sent to the Treasurer,

JAS. M. BARNARD, *Room 4, No. 13 Exchange Street, Boston.*

At a subsequent meeting of the Committee, the following gentlemen were appointed as a sub-committee of finance: Messrs. George T. Bigelow, J. I. Bowditch, Abbott Lawrence, Theodore Lyman, and S. B. Schlesinger. The name of Roger Wolcott was added as secretary.

Soon after the organization of the several sub-committees, the state legislature, on motion of Mr. L. V. Cushing, Jr., passed the following resolve appropriating conditionally fifty thousand dollars to the Memorial Fund.

[Resolves of 1874, chap. 44.]

RESOLVE in favor of the Museum of Comparative Zoölogy,

Resolved, That whereas the proposed Agassiz Memorial Fund is to be devoted to the completion of the Museum of Comparative Zoölogy as the best possible recognition of the benefits conferred upon the State by the labors of the great naturalist, as an educator of the whole community, and to the end that said museum may, for all time, fulfil the aspirations of its originator; therefore,—

Resolved, That when the said memorial fund shall amount to the sum of two hundred and fifty thousand dollars subscribed and paid in from private sources, that *then* there be allowed and paid from the treasury to the trustees of the Museum of Comparative Zoölogy the sum of fifty thousand dollars. [Approved May 11, 1874.]

The following votes of the Agassiz Memorial Committee, and of the corporation of Harvard College, and the annexed correspondence, need no special explanation:—

Voted, That the subscription for the Agassiz Memorial Fund be kept open till the sum of two hundred and fifty thousand dollars (\$250,000) be raised, in order ultimately to secure the fifty thousand dollars voted conditionally by the legislative resolve of 1874.

OCTOBER 26, 1874.

Voted (1), That the Finance Committee be directed to pay over and deliver to the President and Fellows of Harvard College, all sums of money received by them, and all investments of money in their hands, the proceeds of subscriptions to the Memorial Fund prior to this date, except such sum as it may be necessary to reserve to pay the current expenses; the same to be paid by said committee, and received by said President and Fellows, upon the condition that the net income thereof be paid to the Faculty of the Museum of Comparative Zoölogy, to be expended by them for the benefit of the Museum.

Voted (2), That the treasurer of the fund be directed to pay, at convenient times, any balance of interest in his hands to the Faculty

of the Museum of Comparative Zoölogy, to be expended by them for the benefit of the Museum.

Voted (3), That the money received for subscriptions to said fund from teachers and pupils in the United States be paid over to said President and Fellows; the same to be held by them in trust as a separate and distinct fund, to be called the Teachers and Pupils' Fund, and the income thereof applied to the payment of the expenses of the Museum of Comparative Zoölogy.

OCTOBER 26, 1874.

At a meeting of the President and Fellows of Harvard College, in Boston, March 1, 1875, the President having laid before the Board sundry votes passed by the Agassiz Memorial Committee, whereby the treasurer of said Committee was directed to pay over and deliver to the President and Fellows certain money and investments in their hands, to be held in trust, the income to be paid over to the Faculty of the Museum, to be expended by them for the support of the Museum; and also to pay over to said President and Fellows a certain other sum of money received by said Committee from subscriptions by teachers and pupils in the United States, to be held in trust as a separate and distinct fund, the interest to be paid over to the Faculty of the Museum, to be by them applied to the payment of the expenses of the Museum of Comparative Zoölogy; it was therefore,—

Voted, That the treasurer of the corporation is hereby authorized to receive said money and property in behalf of the President and Fellows, the same to be held by them in trust on the conditions in said votes expressed, the income to be applied for the purposes above set forth.

Voted, That the President express to said Memorial Committee the grateful acknowledgments of the President and Fellows for this disposition of the money and property in their hands for the use and benefit of the Museum of Comparative Zoölogy.

Voted, That the principal fund above mentioned be called the Agassiz Memorial Fund.

A true copy of votes from record. Attest: GEORGE PUTNAM, *Secretary*.

HARVARD UNIVERSITY, March 2, 1875.

SEBASTIAN B. SCHLESINGER, Esq.

DEAR SIR:—I beg to express to all the members of the Agassiz Memorial Committee the sincere and hearty acknowledgments of the President and Fellows of Harvard College for the gift to them of the large fund which has been procured through the exertions of the Committee, in order that the memory of Prof. Louis Agassiz may be perpetuated by the adequate and secure endowment of the Museum which he founded at Harvard University. It will be a grateful duty for the President and Fellows, in executing the trust which the Committee have laid upon them, to commemorate the scientific attainments, enthusiasm, and devotion of Prof. Agassiz, while they build up and enlarge the Museum of Com-

parative Zoölogy to the full proportions which his prophetic zeal imagined for it. The continuous growth of the Museum is assured through the successful labors of the Committee.

With the warmest congratulations and thanks, I am, dear sir, very truly yours,

CHARLES W. ELIOT, *President.*

At a meeting of the Memorial Committee, held January 6, 1875, the following letter was received:—

BOSTON, Jan. 6, 1875.

HON. GEORGE T. BIGELOW, *Chairman of the Agassiz Memorial Committee.*

DEAR SIR:—I have the pleasure of announcing to you that Messrs. Quincy A. Shaw and Alexander Agassiz have authorized me to offer the sums respectively of \$100,000 and \$30,000, to complete the \$250,000 necessary to obtain \$50,000 from the State. These gifts are in addition to their previous subscriptions, and are made on the following condition: "That the Memorial Fund shall be in charge of the Corporation of the College, and that the Museum Building shall be enlarged in accordance with the plans of Louis Agassiz and of A. Agassiz, which are now in the hands of the Museum Faculty.

Very respectfully,

THEODORE LYMAN,

Agent for QUINCY A. SHAW and ALEX. AGASSIZ.

Voted, That the munificent donations of Mr. Quincy A. Shaw of the sum of one hundred thousand dollars, and of Mr. Alexander Agassiz of the sum of thirty thousand, be gratefully accepted, on the conditions annexed to said gifts, as stated in the letter of Theodore Lyman, agent for the donors.

JANUARY 6, 1875.

Voted, That the Treasurer of the Committee is hereby authorized to pay over and deliver, from time to time, to the President and Fellows of Harvard College, all moneys and securities that may be in his possession, the proceeds of the subscription raised by this committee and accepted by said corporation.

MARCH 13, 1875.

Voted, That hereafter, at such time or times as may be convenient, all money in the hands of the Treasurer of the "Agassiz Memorial Fund," together with such further sum as may hereafter be invested by him for the use and benefit of said committee, be by him paid over and delivered to the "President and Fellows of Harvard College," to be by them received and held in trust for the uses and pur-

poses following ; namely, to keep and invest the same according to their best judgment and discretion, and collect and receive the income thereon as the same shall accrue from time to time, and apply said income as follows ; to wit, first, such portion thereof as the Faculty of the Museum of Comparative Zoölogy at Harvard College shall direct, shall be accumulated and reinvested as an additional fund, so long as said Faculty shall direct ; and the said fund, thus accumulated, shall be kept till said Faculty shall direct the same to be applied to the erection of an addition to the Museum Building, substantially in accordance with the plan of Prof. Agassiz, as left by him to his scientific executor ; and thereupon, so much of said income as said Faculty shall from time to time direct, shall be applied and paid to said Faculty for the erection of such addition to said Museum, on requisitions therefor to be made by said Faculty and communicated to said President and Fellows ; and secondly, the residue of said income shall be paid to said Faculty from time to time on their requisition, to be applied and expended for the benefit of said Museum.

DECEMBER 11, 1875.

Annexed is (1) a copy of the general subscription list, furnished by the Treasurer, Mr. S. B. Schlesinger ; (2) a copy of the report submitted by Mr. James M. Barnard of the Teachers and Pupils' Fund ; and (3) a general recapitulation of the Agassiz Memorial Fund, all posted to January 1, 1876.

(1) SUBSCRIPTIONS TO AGASSIZ MEMORIAL FUND.

Alexander Agassiz, . . .	\$25,000 00	Col. R. S. Oliver, Albany, . . .	\$100 00
Quincy A. Shaw, . . .	25,000 00	Otis Norcross, . . .	1,000 00
Theodore Lyman, . . .	10,000 00	C. H., . . .	25 00
Nathaniel Thayer, . . .	5,000 00	W. R. Ellis, . . .	50 00
Stephen Salisbury, . . .	5,000 00	Miss Marian Hovey, . . .	50 00
John Amory Lowell, . . .	3,000 00	* * . . .	5 00
James L. Little, . . .	2,500.00	S., . . .	1 00
Henry P. Kidder, . . .	1,500 00	Edw. Wigglesworth, Jr., . . .	100 00
William Amory, . . .	1,000 00	Mrs. John E. Lodge, ad-	
J. Huntington Wolcott, . . .	1,000 00	ditional, . . .	1,000 00
Mrs. Anne S. and Miss		Mrs. N. I. Bowditch, . . .	1,000 00
Alice Hooper, . . .	1,000 00	Moses Kimball, . . .	500 00
Thomas G. Appleton, . . .	1,000 00	George B. Loring, Presi-	
Abbott Lawrence, . . .	1,000 00	dent N. E. Ag. Soc'y, . . .	150 00
George Higginson, . . .	1,000 00	J. M. Forbes, . . .	2,500 00
Mrs. John E. Lodge, . . .	1,000 00	John J. May, . . .	100 00
George Baty Blake, . . .	500 00	William F. Cary, New	
Mrs. Louisa Smith, Bos-		York, . . .	200 00
ton Highlands, . . .	2 00	Abby W. May, . . .	25 00

George H. Kuhn, . . .	\$300 00	F. C. Lowell, . . .	\$500 00
J. M. Clark, . . .	25 00	E. R. Mudge, . . .	500 00
H. L., . . .	10 00	H. H. Hunnewell, . . .	500 00
D. D., . . .	1 00	Cash (a friend), . . .	500 00
E. S. Tappan, . . .	100 00	Nantucket Ag. Society,	30 00
M. A. Tappan, . . .	100 00	Caspar Crowninshield, .	100 00
Caroline Tappan, . . .	100 00	Junior Class Harvard	
G. W., . . .	5 00	College, through Ab-	
G. F. C., . . .	1 00	bott Lawrence, Jr.,	
S. A. W., . . .	1 00	Chairman Com., . . .	208 25
J. B., . . .	1 00	F. Gordon Dexter, . . .	500 00
Mechanic, . . .	2 00	W. G., . . .	25 00
S. P. Barnes, . . .	5 00	George Baty Blake, Jr.,	100 00
Greely S. Curtis, . . .	200 00	Mrs. E. C. James, . . .	100 00
E. P. C., . . .	10 00	L. Prang, . . .	50 00
J. B. T., . . .	5 00	J. C. Burrage, . . .	25 00
M. W. Co., . . .	10 00	Mrs. G. R. Russell, . . .	2,000 00
B. & P., . . .	2 00	Henry Cabot Lodge, . . .	100 00
Alonzo Josselyn, . . .	5 00	Harvard Law School, . . .	45 00
Charles F. Shimmin, . . .	100 00	Horatio J. Gilbert, . . .	100 00
Ezra Abbot, . . .	50 00	J. H. Beal, . . .	100 00
E. Hodge & Co., . . .	10 00	E. W. Hooper, . . .	100 00
Joseph T. Greenough, . . .	1 00	Robert C. Winthrop, . . .	100 00
D. Hutchins, . . .	50 00	J. L. Gardner, Jr., . . .	100 00
Bangs & Horton, . . .	25 00	William Munroe, . . .	100 00
Martin Brimmer, . . .	1,000 00	A Friend, . . .	200 00
Mrs. Brimmer, . . .	500 00	Mrs. George Ticknor, . . .	200 00
R. W., . . .	25 00	The Misses Ward, . . .	20 00
Otto Dresel, . . .	50 00	J. B. Bright, . . .	100 00
Henry Schlesinger, Lon-		Jarvis Lewis, . . .	1 00
don, England, . . .	100 00	T. Wetherby, . . .	1 00
Dr. O. W. Holmes, . . .	100 00	Josiah Beard, . . .	1 00
George Peabody, . . .	500 00	Alexander Starbuck, . . .	1 00
Miss Mary Wiggles-		Jos. F. Gibbs, . . .	1 00
worth, . . .	500 00	Thomas H. Armstrong, . . .	1 00
Arthur Lincoln, . . .	5 00	George Phinney, . . .	1 00
North Middlesex Agri-		J. T. Prince, . . .	1 00
cultural So., Lowell, . . .	50 00	James C. Parsons, . . .	1 00
Sir Charles Lyell, Bart.,	55 00	B. T. D. Adams, . . .	1 00
r. M. Mason, . . .	1,000 00	" In Memoriam," . . .	10 00
Roger Wolcott, . . .	100 00	Miss Georgina Lowell, . . .	50 00
William T. Andrews, . . .	500 00	J. H. Center, . . .	20 00
R. W. Hooper, . . .	300 00	Miss Anna C. Lowell, . . .	100 00
George D. Howe, . . .	300 00	J. B. Bright, . . .	9 30
William E. Howe, . . .	300 00	R. P. Whitfield, . . .	20 00
Henry S. Snow, . . .	100 00	W. S. Bigelow, . . .	100 00
Mrs. G. H. Shaw, . . .	5,000 00	Miss S. P. Banks, . . .	50
J. M. Beebe, . . .	1,000 00	Miss E. M. Wellington, . . .	50
Peter C. Brooks, . . .	1,000 00	Henry A. Ward, . . .	25 00

Lewis Cabot,	\$400 00	Swiss Soc'y in Boston,	\$284 00
Th M. Smith, Jr.,	1 00	Swiss Society in Phila-	
Harlem Collegiate In-		delphia,	33 50
stitute,	2 00	Swiss Society in Cleve-	
Charles H. Williams, for		land, O.,	25 00
Medical Students,	12 00	Swiss So. in Denver, Col.,	20 00
S. Carter, 2d,	5 00	Swiss So. in Evansville, Ind.,	8 10
Boston Daily Advertiser,	110 00	Swiss Consulate, N. Y.,	5 00
Mrs. S. V. R. Thayer,	200 00	Welch & Bigelow, Cam-	
Hon. Samuel Hooper,	1,000 00	bridge,	270 10
Hingham Agr. Society,	30 00	Henry P. Curtis,	20 00
Essex Agricult. Society,	50 00	Public Schools of Whit-	
Albert Fearing,	35 00	insville, Mass.,	5 00
Worcester Co. East Agr.		Calumet, Mich., through	
Society, Milford,	25 00	Chas. Briggs, Treas.,	
Martha's Vineyard,	50 00	subscription of 1,233	
J. A.,	100 00	persons,	1,215 00
Swiss Society in Wash-			
ington,	34 00	Total,	\$115,600 25

SEBASTIAN B. SCHLESINGER, *Treasurer.*

(2) THE AGASSIZ MEMORIAL.

Teachers and Pupils' Fund.

13 EXCHANGE STREET, BOSTON, Dec. 12, 1874.

We have already had the pleasure of reporting, in the public newspapers, the contribution of \$741.63 from 455 teachers and 12,018 pupils of the public schools of Baltimore.

The school committees of Philadelphia, New York, Brooklyn, and Boston believed it to be inexpedient to suspend, in our favor, the law forbidding contributions to be taken up in the schools. Contributions, however, have been received from those cities, excepting Philadelphia. In New York, the president of Columbia College, and Madame Charlier's Institute, gave \$129 61. In Brooklyn, the Packer Institute, and Public School No. 1, gave \$190. In Boston proper, twenty-one friends, some thirty teachers, and a few pupils, gave \$990.15. In the Charlestown district, one hundred and fifteen teachers gave \$135, through the late superintendent, the Rev. B F. Tweed. In the Western States many cities and towns gave freely: Chicago, \$1,003.40; St. Louis, \$765.53. The number of contributors in these cities was not reported, but it may, we believe, be estimated at ten thousand in each. Below is a table showing the amounts received from all quarters. As reports of the number of contributors were not received from all of the schools, the numbers given in this table are hypothetical, but they are believed to be substantially correct. Useful as the amount received will be in building up the Memorial, we have reason to believe, from the letters received at this office, that the indirect effects have been of equal value; that it has been a very important event in the education of the country. It has given to the teachers throughout

the land a rare opportunity to enforce upon their pupils the lesson of the boyhood and manhood of a great and good man, and to teach them the appreciation of those great ideas of which he was an exponent. It has led to meetings where Agassiz's methods of teaching have been explained and discussed. To the established associations for the study of Nature it has given a new impulse, and it has caused the formation of new ones, particularly among the young. Teachers everywhere have found in this plan to honor an eminent man, who claimed above all else that he, too, was a teacher, a new motive to faithful service. In confirmation of this opinion we quote from a letter lately received from Hon. Newton Bateman, the well-known superintendent of education of Illinois: "I am sure that the indirect results of the movement have been exceedingly valuable,—results that would have been cheaply secured by the expenditure of many times the amount of time, money, and labor that the whole enterprise has cost."

It is proposed to keep the fund open permanently for contributions.

A table showing the Amounts Contributed and the Number of Contributors to the "Teachers and Pupils' Fund" of the Agassiz Memorial from all sources, to date.

STATES.	Contributors.	Amount.	STATES.	Contributors.	Amount.
Maine, . . .	743	\$83 90	Indiana, . . .	214	\$33 35
N. Hampshire, . . .	526	64 00	Michigan, . . .	1,755	172 04
Vermont, . . .	163	18 76	Illinois, . . .	30,380	1,982 54
Massachusetts, . . .	10,941	2,555 07	Wisconsin, . . .	2,376	226 04
Rhode Island, . . .	459	140 05	Minnesota, . . .	1,166	114 67
Connecticut, . . .	227	54 36	Iowa, . . .	919	71 25
New York, . . .	6,590	1,106 97	Missouri, . . .	10,975	882 79
New Jersey, . . .	650	216 99	Kansas, . . .	315	45 00
Pennsylvania, . . .	500	108 81	Nebraska, . . .	59	12 75
Maryland, . . .	12,600	815 33	Colorado, . . .	390	66 25
Delaware, . . .	25	19 00	Nevada, . . .	290	60 00
Dist. of Columbia, . . .	2	25 00	California, . . .	-	47 50
Virginia, . . .	30	5 00	Texas, . . .	1	2 00
West Virginia, . . .	195	25 45	England, . . .	2	34 16
N. Carolina, . . .	2	2 00	Unknown, . . .	-	27 31
S. Carolina, . . .	1	25			
Ohio, . . .	4,200	174 25	Total, . . .	86,696	\$9,192 74

Total number of contributors (estimated), 86,696.

Total of contributions, \$9,192.74.

For the Committee,

JAMES M. BARNARD, *Treasurer.*

(3) RECAPITULATION OF THE AGASSIZ MEMORIAL FUND.

General subscription,	\$115,600 25	
Teachers and Pupils' Fund,	9,192 74	
Subscriptions of Messrs. Q. A. Shaw and Alexander Agassiz,	130,000 00	
	<hr/>	\$254,792 99
Interest paid to Faculty of Museum of Comparative Zoölogy at sundry times,—		
November, 1874,	\$1,072 70	
January, 1875,	1,130 00	
“ “	438 00	
July, 1875,	3,060 30	
Interest on Teachers' Fund,	180 00	
	<hr/>	5,881 00
		<hr/>
		\$260,673 99
Conditional State Grant,		50,000 00
		<hr/>
Total,		\$310,673 99

[D .]

FACULTY OF THE MUSEUM.

 CHARLES W. ELIOT, *President.*
ALEXANDER AGASSIZ, *Curator.*

JOHN B. S. JACKSON.

JOSIAH D. WHITNEY, *Secretary.*

THEODORE LYMAN.

 OFFICERS.

ALEXANDER AGASSIZ,	. . .	<i>Curator.</i>
JOSIAH D. WHITNEY,	. . .	<i>Sturgis-Hooper Professor of Geology.</i>
HERMANN A. HAGEN,	. . .	<i>Professor of Entomology.</i>
NATHANIEL S. SHALER,	. . .	<i>Professor of Palæontology.</i>
JOHN McCRADY,	. . .	<i>Professor of Zoology.</i>
L. F. POURTALÈS,	. . .	<i>Keeper.</i>
THEODORE LYMAN,	. . .	<i>Assistant in Zoology.</i>
JOHN GOULD ANTHONY,	. . .	<i>Assistant in Conchology.</i>
CHARLES E. HAMLIN,	. . .	<i>Assistant in Conchology.</i>
JOEL ASAPH ALLEN,	. . .	<i>Assistant in Ornithology.</i>
WILLIAM JAMES,	. . .	<i>Assistant in Physiology and Comp. Anat.</i>
WALTER FAXON,	. . .	<i>Assistant in Zoological Laboratory.</i>
RICHARD BLISS, JR.,	. . .	<i>In charge of Ichthyological Department.</i>
S. W. GARMAN,	. . .	<i>In charge of Reptiles.</i>
J. H. BLAKE,	. . .	<i>In charge of Alcoholic Mollusca.</i>
PAULUS ROETTER,	. . .	<i>Artist.</i>

[E.]

TRUSTEES OF THE MUSEUM OF COMPARATIVE ZOÖLOGY,
1876.

THE GOVERNOR OF THE COMMONWEALTH,

ALEXANDER H. RICE.

THE LIEUTENANT-GOVERNOR,

HORATIO G. KNIGHT.

THE PRESIDENT OF THE SENATE,

GEORGE B. LORING.

THE SPEAKER OF THE HOUSE,

JOHN D. LONG.

THE SECRETARY OF THE BOARD OF EDUCATION,

JOSEPH WHITE.

THE CHIEF JUSTICE OF THE SUPREME JUDICIAL COURT,

HORACE GRAY.

 THEODORE LYMAN.

ALEXANDER AGASSIZ.

 NATHANIEL THAYER.

L. F. POURTALÈS.

MARTIN BRIMMER.

ROBERT W. HOOPER.

QUINCY A. SHAW.

ABBOTT LAWRENCE.

WILLIAM GRAY, JR.

[F.]

EXPLANATION OF THE PLANS.

PLATE I. View of the wing, now partly built, together with its proposed addition and the corner-piece joining it to the main building. In the sketch here given, the main building is seen extending to the southern limit of the central segment. The view is taken facing the north-west corner of the Museum.

PLATE II. Shows the general ground-plan of the whole building; the darkly shaded portion is completed; the dotted part forms the proposed addition. Adjoining the general plan is a cross-section of the building on the line A B.

The basement will contain, as at present, rooms mainly devoted to the storage of alcoholic specimens and the work-rooms for the more bulky alcoholic collections. It contains, also, a room for plaster-casts and general work,—three rooms for the use of the anatomical and physiological departments, the boiler-room, coal-bin, and proper accommodations for aquaria, both marine and fresh-water, as well as suitable quarters for live-stock.

PLATE III. Shows the plan of the first story and first story gallery, the latter, except in two cases, the synthetic and lecture rooms opening into the rooms below, having for the sake of greater economy of space been floored over so as to gain very conveniently situated work-rooms for the entomological, the geological, and palæontological departments, as well as central rooms for a general library and a Curator's room.

The first story immediately under the gallery floor contains exhibition-rooms and work-rooms for the geological and palæontological department, so as to retain the heavy material near the bottom of the building. The synthetic room, giving a general synopsis of the arrangement of the Museum, is placed on this floor opposite the main entrance of the wing.

In the corner-piece we find, in addition to the hall and lecture-room, four smaller rooms for the use of advanced students and professors.

PLATE IV. Shows the disposition of the main floor of exhibition rooms, partly for systematic and partly for faunal collections. These rooms, all having a gallery, occupy the whole of the second story. The central space of the large hall in the corner-piece is destined to receive casts or originals of the larger fossil vertebrates.

The attic story has no gallery; it contains in the wing three exhibition rooms for the anatomical and physiological departments, and six work-rooms for the general use of the assistants of the Museum, to be distributed according to our needs. The corner-piece is entirely devoted to rooms destined for the teaching done in the different branches of natural history at the Museum.

Owing to the facility with which any section of the proposed building can be added without interfering with the existing conditions of things, additional room can always be provided when needed for any department or branch thereof, as rapidly as it outgrows the quarters assigned to it.

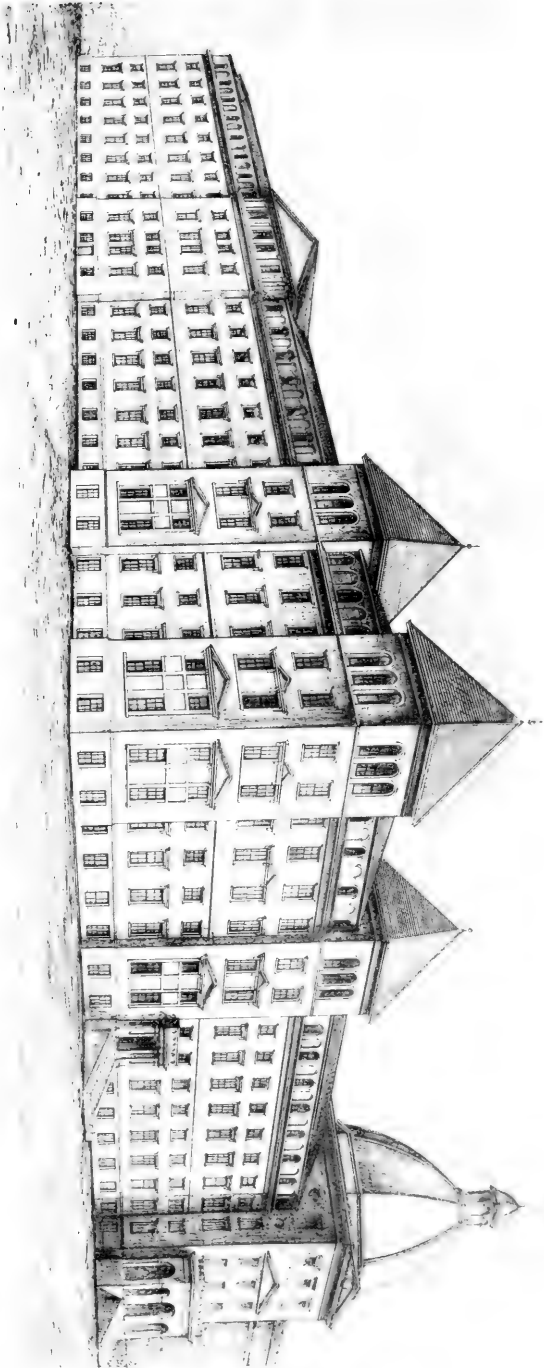


Plate I.

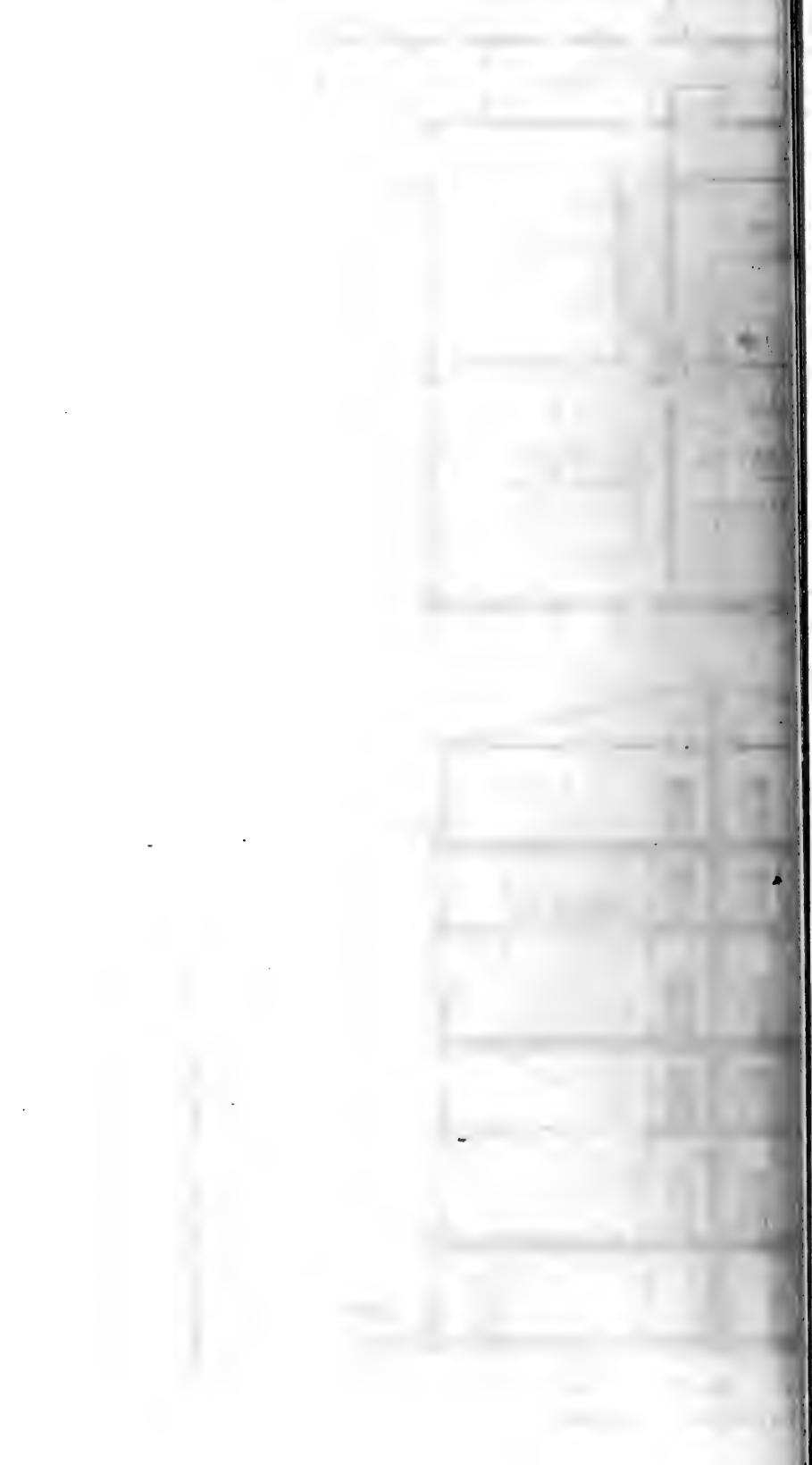
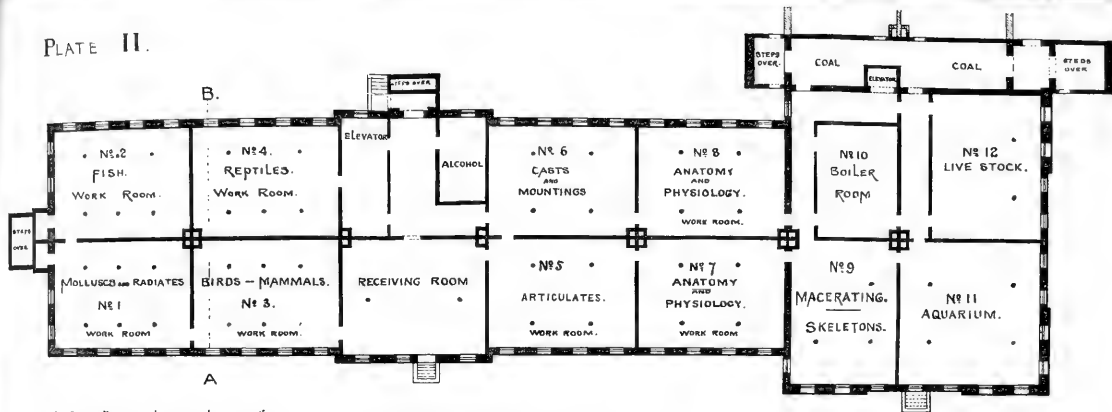
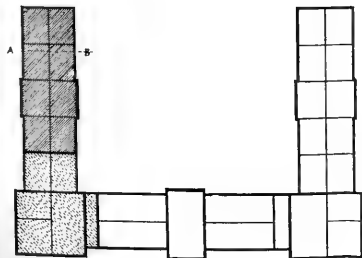


PLATE II.

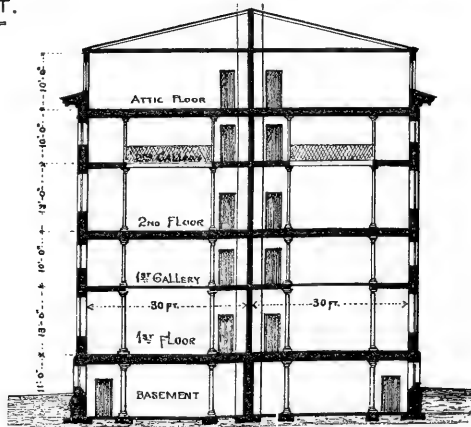


PLAN of BASEMENT.

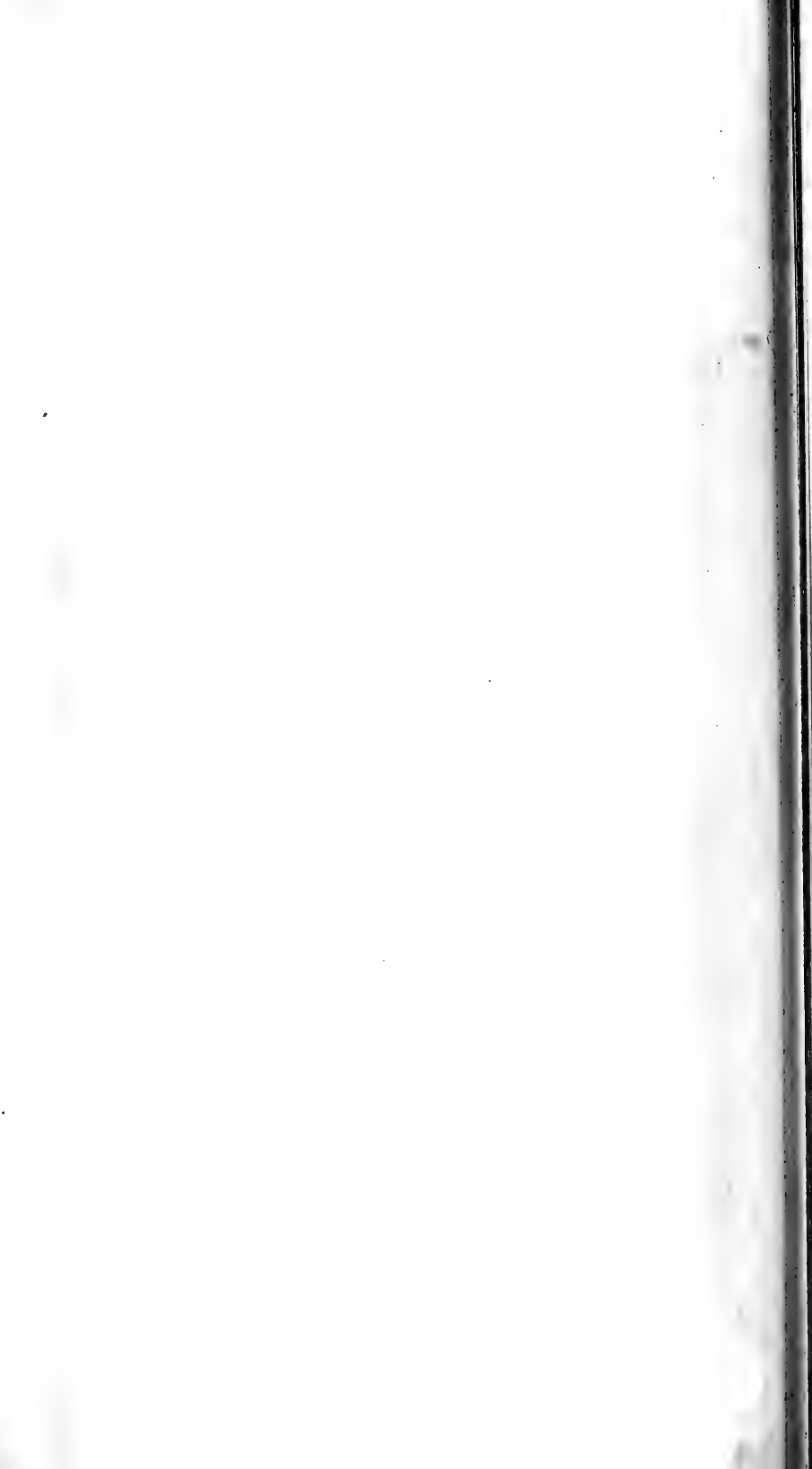
SCALE, 30 FT. TO AN INCH.



GENERAL PLAN.
SCALE, 120 FT. TO AN INCH.



CROSS SECTION, AT A --- B
SCALE, 20 FT. TO AN INCH.



PLAN OF FIRST STORY

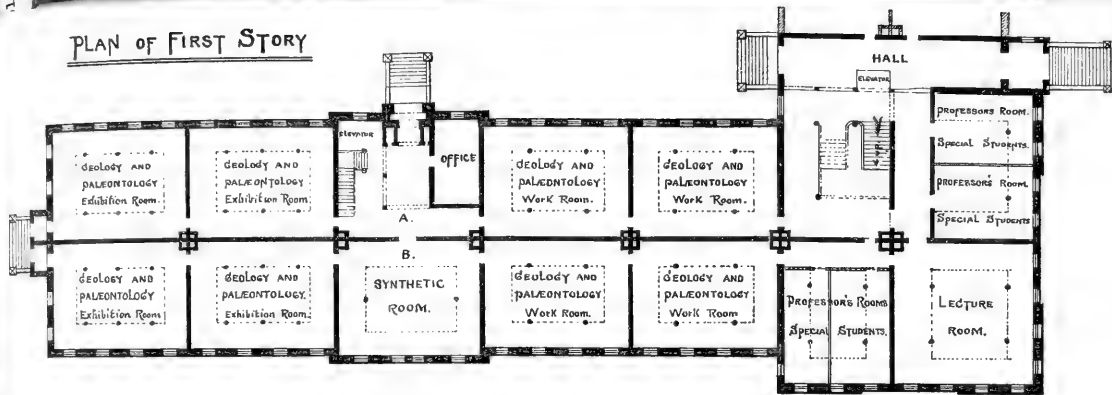
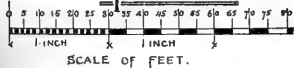
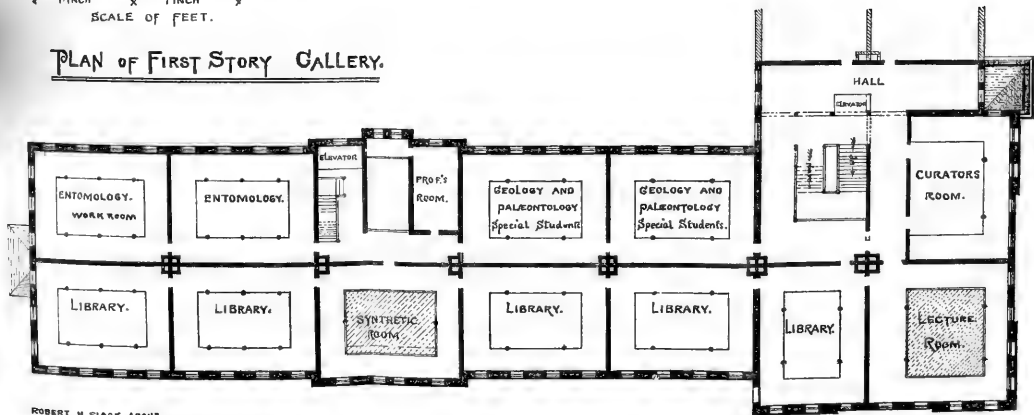


PLATE III



PLAN OF FIRST STORY GALLERY.





SECOND STORY AND GALLERY.

EXHIBITION ROOMS.

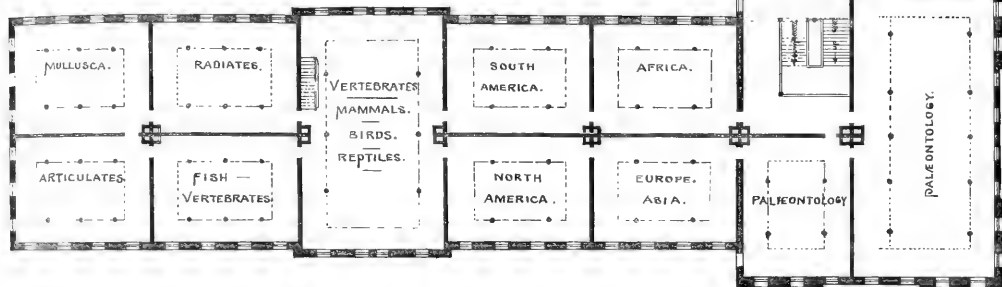
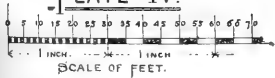
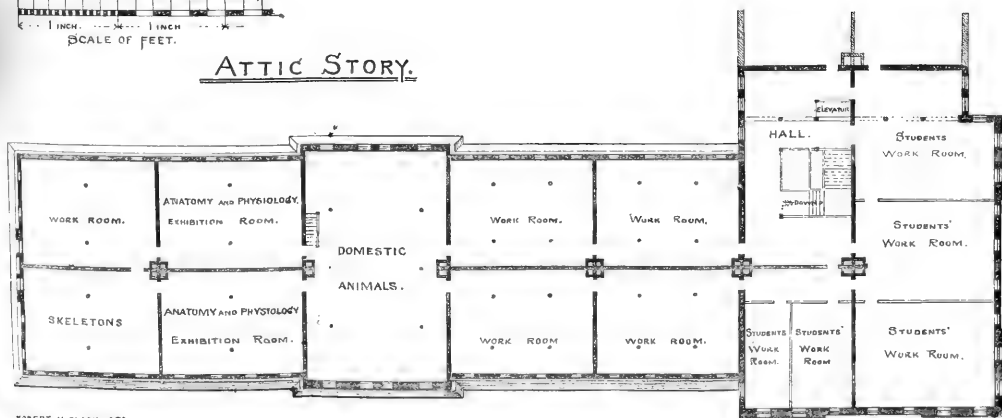
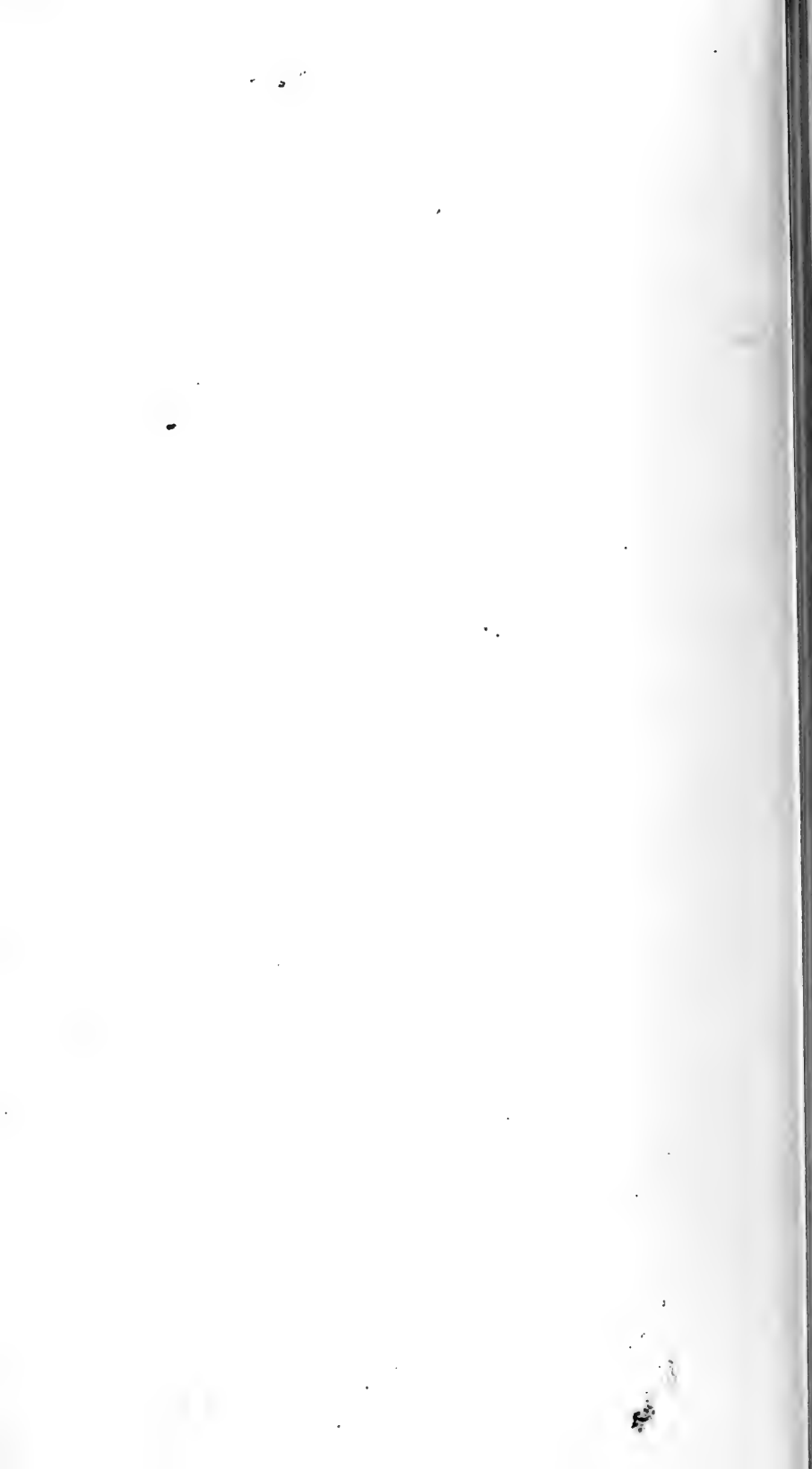


PLATE IV.



ATTIC STORY.





SENATE.

....No. 5.

MUSEU

RE

Museum of Comparative Zoölogy, Cambridge, Mass.

With the compliments of

ALEXANDER AGASSIZ.

LOGY,

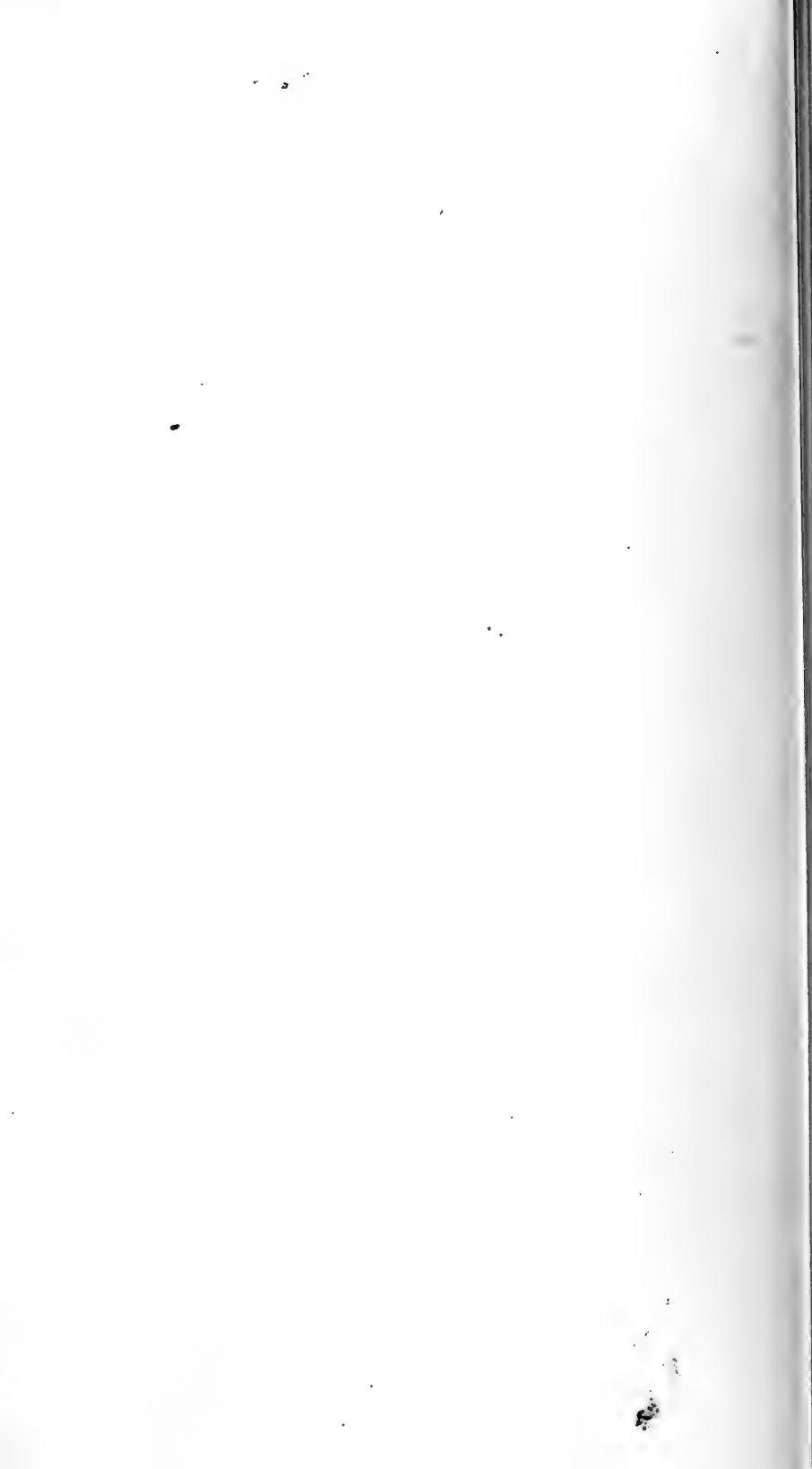
OR

BOSTON:

ALBERT J. WRIGHT, STATE PRINTER,

79 MILK STREET (CORNER OF FEDERAL).

1877.



ANNUAL REPORT

OF

THE TRUSTEES

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY,

AT HARVARD COLLEGE, IN CAMBRIDGE:

TOGETHER WITH THE

REPORT OF THE CURATOR

TO THE COMMITTEE ON THE MUSEUM,

FOR

1 8 7 6 .

BOSTON:

ALBERT J. WRIGHT, STATE PRINTER,

79 MILK STREET (CORNER OF FEDERAL).

1877.

Nos. 1-16.

CAMBRIDGE, MASS., U. S. A.
1871-1876.

BULLETIN

OF THE

MUSEUM OF COMPARATIVE ZOOLOGY

AT

HARVARD COLLEGE, IN CAMBRIDGE.

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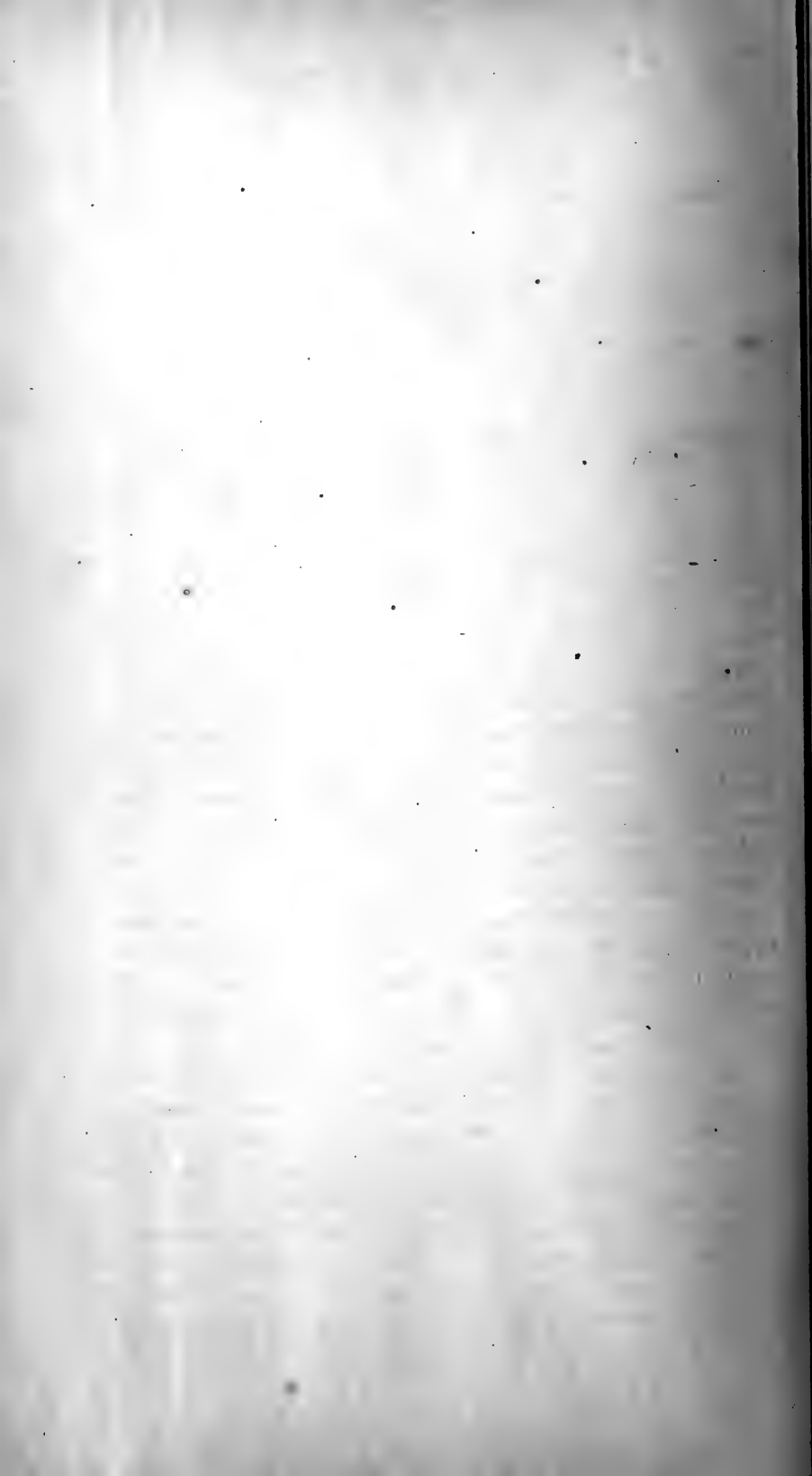
Commonwealth of Massachusetts.

BOSTON, January, 1877.

To the Honorable President of the Senate.

SIR :—The Trustees of the Museum of Comparative Zoölogy have the honor to present to the Legislature the Report of the Curator to the Committee on the Museum, marked [A]. There are added to the Report : [B], the petition of the Trustees to the Legislature, asking to be authorized to transfer the trusts in their hands to the Corporation of Harvard College; [C], the Act of the Legislature giving their consent to this transfer; [D], votes of the Trustees and of the Corporation of the College relating to the transfer of the property; [E], the indenture between the Trustees of the Museum and the President and Fellows of Harvard College, accepting the trust; [F], a Schedule of the property received by the Treasurer of Harvard College from the Treasurer of the Trustees; [G], report of a committee of the Museum Faculty on the publications of the Museum. [H] contains a list of the Faculty of the Museum and the Assistants appointed by them; and [I] a list of the present Trustees.

ABBOTT LAWRENCE, *Secretary.*



[A.]

REPORT OF THE CURATOR

TO THE

MUSEUM COMMITTEE.

As will be seen by this Report, the past year has been an important one in the history of the Museum, changing radically its financial management and greatly enlarging the field of its activity. Though the assistance and constant support of the State were all-important to the Museum in its early stages, enabling it, with the help of a separate board of trustees and an independent faculty, to develop more rapidly than it could have done in direct connection with any other educational establishment, the time has now come when the institution, which has thus far owed so much to the liberality of the State, must depend for its future prosperity upon the friends of the cause of education in general.

The organization of the Museum has been simplified little by little, and it has seemed wise to the present Board of Trustees to reduce the complication still further by consolidating the two boards hitherto holding the property and having charge of the institution into one body. They have thought it advisable to petition the Legislature for permission to transfer the property in their charge to the Corporation of Harvard College. The successful close of the Agassiz Memorial Fund placed in trust in the hands of the Corporation, offered a fitting occasion, and their petition asking for the

passage of an Act authorizing the proposed change, being cordially granted by the Legislature, the transfer of the property to the Corporation of Harvard College was duly made in accordance with said Act. [See the Appendix for the petition of the Trustees, the Act of the Legislature, the indenture between the Corporation of Harvard College and the Trustees, and the receipt of the Treasurer for the property so transferred.]

The objects to be obtained by the proposed transfer of the property in the hands of the Trustees of the Museum to the Corporation of Harvard College are : 1st, to simplify the somewhat cumbersome organization by which the property devoted to the Museum is managed, by placing the trust now controlled by two independent bodies, under the care of a single board ; 2d, to enable the Museum Faculty by this change to concentrate at the Museum the Natural History departments of Harvard University, now only mechanically connected with it ; 3d, to enable the Trustees of the Peabody Museum of Archaeology to erect an edifice eventually to be connected with the Museum building originally planned by the late Professor Agassiz, upon land assigned to them by the Corporation of Harvard College.

From the very foundation of the Museum, the articles of agreement between the Corporation of Harvard College and the Trustees, showed that a most intimate connection between the Museum and the College, so far as consistent with the rights of the public, was contemplated. Without diverging from the spirit of the charter, modifications of these first articles of agreement were subsequently rendered necessary. This was partly a result of the growth of the establishment and partly the desire on the part of the Trustees, fully shared by the Corporation, to prevent by a concerted action, unnecessary duplication either in the instruction to be given at the Museum, or in the collecting of the material necessary to illustrate the several departments. With this object, the instruction in natural history at the Museum has gradually been assumed by the College in exchange for the facilities given by the Museum in the way of collections and laboratories, the Museum retaining, however, the general direction of the educational interests.

The Corporation of the College now pays annually, in salaries connected with the Museum, nearly as much as the original income of the Museum itself. This makes a closer official relation between the Museum and the University doubly important, were it only for the fact that the specimens necessarily accumulated by the instructors in the several departments of natural history are, under the present conditions, merely deposited in the Museum without becoming an integral part of its collections, thus depriving the institution of a great element of stability. It is probable, indeed, that no change in their disposition will be made, but it needlessly complicates the care of the collections.

The Faculty of the Museum, an independent body, distinct from the Trustees and Corporation, and duly recognized in the original articles of agreement between the two bodies, will still continue to exist, and will retain as hitherto the whole scientific direction of the institution and the care of the collections. This Faculty appoints its own members, subject to the approval of the Corporation; they nominate the Curator of the Museum and his assistants, and determine in a general way the policy of the Museum. The direction of the instruction belongs to the Curator, who determines also the expenditures, subject to the control of the Faculty. Thus, while the Trustees have always held the real estate, collections, and buildings, as well as about \$116,000 in trust as a permanent fund, being in fact the guardians of the material interests of the State therein involved, they have never had any voice in the details of the management, the latter being intrusted to the Faculty. It is not proposed, in making this transfer, to alter in any way the status of the Museum Faculty as above defined. With the establishment of the Peabody Museum, a distinct trust was created for the maintenance of one branch of natural history originally included in the plan of the Museum of Comparative Zoölogy, and the latter was thus relieved from the necessity of providing for that department. It is, however, most important that the scientific aims represented by these two institutions should not be disconnected, and the transfer of the Museum trusts to the Corporation of Harvard College enables the latter, as above stated, to assign to the Peabody trustees a site for their new building on the

Museum grounds.* The advantages to be gained by a concentration of all the natural history departments within one enclosure, are too obvious to need enumeration, and this centralization will undoubtedly build up, within a comparatively short period, a comprehensive institution of natural history, with facilities enjoyed by few like establishments elsewhere.

The State has given about	\$290,000 00
Private sources, including college, about	695,000 00
	<hr/>
	\$985,000 00

Which is represented by the following investments: \$116,000 held by the Trustees, and \$350,000 held by the Corporation, the balance being in land, building, collections, and the work done upon them since 1859. In addition to the income derived from these funds, the College pays annually about \$10,000 towards the salaries of instructors connected with the Museum and its different departments, while the Peabody trust virtually increases the resources of the Museum by providing in one of the most expensive branches of natural history, the means for a professorship, beside a collection and building fund, amounting together to more than \$200,000.

As the trusts held for the Museum by the Corporation of the College have all been given for the benefit of the institution on certain conditions which cannot readily be changed, the proposed consolidation offers the readiest means of carrying out at once a plan the completion of which seemed to the founder hopelessly remote, while the transfer of the care of the property to the corporation of Harvard College protects the interests of the State and in no way lessens the value of the Museum to the public.

For the work carried on in the different departments, I would refer to the special reports of the professors and assistants.

The instruction at the Museum has been given by Profs. Whitney, Hagen, Shaler, McCrady, Dr. James, and Mr. Allen.

Prof. Whitney gave a course of thirty-four lectures on economical geology, which were attended by some candidates

* Early last summer, the Corporation assigned, as was expected, a site on the Museum grounds to the trustees of the Peabody Museum.

for higher degrees, and students in the fourth year of the engineering course of the Lawrence Scientific School. These lectures were given in the Lawrence Scientific School building for want of accommodation in the Museum, a difficulty which has now been remedied.

Dr. Hagen gave special instruction in entomology to eight persons during the past year,—one undergraduate, six graduates, and one young lady.

Mr. Allen also gave instruction in ornithology to one special student.

Dr. James gave instruction last year to eight seniors, twenty-five juniors, three sophomores, and two scientific students in vertebrate anatomy and physiology. The anatomy was taught mainly by lectures, and was confined to osteology almost wholly. In physiology, Küss's Elements was used to recite from in addition to lectures. The whole class was obliged to draw pretty thoroughly from nature the facts described in the osteological part of the course; and the laboratory was thrown open to all who chose to dissect. Fifteen to twenty of the class dissected, quite assiduously, fishes, fowls, rabbits, cats, turtles, frogs, etc., and some time was daily spent by Dr. James in supervising them. Dr. James also gave special instruction in anatomy to two extra students who arrived late in the year.

Prof. McCrady's lectures on the zoölogy of the invertebrates were unfortunately interrupted during December, owing to a dangerous illness, which compelled him to leave Cambridge for the South. His lectures were attended by five undergraduates and by five special students. During Prof. McCrady's illness, the laboratory work was continued as usual under Mr. Faxon's supervision.

Prof. Hamlin has continued to take charge of the instruction to undergraduates in structural geology and physical geography.

As will be seen by his Report, Prof. Shaler, in addition to his regular instruction at the Museum, has taken charge of the summer school of geology in connection with the work of the geological survey of Kentucky.

I would heartily congratulate the Museum on retaining the services of Dr. Hagen, who has declined an urgent and

most tempting invitation to take charge of the great entomological collection in the Berlin Museum, in order to cast his lot with us. It is no slight encouragement to a young institution like the Museum that such an investigator prefers to continue his work here, rather than become the successor of the eminent men who have held the place Dr. Hagen now refuses.

It gives me pleasure to be able to state that Mr. F. W. Putnam has returned to the Museum after an absence of twelve years, and is now again in charge of the ichthyological collection.

For important volunteer work, I have to thank as usual Messrs. Pourtalès, Lyman, and Cary.

The publications of the Museum have been continued with more activity than usual. Five numbers of the Bulletin (completing Vol. III.) have been published, four of which contain partial results of the exploration of Lake Titicaca made by myself and Mr. Garman, prepared by Messrs. Garman, Derby, Pourtalès, Allen, Faxon, and myself. One number of the Bulletin, on the Development of Salpa, is by Mr. Brooks, the work for it having been done in my laboratory at Newport.

The scope of the quarto publications of the Museum having been enlarged according to a recommendation of the Museum Faculty, their title has been changed to Memoirs, the former publications collected into volumes, and the fourth volume of Memoirs concluded by an important paper by Mr. Allen on the North American bisons,—twelve plates. This Memoir has been published in connection with the geological survey of Kentucky, the Museum supplying a number of the plates accompanying the paper, the survey electrotyping the text, and both parties profiting by this joint method of publication. It is hoped that the Museum may hereafter continue with other individuals or institutions this mode of issuing a part of their publications.

A shorter paper by Dr. Hagen, on Insect Deformities, illustrated by a single plate, has also been published during the past year.

The Museum has also supplied materials to assist in preparing several publications issued in European scientific journals ;

Prof. Zeller of Stettin has written three papers on North American Microlepidoptera in the Proceedings of the Zoölogical Botanical Society of Vienna, and he has also described a large number of species, mostly from Texas. Prof. Frey of Zurich has described in the Stettiner Entom. Zeitung, a number of North American Tineina. Mr. E. von Harold of Munich has a couple of papers on Coleoptera from the Argentine Republic, in his Coleopt. Hefte. Mr. R. McLachlan of London has published a monographical revision of the Trichoptera; and Dr. Hagen a paper on Phryganidæ in the Proceedings of the Zoölogical Botanical Society of Vienna. A large amount of Museum material has also been available to Mr. Selys Longchamp of Liege, Belgium. He has published a number of memoirs on Odonata in the Bull. de l'Académie Royale de Belgique.

As will be seen by the reports of Messrs. Putnam and Gorman, a large number of collections of fishes and reptiles were distributed to our correspondents. They consisted mainly of materials gathered in the Thayer Expedition to Brazil, and in the voyage of the Hassler. A number of collections of insects, corals, fishes, reptiles, etc., have been distributed in this State.

Considerable material has, as usual, been supplied to original investigators, where it was possible to do so without interfering with the regular Museum work. Collections have been sent to Prof. Lovén, to Dr. Lütken, to Prof. Perrier of the Jardin des Plantes, and to Dr. Steindachner of Vienna. Dr. Steindachner has continued to use the material sent him for incorporation with his monographs on South American fishes. He has also published a finely illustrated memoir in the Mem. of the Zoölogical Botanical Society of Vienna, on the Reptiles of the Gallapagos Islands, from material collected by the Hassler Expedition.

Some progress has been made in the arrangement of two of the exhibition-rooms, that of Radiates and of the Synoptic room, in both of which a good deal of work has been done. The latter, as far as arranged, proves unusually attractive to visitors.

ALEXANDER AGASSIZ.

REPORT ON THE INSTRUCTION IN GENERAL GEOLOGY AND
PALÆONTOLOGY.

By Prof. N. S. SHALER.

During the year 1876, instruction in general geology has been given in the laboratory to two classes; during the first half of the year to a class of forty-eight persons, and in the second half of the year to a class of sixty-two persons. In this course, the instruction has consisted of lectures,—one hundred in number,—following the general course of Lyell's Principles of Geology; of field work in the district adjoining Cambridge, and of laboratory work during that part of the year when field work has been impossible.

A course of lectures on Palæontology, one hundred in number, has been given, during the first half of the year to a class of eight persons, and during the second half of the year to a class of ten persons. In this department a certain amount of laboratory work has also been required.

The summer course of Field Geology and Palæontology, designed to supplement the winter instruction and also to aid teachers in acquiring proper methods of teaching these sciences, was taught in connection with the work of the Kentucky Geological Survey, and by a journey through parts of the States of Virginia, Tennessee and North Carolina. This course was attended by a class of sixteen persons. As will be seen by comparing these numbers with those given in previous reports, there is a steady increase in the number of students in these departments. A corresponding increase has been made in the amount of the required work and the thoroughness of the examinations thereon. The field instruction, both in the neighborhood of Cambridge, during term time, and in the wider field of the summer course, has been more fully organized. By the aid of my assistant, Mr. W. M.

Davis, I have been able to secure field teaching on at least two days in each week during the season when out-door work is practicable. This part of the instruction is so conducted as to require each student to acquaint himself by practical work with the elements of the method of geological determinations. A large part of each class attains considerable skill in making sections and in determining the nature and extension of formations.

During the last session of the summer school, the work was so directed as to secure some important contributions to our knowledge of the structure of the Appalachian system of mountains. A carefully measured section was made from the Cumberland Mountain across the valley of East Tennessee to the Black Mountain of North Carolina. This section is, for its length, the most carefully made of any known to me in this country, and when published will throw a good deal of light on some of the most important problems of mountain structure.

Although some advance has been made in the preparation of materials for teaching, the most important gaps in our collection of such objects remain unfilled. It has been found very difficult to arrange and keep in order a sufficient cabinet of palæontological specimens, to give the student a good basis for laboratory work. To this task the whole time of one competent assistant could well be given. Considerable additions have been made to the collection of maps and models for geological illustration, and a collection of several hundred specimens illustrating the principal problems of lithology has been made, freely accessible to students. A collection of over one hundred volumes of general works on geology and zoölogy has been placed in the laboratory for free use. Most of these books have been deposited by the Harvard Natural History Society, with the condition that they remain freely accessible to students.

A good deal of my time, as well as that of my assistant, Mr. Davis, has been given to the fostering of the Harvard Natural History Society, an association which now serves as a centre of scientific inquiry among the advanced students of the University. This society has become a valuable helper of the natural history instruction given in the Museum. Its

special aims are to train students in methods of presenting their researches, and to secure their attention to all the noteworthy contributions on natural science. To accomplish this latter purpose, arrangements have been made with the special students of various subjects to bring the contributions in their several departments before the society for criticism and discussion.

The next session of the summer School of Geology will begin at the Museum in the first week of July, 1877. After about three weeks' work on the collections and in the neighboring geological fields, the work will be continued in the form of an excursion through the Connecticut Valley, the Berkshire Hills, and the Schoharie Valley in New York. At the close of the regular term of the school, the work will be extended along the line of the railway to Louisville, Kentucky, and will close with a few weeks' study in the cavern district of Kentucky.

REPORT ON THE MAMMALS AND BIRDS,

By J. A. ALLEN.

During the past year, two important collections have been received from the Rev. M. M. Carleton, from near Umballa, Northern India. These embrace in the aggregate eighty-six specimens of mammals, representing twenty-three species, and two hundred and ninety specimens of birds, representing seventy species. The collections of birds consist mainly of large species, and embrace pretty full suites of the raptorial and rasorial birds of Northern India. From the Smithsonian Institution we have received the first duplicate series of the types of Dr. Elliott Coues's "Monograph of the North American Muridæ," embracing twenty-five species and varieties, represented by about fifty specimens. Also, from the same source, twenty-two skulls of North American hares, and several skulls of beavers and porcupines. From Mr. Charles Coxen we have received twenty-five species of birds, represented by twenty-eight specimens, from Queensland, Australia, to whom has also been sent a collection of North American birds, numbering eighty-five specimens and representing sixty-one species.

Among other noteworthy additions are some thirty specimens of birds and birds' eggs, contributed by Capt. Charles Bendire, U. S. A., from Camp Harney, Oregon, which includes a fine specimen of Ross's goose (*Anser Rossii*), and large series of skins of *Leucosticte tephrocotis* (vars. *tephrocotis* and *littoralis*). Capt. Bendire has also sent us a small lot of skins of squirrels and marmots. From Prof. J. D. Whitney has been received a valuable lot of fossil mammalian remains collected by him some years since from the lead crevices of the Wisconsin Lead Region. Dr. S. L. Yates of Centreville, Alameda County, California, has presented a horn of *Bison antiquus*, and bones of the extinct elephant from Alaska.

By purchase have been added a skeleton of *Delphinus delphis*, a small collection of rare nests and eggs of Rocky Mountain birds, and a series of casts of the interior of crania of some forty species of mammals, prepared at the Museum of the Royal College of Surgeons of England.

Early in the year, some twenty or more skins of South American mammals, including the llama, guanaco, vicuña and alpaca, as well as several species of monkeys, sloths, rodents and carnivores, were sent to Prof. Ward to be mounted, and have already been returned satisfactorily prepared. At the same time were sent him for preparation about one hundred and sixty osteological pieces, a large proportion of them skeletons, which still remain in his hands.

During the year, considerable advance has been made in the critical determination of the exotic birds, particularly the South American, and much revisionary work has been done upon the mammals. The collections, including both the skins and the alcoholic materials, remain, as heretofore, in safe condition.

REPORT ON THE REPTILES BATRACHIANS AND SELACHIANS.

By S. W. GARMAN.

For additions to the collections in these departments, the Museum is under obligations to its friends, Samuel Powel, Aug. R. Grote, Hendrick Butler, Chas. Sarkady, Jos. L. Barfoot, Thos. G. Cary, F. W. Putnam, and J. Henry Blake. All of the contributions were in excellent condition. The work of changing the alcohol has been continued through the entire collections. Although redistillation caused a loss in bulk of about one-half, the amount of alcohol withdrawn, added to what was set free by sending duplicates away, lacked but a barrel of being enough to replace the twenty barrels needed for the change. Numerous experiments are being made to determine the relative stability of various metals when used for cans or labels, and the amounts of evaporation and comparative value of different liquids for preserving specimens. Thirty-seven collections, averaging forty species each, were sent to colleges and museums in different parts of this country and Europe for teachers' use and in exchange.

Such specimens as were needed in their studies have been taken out from time to time by the college students.

I am able to report these collections in better condition than ever before.

REPORT ON THE DEPARTMENT OF ICHTHYOLOGY.

By F. W. PUTNAM.

On taking charge of the collection of fishes contained in the Museum in September last, it was considered of primary importance that it should be placed in thorough systematic order before any other work was attempted. I therefore at once began the work of arranging the specimens in the several thousand jars now in the large room and gallery devoted to the department. This work has been carried on as fast as practicable, and the fishes contained in jars are now nearly all placed in their proper family or sub-family groups, and in some instances the genera have been separated. This work will be continued until the collection is so arranged that each genus will be by itself; the identification of the species and the arrangement of faunal and systematic collections can then be proceeded with to better advantage than heretofore.

I estimate that about one-fifth to one-quarter of the collection has been identified by various persons during the past few years, principally by Dr. Steindachner and Messrs. Bliss and Garman.

The elimination of a large mass of decayed material and many duplicate specimens, during the past two years, leaves the collection in as good order as can be expected until the further separation of specimens, in the jars which are still overcrowded, can be accomplished by their distribution to the several collections of the permanent arrangement.

I find by the records of the year, that the work of selecting duplicates for exchange and presentation to various institutions and individuals, begun by Mr. Bliss and completed by Mr. Garman, resulted in the distribution of forty-seven lots, each containing on an average about seventy species, and that the total number of specimens distributed was three thousand six hundred and fifty-six. As these specimens were all

identified and carefully packed in cans with alcohol, the time and expense necessary for this undertaking will be readily understood. By this distribution, seven educational institutions in the State received valuable named specimens ready for placing in jars in their respective museums. The rest of the lots were distributed to nine institutions or individuals in the United States and Canada, and thirty in the Old World.

The specimens of *Scomberesoces* sent to Prof. Lütken of Copenhagen, in January, 1875, have recently been returned with his identifications.

The few additions during the year consist of the following lots in alcohol:—

From the Rev. R. W. Wood, a collection from the Marshall Islands, made by the Rev. B. G. Snow.

From the Department of Engineers, U. S. Army, through the Smithsonian Institution, a series of the type specimens described by Messrs. Cope and Yarrow in the Zoölogical Report of the U. S. Geographical and Geological Surveys, west of the one hundredth meridian, under charge of Lt. G. M. Wheeler, U. S. Engineers.

From Mr. Charles Sarkady, seven species from Napo and Marañon.

From the Boston Society of Natural History, the bulk of the collection which I made at Lake Erie in 1865.

From Mr. T. G. Cary, one specimen from Cape Cod.

From Mr. J. H. Blake, a small collection from Provincetown, Mass.

From Alexander Agassiz, a collection of young fishes from Newport, R. I.

From Mr. Charles Bryant, several species from Onalaska.

From the Rev. M. M. Carleton, a few specimens from Eastern India.

In relation to the last two lots, it is to be regretted that only a few specimens could be saved from each, and I take this opportunity to call attention to the great care that should be given to the proper preservation of specimens intended for the Museum. It is not only necessary to enclose the specimens in tight bottles, cans or kegs, but care should be taken to change the spirits in which they were first placed for strong alcohol before starting the packages on their journey, and above all not to crowd the specimens. By packing cotton rags, hay, moss or shavings between the specimens, crowding

is prevented, the alcohol is brought in contact with the fishes from all sides, and the scales, fin-rays, and other delicate parts are protected. The disappointment to both sender and receiver is so great, when specimens, carefully collected, often at great expense, are destroyed from the lack of the above simple directions, that I do not hesitate to impress on all collectors the great importance of following them, when making up their future contributions to the Museum.

The large collection of Selachians has continued to be in charge of Mr. Garman during the past year, and his report will show what has been done in that group. I can only mention that the collection is well cared for, arranged in part in jars and in part in copper cans and large tanks, and that the specimens have been identified and catalogued by Mr. Garman during the few past years.

Mr. Garman has, during the year, also changed the alcohol in many of the large jars in the upper fish-room, and for this purpose about two hundred and seventy gallons of alcohol were required.

In regard to the portion of the collection still remaining in bulk in copper cans and large jars in the fish-room in the basement, nothing has been done during the year, and it will be part of the work for this winter to examine its condition and separate the specimens as far as practicable, in order to complete the systematic arrangement of the class.

In closing this Report, I beg leave to express my gratification in regard to the general good condition of what I believe to be the largest and most important collection of fishes in existence, to the charge of which I have the pleasure of returning after an absence of twelve years.

REPORT ON THE INSECTS.

By DR. H. A. HAGEN.

Additions to the collection : from—

1. Mr. Jones, from Bermuda Islands. Several insects from Bermuda Islands.
2. Mr. Palmer. Lepidoptera from Guadaloupe Island, Cal.
3. Mr. J. A. Allen. Insects from Yellowstone.
4. Dr. J. H. Kidder, from New York. Odonata from New Zealand.
5. Mr. S. W. Garman. Insects and Fossil Insects from Illinois.
6. Count Kornis, from Austria. Cave Beetles from Krain, Europe.
7. Rev. N. H. Chamberlain. An African Locust, taken at sea, 1,200 miles from land.
8. Dr. C. A. Dohrn, from Stettin. Five hundred and twenty-seven specimens of Coleoptera, all new to the collection. (Exchange.)
9. Mr. H. Edwards, from San Francisco, Cal. Neuroptera.
10. Mr. T. V. Chambers, from Covington, Ky. A very large lot of Microlepidoptera, types of the species published by him.
11. Mr. H. Strecker, Reading, Pa. A large lot of Lepidoptera of the United States. (Exchange.)
12. Dr. A. Staudinger, from Dresden. A large lot of Lepidoptera from Europe. (Exchange.)
13. Mr. Beddome, from Queensland, Australia. A lot of Lepidoptera.
14. Dr. C. A. Dohrn, from Stettin. A large collection of Staphylinidæ and Pselaphidæ, named. (Exchange.)
15. Mr. Meade, Bradford, Eng. A large lot of types of Anthomyidæ, presented by Baron Osten-Sacken.

16. Mr. Fr. Sanborn. Biological specimens from the United States.
17. Mr. R. Thaxter. Odonata from Florida and New Brunswick.
18. Mr. C. E. Webster, from Binghamton, N. Y. *Cæstrus emasculator*.
19. Mr. F. Steindachner, Vienna, Austria. A large lot of Lepidoptera from Tyrol.
20. Baron Osten-Sacken. A large lot of Neuroptera, collected by him in California, Nevada, Utah, and biological specimens; also oak galls from California.
21. Mr. J. Behrens, Saucelito, Cal. Neuroptera.
22. Mr. T. V. Chambers, Covington, Ky. A lot of Microlepidoptera from Colorado.
23. Mr. L. Cabot. *Catocala relictæ* from Manchester, Mass.
24. Mr. H. Strecker, Reading, Pa. A very large lot of Lepidoptera, mostly new to the collection. (Exchange.)

The additions to the Coleoptera, Lepidoptera, and Neuroptera are prominently important.

A large part of the time of Miss M. Clark and myself had to be spent in emptying about twelve hundred boxes needing repair and new paint, in destroying the Museum's pests, and watching the infested boxes. Now the insects are again in good condition.

Baron Osten-Sacken has published a monograph of the *Tabanidæ* of the United States. The types are in the collection. Some families of the *Muscidæ* of the United States are now worked up by him, and partly in England by Mr. Meade.

The United States Lepidoptera, forming a separated collection, are now arranged and mostly determined. For the determination of a large number of the *Noctuidæ*, the Museum is indebted to Mr. H. K. Morrison; of the *Geometridæ*, to Dr. A. S. Packard. The *Tineidæ* received a very valuable addition by a large number of types presented by Mr. T. V. Chambers.

The general collection of Lepidoptera is now arranged for *Papilionidæ* to the end of the *Satyridæ*, and a part of the *Bombycidæ*. The Museum is indebted to Mr. Strecker for a large amount of determinations.

Concerning the Coleoptera, the United States collection is throughout in order, and has been used by several students. For the general collection, the arrangement of the Curculionidæ, Brenthidæ, Anthribidæ, Bruchidæ, is finished. The collection contains for those families about one-third of the species known and two-thirds of the genera.

The large addition of specimens determined by first-class authorities allowed us to arrange the Staphylinidæ and Pselaphidæ, containing about one-fifth of the known species. During the last month the Buprestidæ were arranged, and the family of Carabidæ commenced.

REPORT ON THE CRUSTACEA.

By WALTER FAXON.

The chief work on the collection during the past year has been the continuation of the *scientific* determination and cataloguing of the specimens. At the same time, the duplicates are eliminated, and, being identified and labelled, become for the first time fit for exchange. One may form some notion of the condition of the collection, when it is known that in the group of *Maioids*, answering to 373 catalogue numbers, but forty had been previously identified, mostly by Stimpson.

The card-catalogue system, previously introduced in other departments of the Museum, has been adopted here, and together with a duplicate-sheet catalogue, in which the objects are entered in a consecutive numerical order, fulfils all requirements.

A series of recent and fossil *Crustacea* has been prepared and mounted for the Synoptic collection, and is now on exhibition.

Collections have been received during the year from—

Agassiz, A. *Larvæ* from Newport, R. I.

Bundy, W. F. *Cambarus* from Racine and Ironton, Wis.

Hammond, G. G. *Callinectes* from New London, Conn.

Higgins, Mr. Three species, eight specimens, from Drownville, R. I.

Leinney, W. M. Living *Cambarus juvenilis* from Perryville, Ky.
(In exchange.)

Peabody Academy of Science. *Myctiris* from Newcastle, N. S. W.;
Palæmon Amazonicus? from Para, Brazil. (In exchange.)

Smith, S. I. Three species from Provincetown, Mass.; New Haven, Conn.; Wisconsin; San Francisco, Cal.

Unknown. *Lithodes Maia* from Pigeon Cove, Mass.?

Van Vleck, B. H. *Cambarus*.

Wood, Rev. R. W. Collection made at the Marshall Islands by the Rev. B. G. Snow.

REPORT ON CONCHOLOGY.

By JOHN G. ANTHONY, Assistant in Conchology.

The progress made in this department during the current year will compare favorably with that of preceding years, and is on the whole most satisfactory.

The same plan of revision and re-identification of every species in our collection which was in operation at the close of the past year has been continued in this, and so far as our Univalves are concerned, has been satisfactorily completed. The result has been the critical examination and cataloguing of eleven thousand three hundred and twelve species, which is the number at present in our collection. The bivalves are not, of course, included in that number, that part of the collection being now under examination and very far from being completed.

As fast as we have received species and specimens designed to be added to the collection, they have been carefully cleaned and mounted for exhibition by my daughter, who attends to this part of the Museum work, and this has been done with her usual commendable skill.

Among our other duties, the cause of education has not been forgotten or neglected, and this department has sent out during the current year no less than seven collections of shells, selected expressly to show generic forms. These have been presented to educational institutions, to enable them to teach this branch of natural science more effectually.

We have received since our last report twenty-nine packages, containing one thousand and eighty-two species and seven thousand six hundred and thirty-four specimens. This is about our usual number, though as we now solicit only such species as will add directly to our numbers, we ought not to expect to receive as large accessions as when our collection being smaller we required a larger range of species.

Dr. Dohrn has not been wanting in his usual kindness, and although he has sent us but one package of two hundred species, it contained one hundred and eighty-three species which were not before in our possession, and illustrated many genera and sub-genera of which we previously had no representatives.

Mons. Morelet, too, has again favored us, and this time with a small invoice of species which, however, being from Morocco and North China, were especially acceptable, and added twenty species to our number.

From Dr. Haast of the Canterbury Museum, New Zealand, we received a valuable contribution of marine shells from that coast, adding twenty or more new species.

Since our last report, we have heard of the death of one of our most valued contributors, Mr. Charles Coxen of Queensland. Before his death, which took place on the 17th of May last, he had prepared and packed a box which has since been forwarded us, containing not only one hundred and fifty species of the fine shells of that region, but a fine contribution of bird skins of which Mr. Allen will speak more particularly.

Our consignments during the year have been to twenty-eight persons and institutions, being forty-two packages, containing four thousand one hundred and thirty species and ten thousand five hundred and thirty-one specimens.

This is somewhat larger in amount than last year, and is considerably in excess of our receipts; but the large contribution we have made to educational institutions, and some payments made on account of other departments, have helped materially to swell the amount.

REPORT ON CONCHOLOGY.

By CHARLES E. HAMLIN, Assistant in Conchology.

The revision and determination of species of marine shells, in which I have been chiefly engaged during my connection with the Museum, has proceeded as regularly and rapidly through the past year, as numerous interruptions have permitted. The identification of Gasteropoda having been completed in September, 1875, I began work on the Lamelli-branchiata the following month, and to this all time, not otherwise occupied, has been devoted.

In the early spring of this year, considerable time was given to selecting and naming a series of marine shells for the Synthetic collection.

Several weeks of April and May, and part of the present fall, have been given to putting in order and arranging in the new glazed cases of the attic, the Tertiary, Cretaceous, Jurassic, and Triassic fossils.

At present I am engaged in arranging the Palæozoic fossils of each age by classes. With the return of spring, preliminary labor on this part of the Palæontological collection will be completed, when it is hoped that the fossils will be well secured from dust, and placed in such convenient order as will facilitate access to them, and the subsequent special study to which they will be submitted. In work upon the fossils, I have had the efficient aid of Misses Atkinson and Anthony.

Instruction of a college class in Structural Geology and Physical Geography has occupied the greater part of two days of each week during term time.

REPORT ON RADIATA.

By L. F. POURTALÈS, Keeper of the Museum.

No important additions to this department have been made during the past year. Several sets of duplicate corals have been forwarded to different institutions, in exchange for specimens received in other departments of the Museum, and a number of sets of named species have been prepared and laid aside for future similar use.

The synthetic-room, on the first floor of the Museum, has been in part arranged, according to the plan of the late Professor Agassiz. The Protozoa, Radiates, Crustacea, Birds and Mammals, are in their places, represented by characteristic specimens of the principal families. The other classes are rapidly advancing towards complete arrangement. The room is already used by students to a considerable extent, being conveniently situated relatively to the lecture-rooms, and presenting a general view of the animal kingdom in a small compass.

In the room devoted to the systematic collections of Radiates, the different orders of Echinoderms have been placed on exhibition, with the exception of the Holathuridæ, which will also soon be arranged. The remaining space will be occupied by the sponges and by the Alcyonoid corals, when the latter are returned by Professor Kölliker.

The fossil corals have been put in order, named in part, and catalogued. They are now kept in the new glass-cases in the attic, under better protection from the dust than heretofore, and will be readily accessible when wanted. As in former years, Miss Hyde has done most of the work of cataloguing, mounting and arranging the specimens.

Mr. Theodore Lyman has taken charge, as usual, of the collection of Ophiuridæ and Astrophytidæ, of which preparations have been made, under his direction, by Miss Clark.

REPORT ON THE LIBRARY.

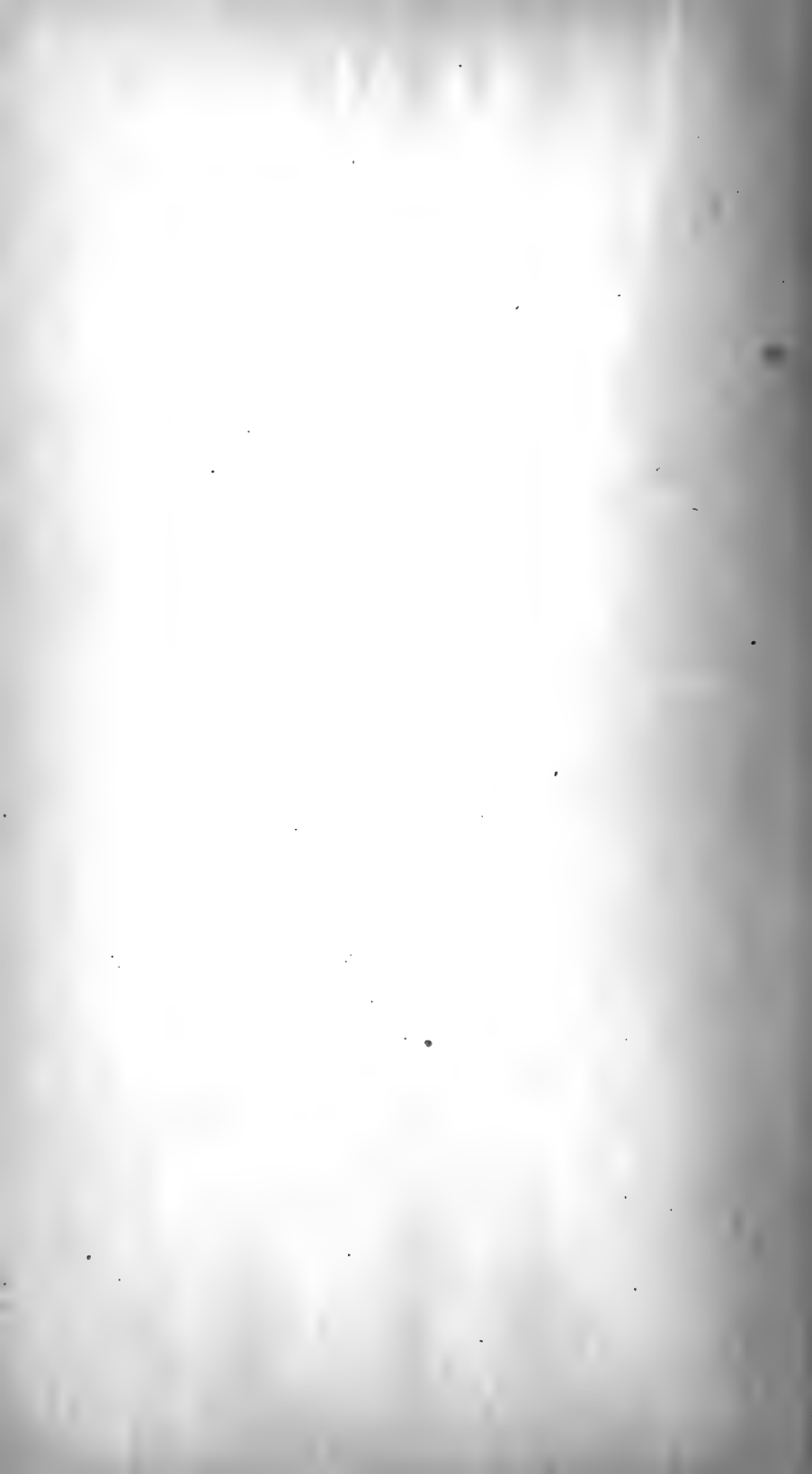
By MISS SLACK.

During the year ending October 1, 1876, the library has received 784 volumes, parts of volumes, and pamphlets.

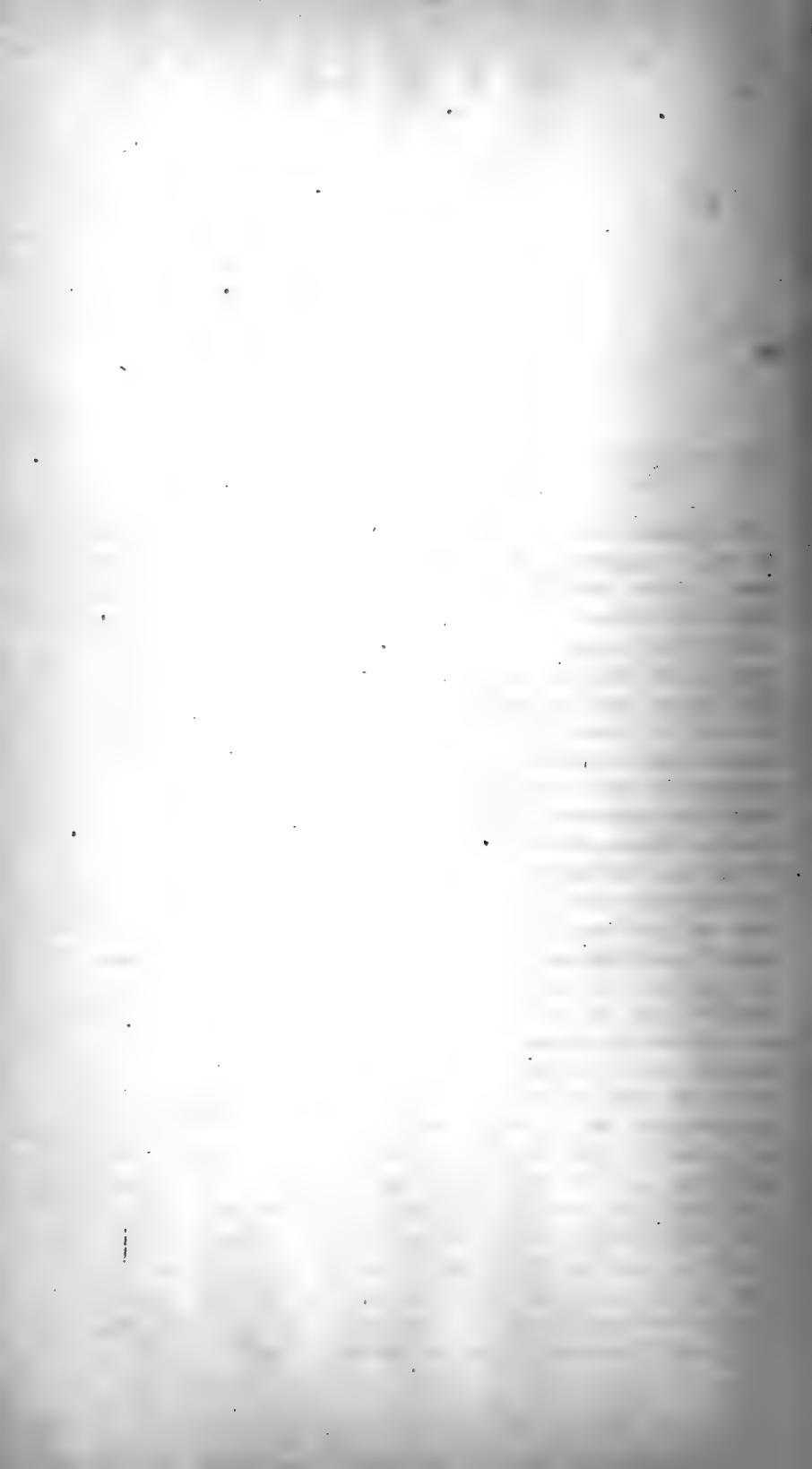
Complete works,	volumes,	110
Transactions, and other serial publications,	"	45
" " " " 	parts,	419
Pamphlets,		210
		<hr/>
		784

Of these, there were received from—

Mr. Alex. Agassiz : 61 volumes, 159 parts, 61 pamphlets,	281
Societies : 21 volumes, 242 parts, 3 pamphlets,	266
Library of Louis Agassiz : 26 volumes, 1 part, 53 pamphlets,	80
Baron R. Osten-Sacken : 35 volumes and 19 pamphlets,	54
Department of the Interior : 5 volumes, 9 parts,	14
Mr. L. F. Pourtalès : 2 volumes,	2
Dr. C. G. Giebel : 2 volumes,	2
Mr. S. H. Scudder : 1 volume and 7 pamphlets,	8
Mr. Theodore Lyman : 1 volume and 1 part,	2
Prof. A. H. Worthen : 1 volume,	1
Museum of Comparative Zoölogy : 5 parts,	5
Bought : 4 parts,	4
Bureau of Education : 3 parts,	3
Mons. P. H. Nyst : pamphlets,	12
Mr. A. Hyatt : "	10
Prof. O. C. Marsh : "	9
Prof. F. Plateau : "	7
Dr. F. Steindachner : "	5
Prof. J. Steenstrup : "	3
Mr. S. W. Garman : "	3
Mr. George Lawrence : "	2
Prof. B. G. Wilder : "	2
Miscellaneous,	9
	<hr/>
	784



APPENDIX.



[B.]

PETITION.

To the Honorable the Senate and the House of Representatives in General Court assembled.

The petition of the Trustees of the Museum of Comparative Zoölogy, a corporation established by Act of the Legislature of April 5, 1859, respectfully represents, that the main purpose for which said Act was passed was to establish a body corporate, with power to receive, hold and possess real and personal property, not exceeding the sum of three hundred thousand dollars, for the erection, support and maintenance of a "Museum of Comparative Zoölogy," at Cambridge; that since the passage of said Act, a large amount of property has been raised, by contributions and otherwise, for the use and benefit of said Museum, consisting of money, real estate and buildings, and of specimens and collections in natural history, all which are now held in trust by said Trustees, for the uses and purposes set forth and declared in said Act; that in addition to the property so held by said Trustees in trust, there has also been raised by general contribution other large sums of money and property, which have been given to, and are now owned and held in trust by, the President and Fellows of Harvard College for like purposes as those declared in said Act, to be used, expended and appropriated for the benefit and support of said Museum; that the result and effect of the creation and establishment of the trusts above set forth, is, that the property designed for the maintenance and support of said Museum of Comparative Zoölogy, instead of being placed in the management and control of one corporation, clothed with necessary power to provide for all its wants, and to administer its affairs with a single eye to the success of the particular department of science and instruction which it was intended to found and promote, is now vested in two distinct corporate bodies, part being held by the corporate body which your petitioners compose, called the "Trustees of the Museum," and part by the President and Fellows of Harvard College.

Neither of these bodies has any direct authority in the management of the Museum, which lies fully in the hands of its Faculty, a body whose status is recognized by the original articles of agreement between the corporation of Harvard College and the said Trustees.

Over the appointment of this Faculty the Trustees have no control, their function being limited to holding the fee in the real estate and the property in the collections, and to the management of about one-quarter of the invested funds, the control of the other three-quarters being in the hands of the said corporation. The management by two corporate bodies of funds held for the same purpose, is obviously unnecessary, and inconvenient.

Your petitioners further represent that the larger part of the funds now held for the use and benefit of the Museum are vested in the President and Fellows of Harvard College, and are held upon trust in such a way that they cannot be diverted or in any way changed; that it would greatly simplify the management of the property to place it in the hands of the President and Fellows, a fixed and established corporate body of well-known and defined powers, and composed of persons charged with the duty of maintaining and administering trusts of like character with those vested in said Trustees.

For these reasons, your petitioners ask that an Act may be passed by which, with the assent of the President and Fellows of Harvard College, all the powers and trusts now vested by law in the "Trustees of the Museum of Comparative Zoölogy" may be transferred to and be vested in said President and Fellows; that said Trustees may be authorized and empowered to make, execute and deliver valid deeds of conveyance of the real estate and property now held by them to said President and Fellows, to hold upon the same trusts upon which they are now vested in said Trustees.

ABBOTT LAWRENCE, *Secretary.*

[C.]

[Senate No. 51.]

COMMONWEALTH OF MASSACHUSETTS.

IN SENATE, February 23, 1876.

The Committee on Education, to whom was referred the petition of the Trustees of the Museum of Comparative Zoölogy, have considered the same, and report the accompanying Bill.

By order of Committee,

JOHN SARGENT.

AN ACT

CONCERNING THE TRUSTEES OF THE MUSEUM OF COMPARATIVE ZOÖLOGY.

Be it enacted by the Senate and House of Representatives, in General Court assembled, and by the authority of the same, as follows :

SECTION 1. The Trustees of the Museum of Comparative Zoölogy are authorized and empowered to convey all the property in their hands to the President and Fellows of Harvard College, upon the same trusts upon which it is now held by said Trustees, and upon such other trusts not conflicting or inconsistent therewith as said corporations may agree upon, and the said President and Fellows of Harvard College are authorized to receive said property upon said trusts, and shall thereupon have all the powers and be subject to all the duties in relation to the said property given to and imposed upon the said Trustees by their act of incorporation and the acts in amendment thereof.

SECT. 2. This act shall take effect upon its passage.

[D.]

At a meeting of the President and Fellows of Harvard College, in Boston, May 1, 1876, the President presented a communication from the Trustees of the Museum of Comparative Zoölogy, with copy of a vote passed at their meeting of April 26, 1876, as follows :

Voted, That the treasurer be authorized to execute and deliver to the President and Fellows of Harvard College, the trust deed and the deed of the land, together with the accompanying papers, prepared by the committee of the trustees, in accordance with the Act of the Legislature of March 13, 1876, and to deliver all the property named in said deeds and held by the trustees for the benefit of the Museum, to the President and Fellows of Harvard College.

Whereas, The Treasurer of said Trustees is now ready to transfer and deliver to said President and Fellows, the property in his hands as aforesaid : Now, therefore—

Voted, That the treasurer be authorized to execute on behalf of the Corporation the trust deed referred to in the above vote, and to receive the property in accordance therewith and on the trusts therein set forth or referred to.

A true copy of record. Attest :

(Signed)

E. W. HOOPER,
Secretary of the Corporation.

[E.]

AGREEMENT

BETWEEN THE TRUSTEES OF THE MUSEUM OF COMPARATIVE ZOÖLOGY AND
PRESIDENT AND FELLOWS OF HARVARD COLLEGE, DATED MAY 6, 1876.

This indenture, made this sixth day of May, A. D. 1876, by and between the Trustees of the Museum of Comparative Zoölogy hereinafter called the Trustees on the one part, and the President and Fellows of Harvard College hereinafter called the Corporation on the other part,—

WITNESSETH :

Whereas, Louis Agassiz, then Lawrence Professor of Zoölogy and Geology in the Lawrence Scientific School of Harvard University, did, prior to and during the year 1858, make a valuable collection of objects of Natural History :

And whereas, In the said year 1858, a fund of fifty thousand dollars was given to the said Corporation by William Gray, executor of the last will and testament of his uncle, Francis C. Gray, late of said Boston, deceased, in trust, to preserve the same as a separate fund, and to appropriate the income thereof to the establishment and maintenance of a Museum of Comparative Zoölogy at Harvard College ; but no part of the same to be appropriated to the payment of salaries or the purchase of real estate ; which donation was made and accepted on a condition that the said Museum be arranged and conducted under the superintendence of a body of five persons, to be denominated the Faculty of the Museum of Comparative Zoölogy, constituted and appointed in the manner set forth in the letter of the said donor, dated December 20, 1858, to the said Corporation, and accepted by vote of said Corporation of December 24, 1858 :

And whereas, The Legislature of the Commonwealth did, by Act

of April 2, 1859, make an appropriation of one hundred thousand dollars out of the proceeds of Back Bay lands, to be paid to such persons as should be incorporated as the Trustees of the Museum of Comparative Zoölogy ; provided an equal amount should be secured by private subscription :

And whereas, By Act of April 6, 1859, the said Legislature incorporated the said Louis Agassiz, William Gray and others, and their successors, as the Trustees of the Museum of Comparative Zoölogy, with power to receive, hold, purchase and possess real and personal property not exceeding three hundred thousand dollars in value, to be used and improved for the erection, support and maintenance of a Museum of Comparative Zoölogy at Cambridge, in this Commonwealth ; and, provided, that the sum of fifty thousand dollars, given as aforesaid by said William Gray, should be deemed a part of the sum required to be raised by private subscription for said Museum, as a condition precedent to the payment of said grant of one hundred thousand dollars :

And whereas, A sum of more than seventy thousand dollars in addition to the said Gray donation, was raised by private subscription, and paid to the said Trustees, who have also since received the said grant of one hundred thousand dollars from the Commonwealth, and other funds for the support and maintenance of the said Museum :

And whereas, By articles of agreement between the parties hereto, dated June 14, 1859, it was agreed that certain lands should be conveyed for a nominal consideration by the said Corporation to the said Trustees for the purpose of enabling them to erect buildings for the said Museum, and rules and regulations were established for the government, occupation, care and management of the institution to be established and maintained by means of the funds, collections and other property held by the said parties for the purposes of a Museum as aforesaid :

And whereas, By deed dated the same day, certain lands were conveyed by the said Corporation to the said Trustees, together with the collections of articles already acquired by the said Corporation toward the formation of such a Museum, to be held by the Trustees upon trust for the erection of buildings, and the maintenance, improvement and extension thereof, and for the establishment and maintenance of the Museum of Comparative Zoölogy, to be used, occupied, managed and governed in strict conformity

to the rules and regulations agreed upon in the aforesaid contract of the same date, which should not be repealed or altered except by mutual consent of the said Corporation and the said Trustees :

And whereas, Since that time a Museum building has been erected by the said Trustees upon the said parcel of land, and large collections have been made, and donations of money and land for the maintenance, support and extension of said Museum, have been contributed, and are held partly by the said Trustees and partly by the said Corporation, and administered under regulations adopted by concurrent vote passed by said Trustees, January 28, 1874, and by said Corporation, January 30, 1874, in accordance with the terms of said articles of agreement of June 14, 1859 :

And whereas, It has been deemed advisable that the ownership, management and control of the said Museum, and collections, lands, funds, and other property held for the purposes of said Museum, should be united in the hands of said Corporation, and the said Legislature has, by Act of March 13, 1876, authorized the said Trustees to convey all the property in their hands to the said Corporation upon the same trusts on which it is now held by the said Trustees, and upon such other trusts not conflicting or inconsistent therewith, as the said Trustees and the said Corporation may agree upon :

Now, therefore, In consideration of the premises, the said Trustees of the Museum of Comparative Zoölogy do hereby convey, remise, release and forever quitclaim to the said President and Fellows of Harvard College, all the lands, buildings, Museum, collections, stocks, bonds, notes, mortgages, money, funds, accumulations and property of whatsoever name or nature held by them, or to which they are in any manner entitled as such Trustees :

To have and to hold; the granted premises to them the said President and Fellows of Harvard College, their successors and assigns, to their use forever ; but in trust, nevertheless, as to all the said property except the said lands for the uses and purposes for which, and subject to the duties and trusts upon which the said Museum and other the granted premises are held by the said Trustees, and upon the further trust that the Museum shall continue to be as at present, under the charge of an independent Faculty constituted and appointed in the manner provided in the sixth article of the conditions named in the aforesaid letter of December 20, 1858, accompanying the said donation of William Gray. And as to the

said lands upon trust, to use them only for the purposes of the said Museum and for other purposes of a similar nature which can be conveniently combined with said Museum.

And the said President and Fellows of Harvard College accept the property herein conveyed upon the trusts aforesaid.

In witness whereof the said Trustees of the Museum of Comparative Zoölogy have caused these presents to be signed with their corporate name and sealed with their common seal by Theodore Lyman, their Treasurer, thereto duly authorized: And the said President and Fellows of Harvard College have caused these presents to be signed with their corporate name and sealed with their common seal by E. W. Hooper, their Treasurer, thereto duly authorized on the day first above mentioned, May 6, 1876.

TRUSTEES OF THE MUSEUM OF COMPARATIVE ZÖOLOGY,

[SEAL.]

THEODORE LYMAN, *Treasurer.*

THE PRESIDENT & FELLOWS OF HARVARD COLLEGE,

[SEAL.]

By E. W. HOOPER, *Treasurer.*

In presence of

ARTHUR G. DAVIS,

to both.

[F.]

SCHEDULE OF PROPERTY

IN THE HANDS OF THE TRUSTEES OF THE MUSEUM OF COMPARATIVE
ZOOLOGY, ON MAY 6, 1876.

Land and buildings, at original value,	\$78,542 13	
Land given by Shaw and Agassiz, at cost,	9,302 34	
Land bought of Harvard Memorial by Agassiz, at cost,	6,937 20	
Collections in Museum, original value,	61,340 06	
Total property yielding no income,	—————	\$156,121 73
United States bonds, 5-20s, registered at par,	\$11,000 00	
Boston & Albany R. R. bonds, 7s, 1892, cost 103,	77,250 00	
Part of Eldredge's mortgage note for \$20,000,	19,959 34	
Total of Permanent Fund,	—————	108,209 34
Balance of Eldredge's mortgage note,	\$40 66	
Chicago, Burlington & Quincy R. R. 7s, 1903, at par,	7,000 00	
Total of Humboldt Fund,	—————	7,040 66
Note of A. B. Almon, with collateral (less discount),	\$11,634 00	
Note of R. S. Fay, with collateral (less discount),	4,363 50	
Note of Washington Mills, indorsed (less discount),	19,390 00	
Chicago, Burlington & Quincy R. R. 5s, 1895, cost 88, and interest,	14,166 67	
Cash in New England Trust Company,	445 83	
Total of State grant to Agassiz Memorial Fund,	—————	50,000 00
Balance due income account in New England Trust Company,	—————	730 52
Total of property (at value as above),	—————	\$322,102 25

Boston, May 6, 1876.

Received of Theodore Lyman, Esq., Treasurer of the Trustees of the Museum of Comparative Zoölogy, all the property mentioned in the above schedule, to be held by the President and Fellows of Harvard College in accordance with the terms of an agreement between them and said Trustees dated May 6, 1876.

(Signed)

E. W. HOOPER,
Treasurer of Harvard College.

[G.]

The Committee appointed by the Faculty of the Museum to consider the expediency of extending the Museum publications so that they should fairly represent the scientific activity of the Natural History Departments of the University, beg to report:—

That, were the University now beginning a system of publication, it would be desirable that all memoirs, papers, etc., issued by the different departments, should form distinct series in one set of University publications. This is, however, impossible, since the Observatory, the Museum of Comparative Zoölogy, the Bussey Institute and the Peabody Museum each have a distinct plan of publication, from which it would be difficult, if not impossible, to deviate.

They therefore recommend that the Museum publications be so extended as to include all the departments lately incorporated with it, retaining the Bulletin for the issue of shorter notices requiring extensive circulation, and that a quarto series of memoirs, to include the larger contributions to science, be substituted for the illustrated catalogue. The heading of each memoir should indicate under which department of the Museum it has been prepared.

While the Committee recognize the impossibility of combining the existing University publications in one series, they hope that after all the different departments of the University have their special publications, there may yet be established, in addition, an octavo journal, to serve as the scientific organ of the University, where professors would be able to give abstracts from the work done in their departments, call attention to their needs, and come more directly in contact with the public than they can hope to do through the pages of the Proceedings of the American Academy or other scientific journals whose editors generally reap the benefit of their communications. Granting that it is not advisable to multiply scientific periodicals, your Committee believe that Cambridge not only should be, but must inevitably become, a scientific centre, and that the work of its original investigators ought, in justice to them, to be associated with the University whose officers they are.

If the proper means be taken, one important result of this increased activity would be the securing by exchange, in return for all such memoirs published by the various departments, like pub-

lications from other learned societies. It is often impossible to obtain these publications in any other way. The feasibility of dividing the exchanges thus received by the University among its different departments where provision exists for special libraries, is to be carefully considered.

Your Committee is of opinion that a library loses its usefulness to a great degree by centralization. To them the system now in vogue among university libraries, of a grand central collection, seems as unpractical as if all the apparatus of the chemical and physical laboratories, the observatory, and the physiological and anatomical departments should be kept together in one general depot and given out only on application from the professors. There are already in the University several special libraries: those of the Observatory, the Law School, the Botanic Garden, the Medical and Divinity schools, and the Museum. Some of these are growing rapidly, and their efficiency would be greatly increased should the general library distribute among them such special works as are not in common demand. By depositing in the general library card catalogues of their contents, these special libraries would still remain accessible to all persons connected with the University. Should each department maintain regular issues of memoirs or reports, thus acquiring, as suggested above, a claim to corresponding publications of other universities and societies, the special libraries would undoubtedly increase very rapidly, faster than the general library could hope to do in the same branches. That the amount of these additions to special collections is important may be shown by a comparison of the exchanges received in the College Library and in the Museum Library. The former receives, through exchange or donations, the publications of fifty societies and individual editors, while the Museum is in regular correspondence with no less than ninety-three societies, chiefly of zoölogy and geology. A moderate activity in the departments recently connected with the Museum would greatly increase this number.

The Smithsonian Institution gives a still more striking instance of what may be accomplished in this direction. This institution, although not more than thirty years old, receives the Transactions of no less than two hundred societies, while Harvard College Library, its senior by nearly two centuries, receives, as stated above, but a quarter of that number.

Considering the limited means at the disposal of the Museum for the increase of their library, it is urged that, in order to augment the efficiency of the departments connected with it, the central library should not duplicate the books already to be found in the Museum Library or the periodicals and other exchanges regularly

received there, beyond the actual needs of the College. It is well known that there exists no concerted action between the libraries of the University. Your Committee would strongly recommend that some definite arrangement be made, not only with the Museum Library, but with all the libraries, by which their acquisitions by exchange or donation and their orders should at once be reported from one to the other, thus preventing unnecessary duplication in private as well as public libraries. It often happens that the professor, who has been endeavoring, perhaps at a great personal sacrifice, to keep up with the literature of his department, presently finds that the central library has also purchased the very books he already possesses. In short, with the present irresponsible system, we frequently have in Cambridge several copies of the more common books purchased in rapid succession, while no provision is made for the more expensive works, or for such as are less easily procured.

ALEXANDER AGASSIZ.

J. D. WHITNEY.

[H.]

FACULTY OF THE MUSEUM.

 CHARLES W. ELIOT, *President.*
ALEXANDER AGASSIZ, *Curator.*

JOHN B. S. JACKSON.

JOSIAH D. WHITNEY, *Secretary.*

THEODORE LYMAN.

 OFFICERS.

ALEXANDER AGASSIZ,	. . .	<i>Curator.</i>
JOSIAH D. WHITNEY,	. . .	<i>Sturgis-Hooper Professor of Geology.</i>
HERMANN A. HAGEN,	. . .	<i>Professor of Entomology.</i>
NATHANIEL S. SHALER,	. . .	<i>Professor of Paleontology.</i>
JOHN McCRADY,	. . .	<i>Professor of Zoology.</i>
L. F. POURTALÈS,	. . .	<i>Keeper.</i>
THEODORE LYMAN,	. . .	<i>Assistant in Zoology.</i>
JOHN GOULD ANTHONY,	. . .	<i>Assistant in Conchology.</i>
CHARLES E. HAMLIN,	. . .	<i>Assistant in Conchology.</i>
JOEL ASAPH ALLEN,	. . .	<i>Assistant in Ornithology.</i>
WILLIAM JAMES,	. . .	<i>Assist. Prof. of Phys. and Comp. Anat.</i>
F. W. PUTNAM,	. . .	<i>Assistant in Ichthyology.</i>
WALTER FAXON,	. . .	<i>Assistant in Zoological Laboratory.</i>
W. M. DAVIS, JR.,	. . .	<i>Assistant in Geological Laboratory.</i>
S. W. GARMAN,	. . .	<i>In charge of Reptiles.</i>
PAULUS ROETTER,	. . .	<i>Artist.</i>

[I.]

TRUSTEES OF THE MUSEUM OF COMPARATIVE ZOOLOGY,

1877.

THE GOVERNOR OF THE COMMONWEALTH,

ALEXANDER H. RICE.

THE LIEUTENANT-GOVERNOR,

HORATIO G. KNIGHT.

THE PRESIDENT OF THE SENATE,

J. B. D. COGSWELL.

THE SPEAKER OF THE HOUSE,

JOHN D. LONG.

THE SECRETARY OF THE BOARD OF EDUCATION,

JOSEPH WHITE.

THE CHIEF JUSTICE OF THE SUPREME JUDICIAL COURT,

HORACE GRAY.

THEODORE LYMAN.

ALEXANDER AGASSIZ.

NATHANIEL THAYER.

L. F. POURTALÈS.

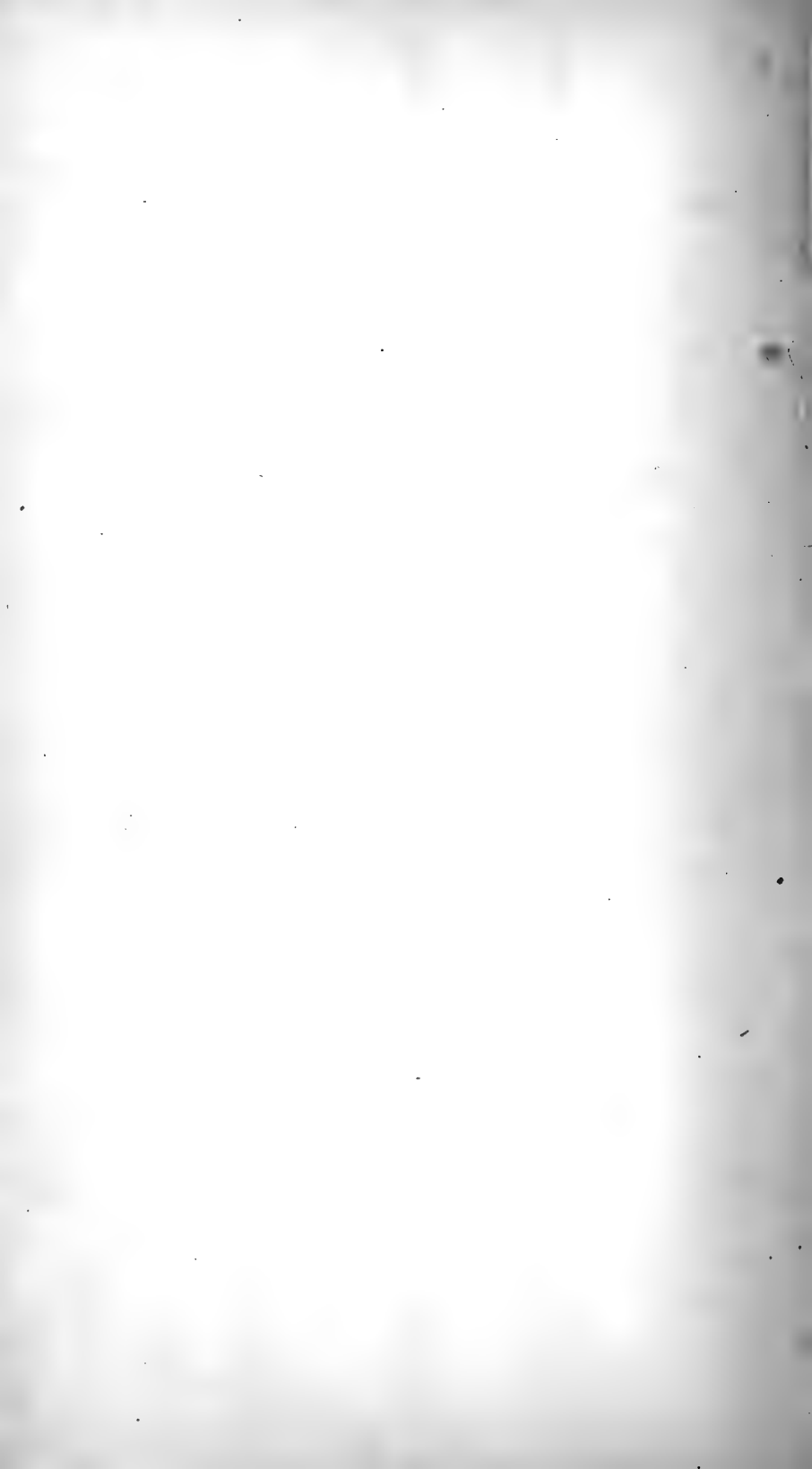
MARTIN BRIMMER.

ROBERT W. HOOPER.

QUINCY A. SHAW.

ABBOTT LAWRENCE.

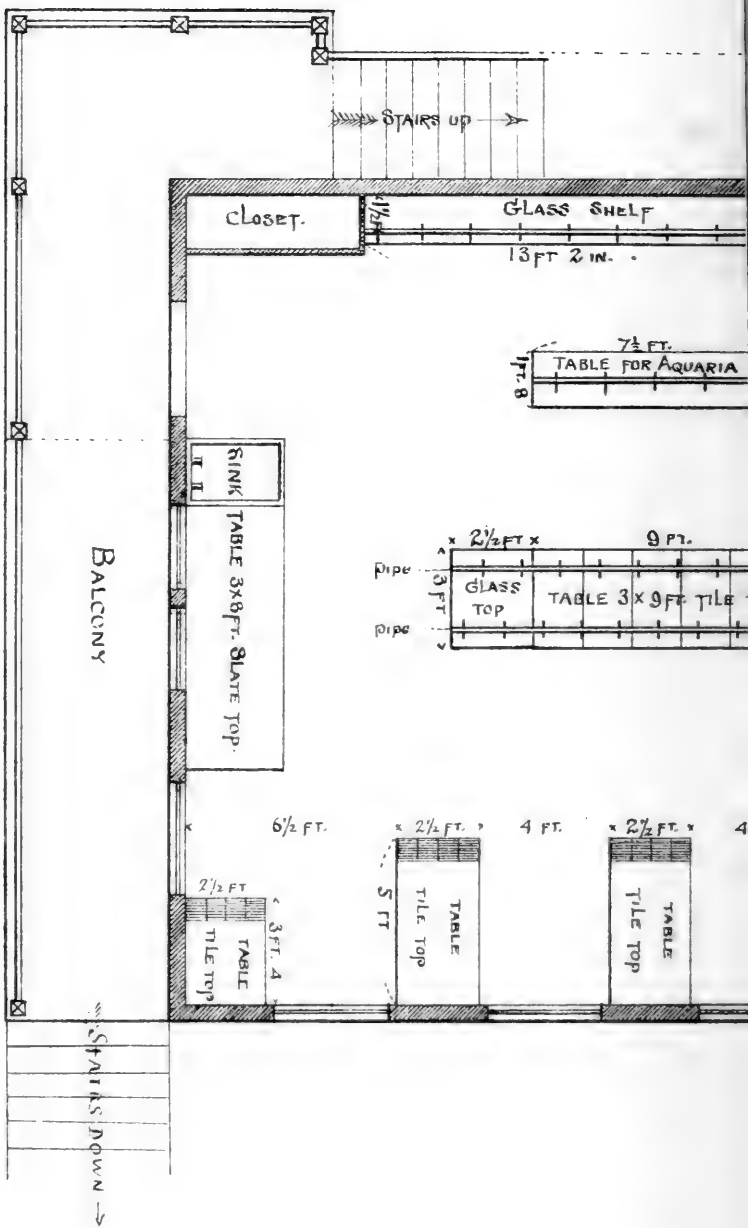
WILLIAM GRAY, JR.

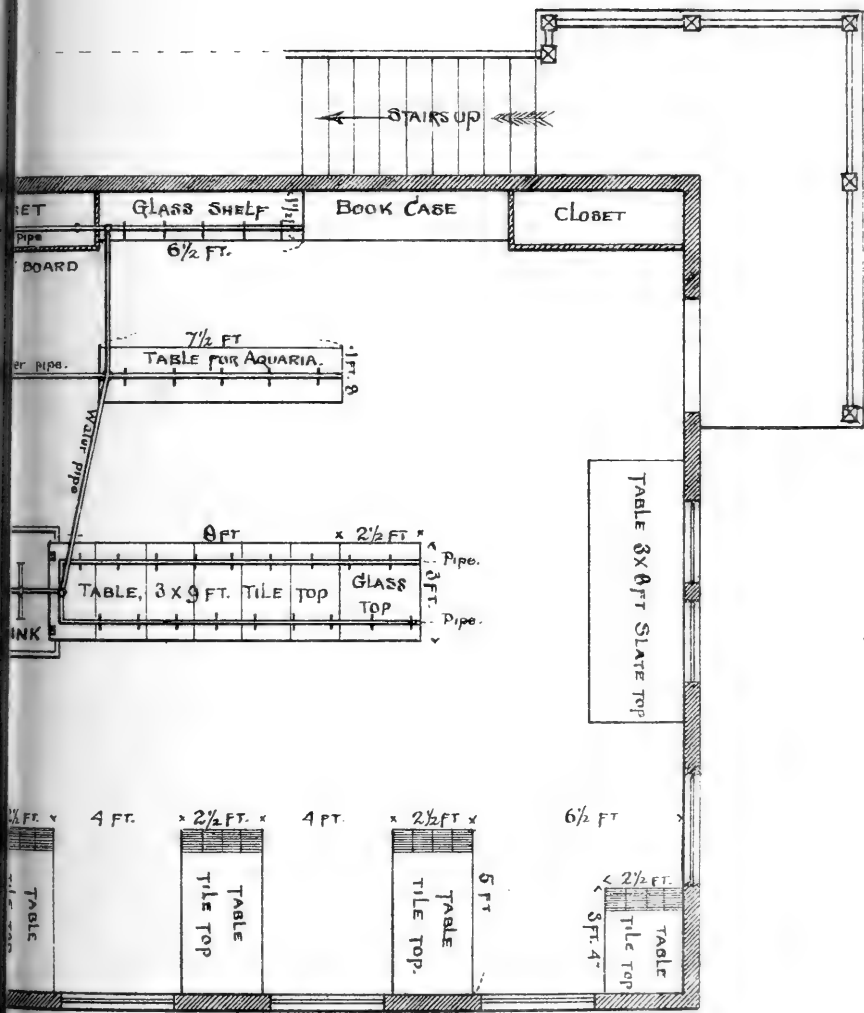




PLAN OF ZOOLOGICAL LABORATORY AT NEWPORT, R.I.

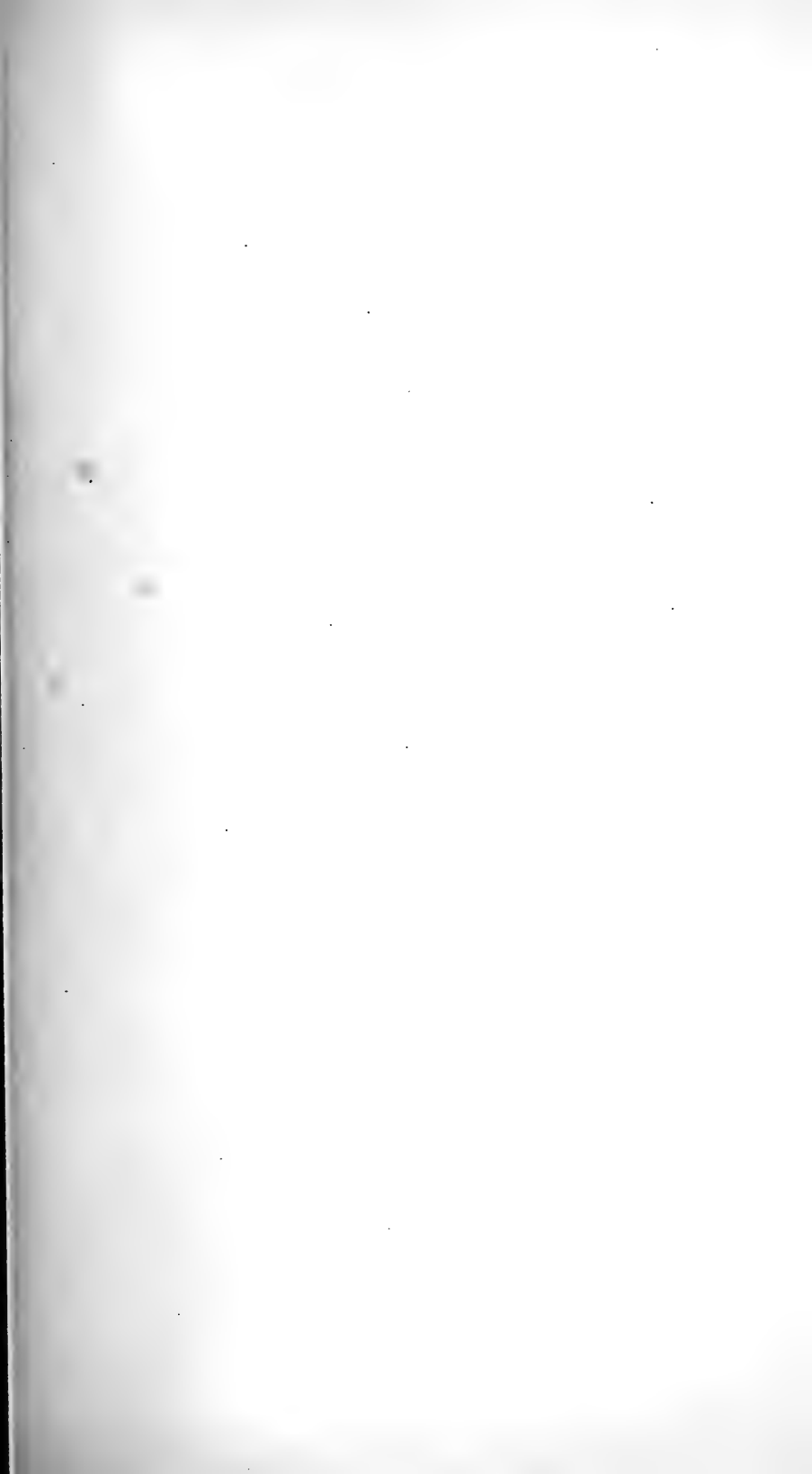
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Boston.

ZOOLOGICAL LABORATORY,

NEWPORT, R. I.

Heliotype Printing Co.

ANNUAL REPORT

OF

THE CURATOR

OF THE

MUSEUM OF COMPARATIVE ZOOLOGY

AT HARVARD COLLEGE,

TO THE

PRESIDENT AND FELLOWS OF HARVARD COLLEGE,

1877-78.

CAMPBELL & CO.

PRESS OF JOHN WILSON AND SON.

1878.



Heliotype Printing Co.

ZOOLOGICAL LABORATORY,

NEWPORT, R. I.

Boston.

ANNUAL REPORT

OF

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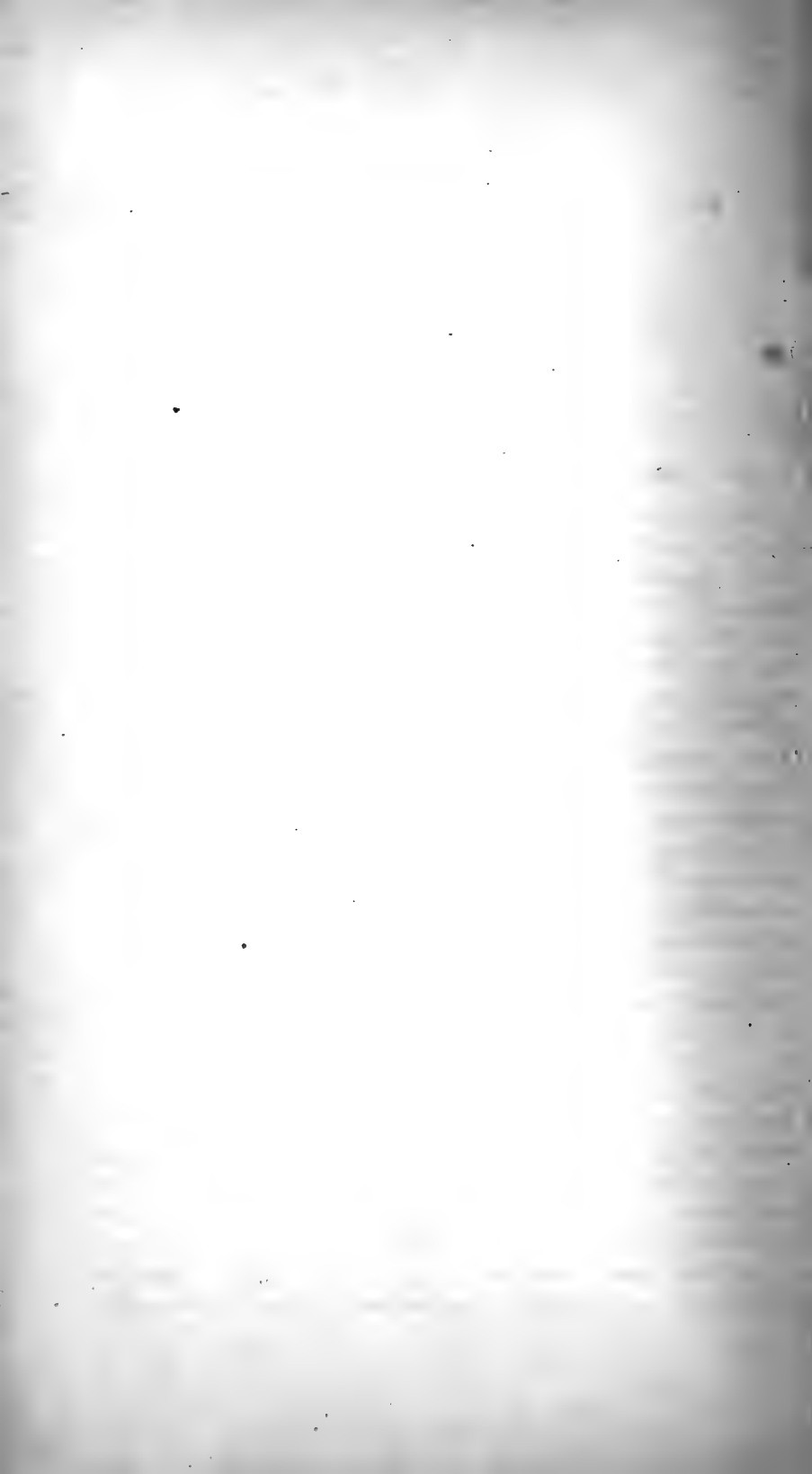
FOR

1877-78.

CAMBRIDGE:

PRESS OF JOHN WILSON AND SON.

1878.



REPORT.

TO THE PRESIDENT AND FELLOWS OF HARVARD COLLEGE:—

The Trustees of the Museum having, in accordance with the Acts of the Legislature (referred to in their last Report for 1876), transferred the property under their charge to the President and Fellows of Harvard College, the Legislature in January, 1877, passed an Act dissolving the Board of Trustees of the Museum (see Appendix A.); this is therefore the first Report I have the pleasure of presenting to the President and Fellows of Harvard College. The last Report submitted to the Trustees extended to the close of the year 1876. The present Report not only covers the year 1877, but the latter part of the academic year (1877-78), to September 1.

Only during the past eighteen months has the Museum enjoyed the income from the whole of the Agassiz Memorial Fund. The means thus placed at my disposal, in addition to assistance from other sources, has enabled me not only to push on the arrangement of the Museum very rapidly, but to lay up a building fund large enough to warrant a considerable addition to the present wing of the Museum building during the past summer. The Trustees of the Peabody Museum having decided that their building should form a part of the plan laid out by Professor Agassiz, it was made to harmonize as far as practicable with the existing wing of the Museum. A few changes, however, were suggested in the architecture of the roof and the proportions of the gallery windows, which changes have been carried out also in the new piece of the wing now in the course of erection; and it is hoped to modify the rest of the old building, so as to bring it into uniformity with the new work.

This requires only a change in the roof, substituting a fire-proof roof for the old one, and the cutting down the gallery windows. The latter has already been done, and the increase of light in the galleries is very marked, besides the improvement in the external appearance of the building.

This addition will allow for the complete arrangement and exhibition to the public of the zoölogical collections. Although the additional room gained on the floors not devoted to exhibition will enable us to do much preparatory work for the exhibition of the palæontological and geological collections, little can be placed on permanent exhibition in those departments until the rooms now occupied for the different courses of instruction given at the Museum are vacated. These rooms are all intended for exhibition rooms in the above departments, and their place is to be supplied eventually by fitting lecture-rooms and laboratories in the new addition to the Museum building. During the early years of the existence of the Museum, every thing had to be sacrificed to the exigencies of the collections, which accumulated at first far too rapidly for their proper arrangement. Little by little, however, the collections have been made available; and in 1876 it became possible to enter upon the definite arrangement planned by the founder of the Museum. This involved the removal of all the objects then on exhibition, and their complete rearrangement. Thanks, however, to the energy and zealous co-operation of the Assistants of the Museum, no less than five rooms have been thrown open to the public, after a period of chaos lasting for over a year, during which plasterers, painters, and carpenters carried on their work, without, however, closing the Museum to visitors. The rooms now permanently arranged are: 1st, the synthetic room, containing a synopsis of the animal kingdom (living and fossil); 2d, a room devoted to the systematic collection of the Radiates, Sponges, and Protozoa; 3d, the lower floor of a room devoted to the systematic collection of Birds; 4th, the lower floor of the large central room devoted to the systematic collection of Mammalia; 5th, the galleries of these two connecting rooms containing the systematic collections of Reptiles and Amphibians; and, lastly, a room containing a Faunal collection of North America, — the Birds and Mammals being on the main floor, the Fishes, Reptiles, and Invertebrates in

the gallery. I do not of course mean to say that these rooms are complete. They contain carefully chosen but sufficiently extensive selections from our collections in the different classes to give an excellent idea, for instance, of the classes of Mammals, Birds, or Reptiles (both living and fossil). These specimens are zoologically arranged, and include all that is likely to interest and instruct the public. The specialist, meanwhile, will find in the store-rooms and work-rooms all he needs for his studies, with facilities for doing his work unmolested at all times. The space now devoted to the different classes of the animal kingdom contains all that we can hope to give for public exhibition, and, indeed, all that is desirable to give, no matter how extensive the collections may become hereafter; limited collections well assorted and labelled being far more intelligible to the general visitor than larger and more indiscriminate ones. This plan enables us to place on exhibition picked specimens, and to make the contents of each room, little by little, as significant as possible. It shows us at once our blanks, and the resources of the Museum can be expended in filling them. This still leaves us in the present building three exhibition rooms not yet completed. One of these rooms is to be devoted to the systematic collection of Mollusca, a second room will contain the systematic collection of the Fishes on the main floor, and in the gallery of the same room will be placed the systematic collection of the Articulates. These two rooms I hardly hope to open to the public before two or three years are over. The third room will contain on the main floor the Faunal collection of South America, while the gallery will receive the Fauna of Australia. The two exhibition rooms to be added on the completion of the new part of the wing will be devoted to Europeo-Asiatic, Indian, and African Faunal collections. We shall thus have on one floor, when this arrangement is finished, a series of systematic collections of the various classes of the animal kingdom, each class being placed by itself, so that the visitor will see only one thing at a time, and will not be bewildered by room after room or case after case of specimens which to him seem to have no meaning. In the synoptic room, for instance, he will get an excellent idea of the great types of the animal kingdom. He will then pass to a room containing a special class, perhaps that of Birds. There he will find a systematic collection of the class, giving

him a broader view of the Birds, both living and fossil: he will not even there find every species, but such forms alone, with the necessary preparations in the way of skeletons, &c., as will give him a good general idea of the class of Birds. Should he wish to get some idea of the Avi fauna of North America, he will pass to the room containing the Faunal collection of that region, and there he will find the Birds characteristic of North America. When the other Faunal rooms are completed, he may pass from one room to another, and become successively acquainted with the characteristic Birds of Australia, Africa, India, &c. Of course, as far as possible, repetitions will be avoided in the faunal and systematic rooms, but this must of necessity be a work of time. This plan obviates the crowding together into one space of the whole collection of Birds, which, when arranged in the old way, merely satiates the visitor, and teaches him nothing. Of course, in such limited space (intentionally so restricted), only the characteristic groups of Birds can be placed on exhibition, and the rest of the collection is safely stored in drawers, where the skins are readily accessible and can be used for study. The intention is to carry on this plan for all the classes of the animal kingdom. There will remain unprovided for, as far as zoölogical collections are concerned, only the Marine Faunæ, it being impossible to connect them properly with any of the great terrestrial realms. It is therefore proposed hereafter to devote the main floor of two rooms, one to the Pacific Ocean, the other to the Atlantic Ocean, and to show in these the geographical distribution of marine animals, and as far as possible, by special collections, something also of the bathymetrical distribution. We hope eventually to carry out this double plan for the Palæontological Department, making one arrangement by Periods and another by Palæontological Series for the different classes. For the proposed location of the other collections, I will refer to the plans published with the Report of 1875.

The plan formerly proposed of labelling each room, so that the visitor should always know what he is looking at, has been carried out in all the rooms thus far opened to the public. Thus the visitor — on entering the Synoptic Room, for instance — finds the walls of the room labelled “Synoptic Collection of the Animal Kingdom.” He further finds each case labelled with

a general indication of its contents, and the contents clearly explained. On entering the room containing the systematic collection of Mammals, the visitor at once reads upon the walls that he is in the room containing the Systematic Collection of Vertebrates, the Class of Mammals. He will next find each case labelled with the name of the order, and frequently that of the suborder and even family. All this is done in each room with large, distinct letters, either on the walls or on the glass doors of the cases, arrows indicating the space to which the labels refer. Judging from the comments of the visitors who see this for the first time, the experiment has completely succeeded in its aim,—that of giving a clear and easily legible explanation of the collections thus far placed on exhibition.

For the past four or five years, no special attempt has been made to increase the collections. The force at the Museum has been occupied mainly in preparing our materials for exhibition, and rendering the collections easily accessible. Only the acquisitions demanded by our immediate wants have been made. The principal additions to our collections have therefore been among Birds and Mammals; a large number of skins and skeletons having been added to our faunal and systematic series. The additions to the Conchological and Entomological Departments have been mainly made through exchanges. The Loew collection of Diptera, purchased some time ago with the Gray Fund, has been received at the Museum; and to Baron Osten-Sacken the Museum owes a large addition in the same order. In the Herpetological Department, the principal collection received, in addition to an extensive series of exchanges, has been a number of skeletons purchased in Europe. By far the most important additions received for many years are the results of the dredgings which I made during the past winter in the Gulf of Mexico, in the United States Coast Survey steamer "Blake." These, added to the collections already in the Museum from the expeditions formerly in the charge of the late Professor Agassiz and of Count Pourtalès, probably give the Museum, after that made by the "Challenger," the richest deep-sea collection in existence.

It is now ten years since Dr. Hagen became connected with the Museum. During his administration of the Entomological Department, the collections have more than trebled in size;

and I may call attention to the biological collection, which owes its existence and present condition entirely to his care. It contains about three thousand species of all orders, and far surpasses any existing collection.

For the first time, the name of one of the most enthusiastic and distinguished of our Assistants does not head the annual report hitherto so carefully prepared by him. The death of Mr. Anthony, which occurred on October 16th, has brought to a close a long term of faithful service. Mr. Anthony became connected with the Museum in August, 1863, and from that time until his decease his time and energies were given to the department of Conchology, with such assiduous and entire devotion as is rarely equalled. He was a recognized authority on American Land and Fresh-water Mollusca; having shared pioneer work upon them with Say, Haldeman, Conrad, and Lea. His descriptions of species — more numerous than is generally known, since many of them antedate the recollection of younger conchologists — are to be found in the earlier volumes of most of our scientific journals. He had held correspondence and conducted exchanges with almost all active conchologists and shell-collectors of his time, who never failed to appreciate the remarkable skill in exchanging, the complete knowledge of the relative value of specimens, and the wide acquaintance with the traditions of Conchology, which were fruits of his long experience. He died at the age of seventy-three years, after a sickness of five weeks.

It is particularly gratifying to me to speak of the thorough co-operation now existing between the University and the Museum Library, and to recognize the cordial assistance given by Mr. Justin Winsor, the Librarian of Harvard College, to the Museum Librarian.

The publications of the Museum during the past eighteen months have been more numerous than during any previous corresponding time. The fourth volume of the Museum Bulletin, devoted to the Terrestrial Mollusca of the United States, by Mr. W. G. Binney, has been published, pp. 239, plates 100. The Museum is indebted to Mr. Binney for the large number of plates which accompany this volume. Mr. Binney has also presented to the Museum all his MS., as well as the copper-plates belonging to the Terrestrial Mollusks of North America,

by Amos Binney. The first six numbers of Vol. V. of the Bulletin, containing articles by Messrs. Agassiz, Faxon, Prime, and Benton, have been distributed.

To Mr. Temple Prime we owe the plates which accompany his paper on Corbiculidæ; and to the Hon. Carlile P. Patterson, Superintendent of the United States Coast Survey, the small map of the Hydrography of the Gulf of Mexico, which accompanies Bulletin No. 6.

In connection with Professor J. D. Whitney and the Geological Survey of California, the Museum has published No. 2 of Vol. VI. of the Memoirs on the Fossil Plants of the Auriferous Gravel Deposits of the Sierra Nevada, by Leo Lesquereux, pp. 58, 10 plates.

The Hydroids of the Gulf Stream, collected by Mr. Pourtalès under the auspices of the United States Coast Survey, have been fully worked up by Professor George J. Allman, of London, and published, with the permission of the Superintendent of the United States Coast Survey, by the Museum as Vol. V. No. 2 of its Memoirs, pp. 54, plates 34. Finally, I have myself issued, as one of the Museum Memoirs, the materials left by Professor Agassiz to form the fifth volume of the Contributions to the Natural History of the United States, pp. 136, 20 plates, as Vol. V. No. 1.

In addition to these publications, I could refer to papers of Baron Osten-Sacken, Mr. R. McLachlan, of Mr. Fauvel, of Baron Sélys Longchamp, who have availed themselves of Museum material placed at their disposal, besides those published by the Museum Assistants in other serials than those of the Museum. Dr. Steindachner has continued in the Proceedings of the Vienna Academy the descriptions of many new species of fishes collected by the Thayer Expedition.

Very gratifying returns are received at the Library in exchange for our publications, the societies with which we now exchange regularly having increased in number during the past year. It is, however, questionable how far the system of exchanges now generally carried on by scientific societies is remunerative.

As in former years, large collections have been sent to specialists for examination or for the preparation of special reports in expeditions undertaken with the supervision of the Museum.

These Reports are to be published either by the Museum or in connection with other publications. Collections of Crustacea have been sent to Professor Alph. Milne Edwards; of Annelids, to Professors Ehlers and Perrier; of Star Fishes, to Professor Perrier; of Cephalopods, to Professor Carus; of Sponges, to Professor Schmidt; Hydroids, to Mr. Clarke, of the Johns Hopkins University; Mollusca, to Mr. Dall, of the Smithsonian; and Crinoids, to Sir Wyville Thomson.

During the years 1862 to 1864, a number of collections were sent from the Museum to schools and colleges, not only in the State, but also throughout the country. From 1864 to 1876, collections have been sent at irregular intervals to complete, as far as possible, the series intended for instruction in our schools. Since 1876, the date of the last Report, an unusually large number of collections have been sent out, supplementing those previously sent to High Schools, Normal Schools, and Colleges in the State: to the eight State Normal Schools; to the Public Schools of Boston, through Miss Crocker; to Amherst and Williams Colleges; to the Peabody Academy at Salem; to the Boston Society of Natural History; to the Wellesley College; to the Springfield City Museum; to the Cambridge High School; to the Museum at Gloucester; to Mount Holyoke Seminary; to Maplewood Institute, Pittsfield. Similar collections have been sent outside of the State to Chicago, to Cornell University, to Salt Lake City, to Brown University, to the University of Michigan, to Hillsdale, to Buffalo, to Kentucky, to Oberlin College, to Marietta. As far as practicable, similar educational collections will always be cheerfully sent, when the time of our staff will allow.

The general instruction at the Museum has been in charge of Professors J. D. Whitney, Shaler, Dr. James, Professor Hamlin, Dr. Faxon, Dr. Mark, Mr. Wadsworth. Special students have also received facilities for work as well as guidance in the different Laboratories of the Assistants.

The Sturgis-Hooper Professor of Geology, Professor J. D. Whitney, has given twice a week throughout the year lectures in Economic Geology to special students, candidates for the degree of Ph.D., and to Seniors and Juniors. He also gave instruction in Physical Geography during the greater part of the year to Sophomores and Juniors. During the past year, Professor

Whitney has also made preparation for a thorough course in Lithology, and has engaged Mr. Wadsworth as his Assistant in that department. By Professor Whitney's care, a large number of rock sections have been made for the use of the students in Lithology: a part of his private lithological collection has been unpacked, and made available at the Museum, thus placing the lithological department on a very creditable footing. A beginning of a special geological library has also been made by Professor Whitney, which, though incomplete as yet, is probably the best in the country. The Corporation have appropriated the larger part of the expenses of bookcases for its reception. Professor Whitney, besides defraying the greater part of the expenses of publishing Vol. VI. Part 2 of the Memoirs, has also, in addition to other expenses, provided himself the needed Assistants for the instruction in his department; the funds at present at the disposal of the Geological Department not being sufficient to more than pay the salary of the Professor, a condition of things which, it is hoped, will not continue long in so important a department of the Museum.

Professor N. S. Shaler has given instruction in general geology during the past year to seventy undergraduates and four graduates, the work consisting of lectures and field-work. In Palæontology there were fourteen undergraduates and three graduates who received instruction by lectures and laboratory work. Professor Shaler has also continued his usual summer course in connection with the Geological Survey of Kentucky.

Dr. William James gave instruction during the past year in Comparative Anatomy and Physiology of Vertebrates to a number of undergraduates, varying from eighty to ninety. The course was similar to that given the previous year. The more practical and human parts of the subject seem to awaken the most general interest. Since the resignation of Professor McCrady, the instruction in zoölogy has been divided between Dr. Faxon and Dr. Mark; Dr. Faxon taking charge of the Radiates and Crustacea, Dr. Mark of the Mollusks and air-breathing Arthropods.

Aside from the work of instruction, Dr. Mark gave considerable time, especially in the first half of the year, to the collection of Vermes in the Museum. This collection has been

assorted and arranged according to orders. The bottles have all been thoroughly cleaned, and alcohol changed when necessary. The critical study and determination of specimens have only been begun. A small number of contributions from outside have been received. There have been sent from this collection: 1. All the Lumbricidæ to M. Perrier; 2. All Vermes of the Hassler Expedition to Professor Ernst Ehlers, also those of the "Blake" Expedition.

During the winter of 1877 to 1878 from December to March, I was invited by the Superintendent of the United States Coast Survey to join the steamer "Blake," and carry on extensive dredging operations in deep water in the Straits of Florida, the Yucatan Channel, and in the Gulf of Mexico. A preliminary account of this first expedition will be found in Bulletins No. 1 and 6 of Vol. V., two letters addressed to the Superintendent of the Coast Survey on the results of the expedition, and the disposition made of the collections for publication. I may add that the "Blake" is fitting out for a new cruise to the West Indies, and that I shall again be allowed to join her, and continue the work so successfully commenced. Mr. Garman accompanied me in the "Blake." Although I have in my letters acknowledged my indebtedness to the officers of the "Blake," I cannot allow this opportunity to pass without reiterating my thanks for their interest in my work, and more specially to Captain C. D. Sigsbee, to whom so much of the success during our last cruise is due.

During the early part of 1877, I spent a couple of months at Edinburgh, at the invitation of Sir Wyville Thomson, who was kind enough to ask me to assist him in assorting the magnificent collections made by the "Challenger" for distribution among the different specialists who were to take charge of them. Sir Wyville Thomson generously proposed to allow two of the collections, the Echini and the Ophiuridæ, to come to this country; and these collections are now safely deposited in the Museum, where Mr. Lyman and myself are preparing the Reports on the Ophiuridæ and the Echini. Mr. Lyman is now printing a Preliminary Report on the Ophiuridæ, accompanied by ten plates. I have made fair progress with the text of the Echini, and thirty lithographic plates are nearly finished for the final Report.

To Messrs. Cabot, Lyman, and Pourtalès, the Museum is indebted for voluntary work and other valuable assistance. I have been relieved of much tedious detail by the Bursar of the College, Mr. Allen Danforth, who has taken charge of the Museum accounts since the transfer of the property from the Trustees to the President and Fellows of Harvard College.

Although summer instruction in Zoölogy has been abandoned at the Museum, I have been able in my new Laboratory at Newport to give facilities for work to half a dozen teachers (three ladies and three gentlemen); and it is my intention hereafter to divide the facilities at my command between students of the Museum and teachers of our common schools, who must, however, be sufficiently advanced to study for themselves with profit.

The new Laboratory erected by me at Newport is twenty-five feet by forty-five. The six windows for work are on the north side, and extend from the ceiling to within eighteen inches of the floor. In the spaces between the windows and the corners of the building are eight work-tables, three feet by five, covered with white tiles, one foot of the outer edge being covered, however, with black tiles for greater facility in detecting minute animals on a black background. Between the windows, movable brackets with glass shelves are placed; while similar brackets extend across the windows and between the tables, thus providing a shelf at any desired height. The tables for microscope work are three-legged stands of varying height, adapted to the different kinds of microscopes in use. The whole of the northern side of the floor upon which the work-tables and microscope-stands are placed is supported upon brick piers and arches independent of the main brick walls of the building, which form at the same time the basement of the building. The rest of the floor is supported entirely upon the outside walls and upon columns with stretchers extending under the crown of the arches reaching to the northern wall. This gives to the microscopic work the great advantage of complete isolation from all disturbance caused by walking over the floor. This will be duly appreciated by those who have worked in a building with a wooden floor, where every step caused a cessation of work, and was sure to disturb any object just at the most interest-

ing moment. The floor is cemented, and covered by a heavy oil-cloth. The centre of the large room is occupied by a sink, on each side of which extend two long tables, three feet by twelve. These are covered with different colored tiles, imitating mud, sand, gravel, sea-weed, black and white tiles, as well as red, yellow, blue, green, violet, to get all possible variety of background. A space at each end is covered by a glass plate, allowing the light to come from underneath, thus enabling the observer to examine larger specimens from the under side, without disturbing them when fully expanded. Two shorter and narrower tables, eighteen inches by seven feet, are placed half-way between these central tables and the southern face of the building. These tables are intended for larger aquaria or dishes, and are covered with common marble slabs. There is a blank wall on the south side, the whole of which is occupied by closets and shelves for storing glass jars, reagents, bottles, dishes, and so forth. A space is devoted to books. The open shelves for jars and dishes are of heavy rolled glass, supported upon iron brackets. The basement is used for the storage of alcoholic specimens, dredges, trawls, and other similar appliances. In the attic there is a large tank for salt water and another for fresh: the rest of the attic space will be eventually devoted to photographic rooms and room for an artist. The Laboratory is supplied with salt water by a small steam-pump driven by a vertical boiler of five-horse power: this is kept going the whole time day and night, the overflow of the tank being carried off by a large pipe. The water is taken some distance from the Laboratory, and drawn up at a horizontal distance of sixty feet from the shore in a depth of some four fathoms, the end of the suction pipe standing up vertically from the ground a height of five feet, and terminating in an elbow to prevent its becoming choked. The water is led through iron pipes coated inside with enamel. From the tank, the salt water is distributed in pipes extending in a double row over the central tables, over the long narrow tables for aquaria, and along the whole length of the glass shelves on the south wall. Large faucets to draw off salt water are placed at each sink; and by a proper arrangement of valves it is possible to lead fresh water to a part of the pipes, in case it is needed. The pipes leading over the tables and shelves are

provided with globe valves and nozzles, to which rubber pipe can be attached and the water led to a vessel below: there are fifty such taps, each of which can supply water or air to at least three or four jars. The overflow runs into gutters laid alongside the tables, leading into the main drain pipe. To aerate the salt water, I use an injector invented by Professor Richards of the Institute of Technology. This can be used to supply aerated water directly to the jar by providing it with a siphon overflow, or the aerated water can be collected in a receiver, from which air alone is then led to the jar. This latter course is the only practical one for delicate specimens, and for the bulk of the work of raising embryos. The east and west sides have large windows and doors provided with blinds; they always remain open, with the blinds closed to keep out sun-light, and serve to ventilate the Laboratory thoroughly. Large tables for dissection, covered with slate and adjoining a sink provided with fresh and salt water, are placed across the windows of these sides.

Ever since the closing of the school at Penikese, it has been my hope to replace, at least in a somewhat different direction, the work which might have been carried on there. It was impossible for me to establish a school on so large a scale; but I hope, by giving facilities each year to a few advanced students from the Museum and teachers in our public schools, to prepare, little by little, a small number of teachers, who will have had opportunities for pursuing their studies hitherto unattainable. The material to be obtained at Newport is abundant. The dredging is fair, and not difficult, as the depth in the immediate neighborhood does not exceed twenty to thirty fathoms. The pelagic fauna, however, is the most abundant. During the course of each summer, by the use of the dip-net, representatives of all the more interesting marine forms are sure to be found. With my small steam launch, a large space can always be traversed any evening, and advantage taken of the condition of the wind and tide, the launch being amply large for easy dredging in the moderate depths of the entrance of Narragansett Bay. The Laboratory is placed on a point at the entrance of Newport Harbor, past which sweeps the body of water brought by each tide into Narragansett Bay, and carrying with it every thing which the prevailing south-westerly winds drive before it.

Newport Island and the neighboring shores form the only rocky district in the long stretch of sandy beaches extending southward from Cape Cod, — an oasis, as it were, for the abundant development of marine life along its shores.

ALEXANDER AGASSIZ.

CAMBRIDGE, September, 1878.

REPORT ON THE GEOLOGICAL DEPARTMENT.

By J. D. WHITNEY, *Sturgis-Hooper Professor of Geology.*

DURING the past year, instruction has been given at the Museum, by the Sturgis-Hooper Professor, in the department of Economical Geology; on which subject there were lectures twice a week throughout the year. The class consisted of candidates for the degree of Ph.D., of special students, and of Seniors and Juniors from the undergraduate department. The Sturgis-Hooper Professor also gave or provided, during about six-sevenths of the year, instruction in Physical Geography, for Sophomores and Juniors, in the College "Natural History 1" elective. A part of the instruction in this elective was given by Mr. Wadsworth; and this consisted of a short practical course in Determinative Mineralogy and Lithology, as a necessary introduction to a course of Physical Geography and Elementary Geology.

There being no facilities for practical instruction in Lithology in the University, and this being considered by the Sturgis-Hooper Professor as the foundation of all geological study, the necessary preparations were made by him for giving such instruction in future years. The services of Mr. M. E. Wadsworth were engaged for this purpose, and the requisite apparatus for making thin sections was purchased. There was also procured a suitable microscope, made in Berlin, on the pattern given by Rosenbusch. Mr. J. H. Huntington was engaged during nearly the whole year in making thin sections of a portion of the lithological collection belonging to the Sturgis-Hooper Professor; and as much of this collection as room could be found for was unpacked and arranged in trays, and these placed in cases, with proper labels. All this was done under the direction of Mr. Wadsworth. The number of thin sections of specimens in the

collection prepared during the year is nearly one thousand. Besides these, a considerable number (about two hundred) have been imported from Europe for comparison. During the vacation just elapsed, Mr. Wadsworth spent several weeks at New York studying the collection and slides of the "Fortieth Parallel Survey," made for and under the direction of F. Zirkel. This department is now properly prepared for lithological instruction; and, the services of Mr. Wadsworth having been engaged exclusively for this work next year, several students have already applied for the enjoyment of the facilities thus provided, and will devote a considerable portion of their time to original lithological work.

In the way of publications, the geological department of the Museum has contributed to its *Memoirs* a work by Leo Lesquereux, describing the fossil flora of the Tertiary auriferous gravels of the Sierra Nevada, illustrated by ten double plates. This work forms Part 2 of Volume VI. of the *Memoirs*; and Part 1, which will complete the volume, is in press. The beginning of a special geological library is now being placed on the shelves in the rooms of the Sturgis-Hooper Professor; and, though incomplete, it is undoubtedly the best in this country.

With the co-operation of Professor Shaler, who instructs in geology in the undergraduate department of the College, and at the request of the Committee of the College Faculty having the subject of post-graduate instruction in charge, a scheme has been made out for a course of higher geological study at the Museum. For this purpose, it was necessary to some extent to combine the resources of the Museum and the College, and some of the students offering themselves for this course will undoubtedly be undergraduates; who can, however, avail themselves of the post-graduate studies only by special permission of the College Faculty, with the approval of the instructor specially interested, and whose course is desired to be taken. The scheme of post-graduate instruction, for the present, includes—

- I. Lithology.
- II. Dynamical Geology.
- III. Palæontology, Historical Geology.
- IV. Geological Field Work.
- V. Economical Geology.

The collections of the Museum in the Palæontological Department are ample for all purposes of ordinary instruction. For instruction in Lithology, we are for the present sufficiently well prepared. Books and maps for illustrating instruction in Dynamical and Field Geology are at hand in sufficient number and variety; but a considerable sum could be advantageously expended in procuring models in plaster, wood, and glass, for various illustrative purposes. Extensive collections in Economical Geology, and a large amount of room in which to display them, are required, if thoroughly valuable instruction is to be given in this portion of the course. The funds of the Geological Department of the Museum are, as it appears, hardly more than sufficient, however, for the payment of the salary of the Professor. During the past year, the Corporation of Harvard College has paid one thousand dollars towards the expense of bookcases for the geological library; and the sum of one hundred and forty-two dollars and fifty-two cents has been received from the Sturgis-Hooper fund, in addition to the salary of the Professor. This latter sum was applied to the payment of the expense of fitting up the lecture-room with black-boards, chairs, tables, and other necessary furniture. All the other expenses of the department have been paid by the Sturgis-Hooper Professor; including the cost of lithographing and printing the illustrations of Vol. VI. Part 2 of the Memoirs, and the amount paid Mr. Lesquereux for the preparation of the text.

REPORT OF N. S. SHALER, PROFESSOR OF PALÆONTOLOGY.

THE work in the department under my charge has been as follows, viz. :—

Instruction in general geology has been given to two classes, containing in all seventy undergraduates and four graduate students, during the academic year. Their work consisted in attendance on lectures three times a week, and field-work upon the geological problems of this vicinity. In the field-work I have had the assistance of Mr. M. E. Wadsworth; who replaced my assistant, Mr. E. M. Davis, during his absence on an extended journey.

In the department of Palæontology, fourteen undergraduate and three graduate students received instruction. Their work consisted in attendance on lectures thrice a week, and work upon the students' collections throughout the year. In their laboratory work, great use has been made of the synthetic collection of the Museum; the students having been required to familiarize themselves with all the forms represented there.

The summer instruction in geology was given by me, with the aid of my assistant in the summer school, Mr. J. S. Diller, and also by my assistants of the Kentucky Survey, Messrs. J. R. Procter, C. J. Norwood, and L. H. De Friese. Professor Theodore B. Comstock, of Cornell University, also rendered the school great service as an instructor. The teaching was carried on during the months of June, July, and August, in connection with the survey of a transit line, and a detailed geological section between Columbus, Kentucky, and Abingdon, Virginia. Nine persons attended the instruction of the school,—as great a number as could well be provided for in a school working in this fashion.

During the present academic year (1878–79), certain important changes will be introduced in these departments. The

course in Palæontology is no longer open to undergraduates, except in cases where they have received a complete preparation for it. The course itself now extends over two years, — the first year including systematic Palæontology; the second, Historical Geology. A post-graduate course in advanced field-work has also been added to the scheme of studies; the object being to train students in the methods of making geological surveys. The summer school will also be divided into a two-years term; the first year for beginners, the second year for persons of some training. The first or elementary course will be taught during the next summer in Cambridge, and in the Catskill region of New York; the second-year or advanced course will be taught, in connection with the work of the Kentucky Geological Survey, in Eastern Kentucky and the neighboring States. Mr. Davis will have immediate charge of the first-named course; the other will be under my own supervision.

A considerable part of the time of the instructors in these departments has been given to the maintenance of the efficiency of the Harvard Natural History Society, which is now a valuable aid to the schemes of instruction given at this Museum. This society has provided fortnightly meetings devoted to subjects connected with general Natural History, and also a section with meetings once a week, devoted to Geology and Palæontology. The society also maintains a system of prizes, to be given to students in high-schools and academies, for work done on designated scientific subjects. It furthermore supplies a course of popular lectures on scientific subjects, open to the public of this vicinity. Eight lectures were given in this course during the past year, with an average attendance of one thousand persons.

REPORT ON THE MAMMALS AND BIRDS.

By J. A. ALLEN.

IN the departments of mammalogy and ornithology the additions made since the last Report have been unusually important. There have been added to the collection of mammals three hundred and eighty skins, representing about one hundred and fifty species; two hundred and seventy-five skulls (about one hundred and seventy species); and one hundred and fifty skeletons (one-third of them mounted), representing nearly an equal number of species. The collection of birds has been increased by the addition of twelve hundred skins, representing about four hundred species; one hundred and forty-five skeletons (about one-fourth of them mounted); thirty mounted skulls; fifty-four sterna, and twenty other parts of skeletons, mounted separately; nine hundred and thirty-six eggs, and one hundred and ninety-five nests, altogether representing not less than one hundred and forty species. The accessions in both these departments represent mainly species not previously contained in the Museum, and were selected generally with special reference to filling important deficiencies. By far the larger part are the gift of Mr. Agassiz. Several invoices have been received from the Rev. M. M. Carleton, of Umballa, India, in the vicinity of which locality they were collected. These, added to Mr. Carleton's previous shipments, represent very fully the mammalian and avian faunæ of Northern India. Dr. T. M. Brewer, of Boston, has also contributed many nests and eggs of European and American birds, most of the latter being those of rare species. The oölogical department has been further enriched through the purchase of several considerable lots of eggs and nests collected in Colorado, California, and other parts of the West, embracing a large number of rarities.

From the National Museum at Washington has been received a collection of about fifty skins and a small lot of skulls of *Sciuridae*, embracing about twenty species and varieties, chiefly from Mexican and Central American localities; also, a considerable series of skulls of North American *Carnivora*. About ninety skins of mammals have been added through exchanges with the Boston Society of Natural History. Also, by exchange, a skeleton of an African Ostrich; a skull, an entire skeleton, and an embryo of the Dugong; several eggs of the Emeu, and of the Bush Turkey; and two eggs and a bower of one of the Australian Bower Birds (*Chlamydodera nuchalis*). Captain Charles Bryant has presented several embryos of the Northern Sea-Lion (*Eumetopias stelleri*).

A large part of the skeletons sent last year to Professor H. A. Ward, of Rochester, for preparation have been returned; some of them mounted, but the greater number as disarticulated skeletons. A considerable number of mammal and bird skins have been mounted from specimens previously in the collection.

The work on the collections has consisted in the identification and cataloguing of the additions, the marking of the osteological material recently added, and the re-marking of that returned by Mr. Ward. Among the noteworthy changes in the condition of the collection is the substitution of tight, glazed cases for the reception of the glass-stored alcoholic collections in the cellar, and the osteological collections in the attic, in place of open shelves. The systematic collection of mounted specimens has been rearranged, and a new room, devoted to the North American fauna, has been opened to the public. A collection illustrative of the South American fauna has been begun, material for which is rapidly accumulating.

Several small lots of mammals and birds have been sent out as exchanges; and others loaned for study, chiefly to Mr. Robert Ridgway and Dr. Elliott Coues of Washington. The *Rodentia* in the collection have been of great use to the writer in the preparation of monographs (published under the auspices of the General Government, in the Reports of the United States Geological and Geographical Survey of the Territories) of several families of the American representatives of this order.

REPORT ON THE DEPARTMENT OF REPTILES AND
BATRACHIANS.

By S. W. GARMAN.

THE collections in this department have maintained a very gratifying rate of growth since the time of the last report. A large and most important collection of skins, skeletons, and alcoholic specimens was secured by purchase in London. Through the kindness of our friends, Rev. M. M. Carleton (India), Revs. B. G. Snow, and A. A. Sturgis (Micronesia), Richard M. Kemp (Florida Keys), Mrs. C. N. Willard (Florida), Professor John T. Humphreys (Georgia and North Carolina), Dr. G. E. Manigault (South Carolina), Dr. Edward Palmer (Arizona), Professor Joseph L. Barfoot (Utah), Miss Mary H. Hinckley, Mrs. J. B. Burnham, Mr. N. Vickary, and Russell Hooper, Esq. (Massachusetts), Dr. R. M. W. Gibbs (Michigan), and others, the Museum has received valuable contributions from their various localities. To Count Emil Kornis (for Montenegrin species), the Musée Civique of Lyons (Syrian and Cochin-Chinese), and the Turin Museum (Italian), it is much indebted for well-selected and carefully preserved donations and exchanges. The collections made in Northern New York, Kentucky (with the Kentucky Geological Survey, under Professor N. S. Shaler), and in Cuba and Southern Florida (with the Blake Expedition of the United States Coast Survey), furnished quite an extended list of species, and many duplicates especially desirable for exchanges with foreign correspondents.

The most bulky additions were the large turtles purchased or prepared by Professor Ward. The portion of my time which has been spent on this department has been devoted to the care of the material, its study and identification, and in preparing it for the rooms open to the public, or for exchange.

It is found that, by mounting the majority of the Sauria and Batrachia on plaster tablets, in the jars of alcohol, their value for purposes of exhibition is greatly enhanced. This takes considerable labor; but, once mounted, they will need no further attention for a long period. Many specimens have been sent to correspondents of the Museum. Every request for duplicates has been complied with. Yet the bulk of what has gone out has been much exceeded by that of the arrivals.

The space allotted to Reptiles and Batrachia in the Systematic Exhibition Room, as well as that in the North American representation, has been occupied.

The upright storage cases which have been erected for the alcoholic collections have prevented the sudden changes of temperature, and the frequent breakages done to them.

The checks upon evaporation introduced by the use of these cases, of copper cans, and of a preparation of wax for the stoppers of the jars, have so cut it down that its amount is very small indeed compared with what it was formerly.

The instances in which the cans suffer by corrosion are few, and the expense on this account will prove a mere trifle in comparison with the amount saved in the prevention of evaporation, and of breakage in glassware, by their use. This applies as well to the alcoholic material in other departments. Alcohol, which has been reduced by the addition of water to 75 per cent or lower, requires changing so much sooner than if left full strength that it is in reality more expensive. There is also in its use an increased danger of decay in the specimens, while cans containing specimens perfectly preserved in strong alcohol are the least likely to be corroded.

The incidental correspondence—requests for information, identifications, &c.—is increasing. A careful attention to all questions has resulted in increasing the interest and activity of our correspondents, from which the Museum of course receives direct benefit.

REPORT ON INSECTS.

 By DR. H. A. HAGEN.

1877. Additions to the collection, from —

Mr. C. E. Webster, Binghamton, N. Y. Biological specimens.

Mr. Charles T. Minot. Odonata, and a large lot of other insects, from New England.

Professor Asa Gray. Living Caterpillar of *Cossus* from Bur-Oak, from Ohio.

Mr. H. W. Edwards, Coalburgh, W. Va. Biological specimens for Lepidoptera.

Mr. R. Thaxter, Newton. Lepidoptera, some very rare Noctuidæ.

Rev. A. A. Sturgis, Insects from Ascension Island, Pacific Ocean.

Baron von Osten-Sacken. A very extensive collection of Californian Diptera and Neuroptera.

Professor C. H. Fernald, Orono, Me. A lot of living *Pteronarcys regalis*.

Mr. R. H. Lee, Philadelphia. A Wasp's Nest.

Mr. A. Osgood, Newburyport, Mass. Living Caterpillar of *Bomb. Velleda*.

Mr. H. L. Higginson. A full series of stages of the Rocky Mountain Grasshopper, from Nebraska.

Mr. T. V. Chambers, Covington, Ky. A large lot of United States *Tineina*.

Mr. Theodore Lyman. Several insects.

Mr. L. F. Pourtalès. Living *Eriosoma*.

Mr. P. R. Uhler, Baltimore, Md. A series of United States *Saldidæ*.

Mrs. C. N. Willard, Camp Barrancas, Fla. A lot of insects.

Professor C. Semper. Galls from California: biological and mimical specimens.

Mr. S. H. Scudder. Biological specimens.

Miss C. Clarke. Biological specimens.

In exchange, from —

Mr. J. H. Morrison. United States Lepidoptera.

Professor C. H. Fernald, Orono, Me. United States Lepidoptera: some very rare.

Mr. B. Neumoegen, New York. *Argynnis nitocris*, from Arizona.

Mr. C. A. Dohrn, Stettin. A rich lot of Buprestidæ and Cave Beetles, Neuroptera, a lot of Lamellicornia, Erotylidæ.

Mr. R. Anker, Buda-Pesth, Hungary. European Lepidoptera.

Professor G. Mayr, Vienna, Austria. Dipterous and Hemipterous Galls.

Mr. H. Strecker, Reading, Pa. Cocoons of *Lamia Gloveri*, from Arizona.

Bought from —

Mr. J. H. Morrison. A large lot of Neuroptera, from Georgia and North Carolina.

Professor H. Loew, Guben, Germany. His typical collection of United States Diptera.

1878. From —

Mr. H. G. Hubbard, Detroit, Mich. A very large collection of biological specimens of Termites and other insects, from Jamaica.

Mr. G. Horn, Philadelphia, Pa. Living larva of *Amblycheila* and other larvæ.

Mr. A. Agassiz. Insects from Key West and Havana; Cave Myriapods, from Matanzas.

Mr. R. Morrow, Halifax, N. S. Larvæ of *Cæstrus Tarandi*.

Mr. E. H. Burr. Living *Scolopendra*, from Borneo.

Mr. R. Thaxter, Newton. Neuroptera.

Mr. W. H. Edwards, Coalburgh, W. Va. A valuable collection of biological specimens of Lepidoptera.

Mr. F. Sanborn. Neuroptera, from Massachusetts.

Mr. S. Henshaw. Biological specimens of *Amblycheila*, both sexes.

Mr. W. T. Brigham. *Ornithomyia*, from Kanai, Hawaii Island.

Dr. H. A. Hagen. Biological specimens and insects.

The collections of Diptera from Loew and Osten-Sacken are doubtless the most prominent additions. Some large collections have been sent in exchange: to the Museum in Tokio, Japan, a full set of Lepidoptera, covering all families, seven hundred species, in eleven hundred specimens. Of Coleoptera, several larger sets have been sent to Dr. Dohrn: of Lepidoptera, to Dr. Staudinger, Dresden; Mr. Anker, Buda-Pesth; Mr. Strecker, Reading, Pa.

Scientific publications, based more or less on parts of the collection, are the monographs of Osten-Sacken of the Tabanidæ, of the western Diptera of the United States, and the new edition of his catalogue of the Diptera of the United States. Mr. R. McLachlan, London, has used for his admirable monograph of the Trichoptera of the European Fauna the types of the collection. Several authors in Europe have described and published a number of South American and Himalayan Beetles; and Mr. Fauvel, Caen, the United States Staphylinidæ.

A paper on the remarkable genus *Pteronarcys*, containing biological and anatomical details, and several others, are published by the assistant, besides scientific work done for other entomologists: the identification of the Neuroptera from Quebec, Canada, for Abbé Provancher; the family of Gomphina, for Baron Sélys Longchamps, &c.

Miss M. Clark has given as usual her untiring help to keep the collection free of pests, and to spread and label insects.

The work done by the assistant consists in the systematical collection of an entirely new arrangement of the Lepidoptera of the United States, and of several larger families of Coleoptera. The most important work done relates to the biological collection. In this the Coleoptera are finished; occupying thirty-nine boxes, about eight hundred species, more or less illustrated, and covering all families. Some parts are rather prominent, from the number of typical specimens. The Diptera are also finished, filling fourteen boxes. Of the Hemiptera and Hymenoptera, several parts are arranged. The collection of Galls, on account of the numerous additions, had to be rearranged, and is now completed. The Parasites, animal and vegetable, are finished. As we are promised very valuable additions among the Lepidoptera, the arrangement of this order was not continued. A general collection has been placed on exhibition in the Synoptic Room.

The great care taken to obtain a thoroughly safe insect cabinet has undoubtedly led many entomologists to deposit their collections permanently in the Museum. The conviction that collections are safely cared for here has induced Osten-Sacken to present his collection, Dr. Le Conte to bequeath his collection, Mr. Chambers to present a collection of Tineina, as well as other entomologists who have promised their collections to the Museum.

REPORT ON THE ICHTHYOLOGICAL DEPARTMENT.

 By F. W. PUTNAM.

SINCE the last Report, the work of arranging the specimens, already in jars, has steadily progressed, and I can now state that the alcoholic portion of the collection is disposed of in the basement of the building as follows:—

Eighteen hundred and fifty-four trays have been placed in the two hundred cases, built for the purpose, in the three basement rooms. Each of these trays (with a few exceptions) contains representatives of a single genus, the name of which, with that of the family to which it is referred, is given on the tray. These are placed, as nearly as possible, in systematic order, so that all the specimens of any genus are now readily accessible.

In addition to the thousands of jars that have been arranged in the trays, there are about fifteen hundred which have accumulated during the year, principally by the separation of mixed lots in large jars and the unpacking of several of the copper cans. These jars will be placed in their proper trays when the next step toward the final arrangement of the collection is taken. There still remain between eighty and ninety copper cans and two large tanks, the contents of which are at present unknown to me.

The following additions have been received since the last Report:—

From Mr. R. Brooks, a specimen of *Prionotus* from Rockport, Mass.

From Count Kornis, two specimens of *Cobitis* from Hungary.

From Mr. John T. Humphreys, a young *Petromyzon* from Georgia.

From Miss C. M. Clapp, of the Mt. Holyoke Seminary, a living young *Petromyzon* caught in the Connecticut River, in November, 1876.

From Rev. M. M. Carleton, two species, four specimens, from Umballa, North India.

From Mr. E. M. Nelson, a specimen of *Sternotremia isolepis* Nelson, = *Aphrodederus Saganus*, from the Calumet River, near Chicago, Ill.

From Rev. A. A. Sturgis, about one hundred specimens, of several species, from Ascension Island, Pacific Ocean.

From Rev. B. G. Snow, a second collection of over two hundred specimens, of various species, from Ebon Island, Pacific Ocean.

From Mr. Samuel Powel, one specimen each of *Acipenser* and *Elacate* from Newport, R. I.

By exchange with the Museum of Lyons, a collection of fifty specimens, comprising twenty-six named species of fishes from Syria, Cochinchina, and Switzerland.

From the Smithsonian Institution, a collection of one hundred and eleven species, named, from various localities in North America.

From Prof. G. Brown Goode, several specimens of a new species of *Fundulus* from Bermuda.

From Mr. B. F. Goss, many specimens of young *Amia* from Pewaukee, Wis.

From Mr. J. Henry Blake, a young specimen of *Dactylopterus* and a *Pelamys* from Provincetown, Mass.

From Mrs. C. N. Willard, of Fort Barrancas, two small lots of specimens from Camp Barrancas and Pensacola, Florida.

From Colonel R. H. Beddome, of Somerset, Queensland, Australia, a collection of fourteen species from Queensland.

From Captain Charles Bryant, of Fair Haven, Mass., three species from Unalashka.

From Captain Vinal N. Edwards, of Wood's Hole, Mass., eight specimens of the common Eel from the Market at New Bedford, December 31st. These are all females, with eggs in various stages of development though none are mature. They are all of the variety known as "silver-bellies." (Qy. Are the "golden bellies" males?)

From Colonel Theodore Lyman, of Boston, the dorsal fin of a young Brook Trout, showing the repair of a cut fin and one year's growth.

From Mr. S. W. Garman, of the Museum, a small collection from Black Lake, St. Lawrence County, New York, made in May. This collection contains twenty-four pairs of Lepidostei taken at the time of spawning.

From Mr. A. Agassiz, several specimens of young fishes from Newport, R. I., and a collection, consisting of about thirty lots, from various places in the Gulf of Mexico, obtained during the Gulf Stream and Gulf of Mexico Exploration in the United States Coast Survey steamer "Blake," 1877-78.

During the year, a few specimens have been sent from the Museum by special request.

The Selachians have remained in the charge of Mr. Garman, as stated in the last Report.

REPORT ON THE CRUSTACEA.

 By WALTER FAXON.

THE principal additions to the Crustacea since the last Report consist of a large collection made by the Rev. B. G. Snow at the Marshall Islands, and by the Rev. A. A. Sturgis at Ascension Island; a lot of forty-three Norwegian species (all identified) from the Bergen Museum; the dredgings of the United States Coast Survey steamer "Blake" in the Gulf Stream (now in the hands of M. Alphonse Milne Edwards, Paris); a collection from Professor Lovén; and Cladocera from Wisconsin, determined by Mr. E. A. Birge.

During the winter of 1876-77, I determined and catalogued the large collection of the Cancroids of the Museum, and set apart a series of dry Crustacea to illustrate the fauna of North America.

During the academic year 1877-78, most of my time has been devoted, as Instructor in Zoölogy, to the students in that department. Little has been done with the collection of Crustacea, beyond the care necessary for its safe-keeping.

List of accessions to the collection of Crustacea:—

- Agassiz, A. Larvæ from Newport, R. I.
 Beddome, C. E. *Matuta*, *Squilla*, from Queensland.
 Bergen Museum. Forty-three species from Norway.
 Birge, E. A. Sixteen species of Cladocera from Madison, Wis. (In exchange.)
 Faxon, Walter. Crustacea, including eggs and larvæ, from Wood's Hole, Mass.
 Fernald, C. H. *Cambarus Bartonii* from Houlton, Me.
 Garman, S. W. Specimens from San Francisco, Cal., and Cambridge, Mass.
 Greenleaf, R. W. Live *Branchipus* from Milton, Mass.

- Humphreys, J. T. *Cambari* from North Carolina.
- Lintner, J. A. *Gammarus fasciatus* from Albany, N. Y.
- Lovén, Professor S. Crustacea from Northern Europe.
Lyons Museum. *Limulus Moluccanus* from Cochin-China.
- Manigault, Dr. G. E. *Cambarus* from Charleston, S. C.
- Mansfield, J. F. A collection of fossil *Merostomata* from Cannelton,
Pa. (Purchased.)
- Pacific Mail S. S. Co. *Lepas* from Pacific Ocean, through Lieutenant
Day, U. S. N.
- Packard, A. S., Jr. Types of *Lepidurus Couesii* Pack. and *Estheria*
Clarkii Pack. North-Western Boundary Survey. (In exchange.)
- Powel, Samuel. Live *Branchipus* from Newport, R. I.
- Semper, Carl. Specimens from Europe and Philippine Islands.
- United States Coast Survey steamer "Blake." A. Agassiz's collec-
tion of dredgings in the Gulf of Mexico.
- Willard, Mrs. C. N. Crustacea from Florida.
- Wood, Rev. R. W. Thirty-four species, one hundred and twenty-four
specimens, from the Marshall Islands, collected by the Rev. B. G.
Snow. Thirty-four species, ninety-seven specimens, from Ascension
Island, collected by the Rev. A. A. Sturgis.

REPORT ON THE CONCHOLOGICAL DEPARTMENT.

By CHARLES E. HAMLIN.

FROM November, 1876, the work of identifying and revising species of marine Lamellibranchiata, in which I was then engaged, was carried forward through the winter and early spring, —all time not given to instruction being so employed.

In May, labor upon the collection of Fossils, now stored in the attic, was taken up where it was left when interrupted by the cold of winter. The Palæozoic Mollusca were arranged in the order of their geological age and by classes, distributed into their respective families and genera, and were placed in the glazed cases provided for their reception. The fossil Fishes, Articulatés, and Radiates were arranged in accordance with their geological succession.

Part of two days in each week of the academic year 1876–77 was given by me to instructing a college class in Structural Geology and Physical Geography.

In consequence of the death of Mr. Anthony, it becomes my duty to report upon that part of the work of which he had more immediate charge. As during the four years previous, his special attention was given to the Land and Fresh-water Mollusca, and the conducting of exchanges with numerous correspondents. His records show that from Nov. 23, 1876, to Sept. 1, 1877, there were received eleven packages, containing, besides much material for other departments, two thousand four hundred and forty-five specimens of shells, representing one hundred and twenty-five species.

The number of packages forwarded to different persons and institutions, during the same time, was sixteen, including one thousand six hundred and fourteen species, and five thousand five hundred and fifty-six specimens. The larger consignments were made to Dr. Henry Dohrn of Stettin, Prussia; C. E. Bed-

dome of Somerset, Queensland; Mrs. Charles Coxen, Bulimba, Queensland; Count Emil Kornis of Buda-Pesth, Hungary; W. Legrand of Hobart Town, Tasmania; and L. G. Yates of Centreville, Cal.

The conchological work for the year ending Sept. 1, 1878, has been unusually miscellaneous in character, as a consequence of the changes that have been in progress throughout the Museum.

During the fall, the alcoholic mollusks were arranged in the cases provided for them in the basement, by families and genera, so far as the original lots have been divided up. From the palæontological collections now stored in the attic, a large number of Palæozoic and Mesozoic Mollusks were selected, to be hereafter divided between the Systematic Collection and that which will be formed to illustrate the various geological formations. This work was continued so long as it could be carried on in rooms not furnished with heating apparatus.

Since the beginning of winter, there have been accomplished:

1. The systematic arrangement of the great mass of duplicate Land and Fresh-water Shells. They are now for the first time readily accessible for use in exchange or study.

2. An examination of some large but disorderly collections of miscellaneous shells, followed by a proper distribution of the valuable material and the rejection of the worthless.

3. The overhauling of several foreign local collections of great value, which had become mingled and confused, their separation according to locality, and such arrangement as was essential for ready access.

4. Final arrangement of the dry Mollusks of the Synoptic Collection, and preparation of diagnoses of the larger molluscan groups.

5. The naming of three collections of shells sent by educational institutions for determination.

6. Care of collections of shells received in exchange; and the selection and labelling of lots sent in return.

7. Selection of specimens of shells for the North American Faunal Collection. About two-thirds the number required have been made ready, and have received preliminary arrangement in the exhibition cases.

8. Provisional arrangement (pending the construction of new cases for the Systematic Collection of Mollusca) of mounted Land Shells in the glazed cases of the attic; the overhauling of the large accumulations of shells of Unionidæ (duplicates), the rejection of the greater part, and the storing of the rest in the attic cases.

9. Communication with the numerous correspondents of the late Mr. Anthony with reference to future exchanges.

Miss Anthony, as in years past, has had charge of mounting shells for exhibition, and has rendered valuable service by cleaning specimens and securing them from dust.

The transactions in exchange have been as follows:—

Ten packages of shells have been received, containing four thousand four hundred and ninety-three (4493) specimens of five hundred and seventy-three (573) species. Three packages have been sent to as many persons, containing two thousand one hundred and twenty-five (2125) specimens, illustrating seven hundred and twenty (720) species.

REPORT ON RADIATA AND PROTOZOA.

By L. F. POURTALÈS, Keeper of the Museum.

THE most important additions to the collections in this department made for many years are those resulting from the dredgings made by Mr. Agassiz in the Gulf of Mexico. These, added to what the Museum had before, make it the depositary of probably one of the richest deep-sea collections in existence. The Gulf of Mexico and the West Indian seas prove to be one of the richest regions thus far explored for deep-water forms.

The arrangement of these and the description of the new forms is progressing favorably, the Echini, Ophiuridæ, and Corals having been nearly completed by Messrs. Agassiz, Lyman, and myself. The Star Fishes are in the hands of Professor Perrier of Paris, the Sponges are with Professor Oscar Schmidt, and the Foraminifera with Mr. H. B. Brady. The Alcyonarians of former dredging expeditions, which had been for a number of years in the hands of Professor Kölliker of Würzburg, will be returned, as he has found it impossible to work them up, on account of the pressure of other occupations.

In the exhibition room devoted to Radiates, the collections had to be removed temporarily, for the purpose of having the exhibition cases painted. They have been replaced lately, and the collection of Sponges added. The room will be completed when the systematic collections of Crinoids, Alcyonarians, and Protozoa are arranged.

The collection of Ophiuridæ has been, as heretofore, under the charge of Mr. T. Lyman, who has been assisted by Miss E. H. Clark.

REPORT ON THE LIBRARY.

 By MISS F. M. SLACK.

DURING the year ending Oct. 1, 1877, there were added to the Library 424 volumes, 864 parts, and 244 pamphlets; and, during the months following up to Sept. 1, 1878, 316 volumes, 478 parts, and 116 pamphlets. Of these, there were received from —

	VOLUMES.	PARTS.	PAMPHLETS.	TOTAL.
Donations and Purchase	622	982	242	1845
Foreign Societies, Exchanges	92	256	20	368
American Societies	14	81	12	107
Library of Louis Agassiz	3	14	86	103
Museum of Comparative Zoölogy	9	9	0	18
	<hr/>	<hr/>	<hr/>	<hr/>
	740	1342	360	2442

[A.]

[House No. 4.]

COMMONWEALTH OF MASSACHUSETTS.

HOUSE OF REPRESENTATIVES, Jan. 12, 1877.

The Committee on the Judiciary, to whom was referred the petition of the Trustees of the Museum of Comparative Zoölogy for the dissolution of said Corporation, have had the same under consideration, and report the accompanying Bill.

For the Committee,

EMORY WASHBURN.

AN ACT

TO DISSOLVE THE CORPORATION OF THE TRUSTEES OF THE MUSEUM OF COMPARATIVE ZOÖLOGY.

Be it enacted by the Senate and House of Representatives, in General Court assembled, and by the authority of the same, as follows:—

The Corporation of the Trustees of the Museum of Comparative Zoölogy, created by chapter two hundred and eight of the acts of the year eighteen hundred and fifty-nine, is hereby dissolved, subject to the provisions of sections thirty-six and thirty-seven of chapter sixty-eight of the General Statutes.

[B.]

INVESTED FUNDS OF THE MUSEUM

IN THE HANDS OF THE TREASURER OF HARVARD COLLEGE, SEPT. 1, 1877.

Sturgis-Hooper Fund,	\$70,142.52
Gray "	51,750.00
Agassiz Memorial ,,	} 297,933.10
Teachers & Pupils' Fund,	
Permanent "	117,469.34
Humboldt "	7,740.66
Agassiz Building "	8,345.26
	<hr/>
	\$560,944.89

[C.]

FACULTY OF THE MUSEUM.

 CHARLES W. ELIOT, *President.*
ALEXANDER AGASSIZ, *Curator.*

JOHN B. S. JACKSON.

JOSIAH D. WHITNEY, *Secretary.*

THEODORE LYMAN.

 OFFICERS.

ALEXANDER AGASSIZ, *Curator.*JOSIAH D. WHITNEY, *Sturgis-Hooper Professor of Geology.*HERMANN A. HAGEN, *Professor of Entomology.*NATHANIEL S. SHALER, *Professor of Palæontology.*WILLIAM JAMES, *Assist. Prof. of Physiol. and Comp. Anat.*L. F. POURTALÈS, *Keeper.*THEODORE LYMAN, *Assistant in Zoölogy.*CHARLES E. HAMLIN, *Assistant in Conchology and Palæontology.*JOEL ASAPH ALLEN, *Assistant in Ornithology.*F. W. PUTNAM, *Assistant in Ichthyology.*WALTER FAXON, *Assistant in Zoölogical Laboratory.*W. M. DAVIS, JR., *Assistant in Geological Laboratory.*S. W. GARMAN, *In charge of Reptiles.*E. L. MARK, *Assistant in Zoölogical Laboratory.*M. E. WADSWORTH, *Assistant in Lithology.*PAULUS ROETTER, *Artist.*MISS F. M. SLACK. *Librarian.*

ANNUAL REPORT

OF

THE CURATOR

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY

Museum of Comparative Zoölogy, Cambridge, Mass.

With the compliments of

ALEXANDER AGASSIZ.

CAMBRIDGE :

UNIVERSITY PRESS : JOHN WILSON AND SON.

1879.

[C.]

FACULTY OF THE MUSEUM.

 CHARLES W. ELIOT, *President.*

 ALEXANDER AGASSIZ, *Curator.* JOHN B. S. JACKSON

JOEL ASAPH ALLEN, *Assistant in Ornithology.*
 F. W. PUTNAM, *Assistant in Ichthyology.*
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 PAULUS ROETTER, *Artist.*
 MISS F. M. SLACK, *Librarian.*

ANNUAL REPORT

OF

THE CURATOR

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY

AT HARVARD COLLEGE,

TO THE

PRESIDENT AND FELLOWS OF HARVARD COLLEGE,

FOR

1878-79.

CAMBRIDGE :

UNIVERSITY PRESS : JOHN WILSON AND SON.

1879.

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REPORT.

TO THE PRESIDENT AND FELLOWS OF HARVARD COLLEGE:—

OUR most important accessions of the year are the magnificent collections of the "Blake" Expedition of 1878-79, and the large collections of Birds, Mammals, Reptiles, and Fishes made by Mr. Garman at St. Kitts, Dominica, Grenada, Trinidad, St. Thomas, and Porto Rico, after he left the "Blake." I may mention, also, our exchanges with the National Museum at Washington, and the purchases made of Professor Henry A. Ward in Birds and Mammals.

Many improvements have been made in the arrangement of the Exhibition Rooms. The galleries of the North American Faunal room, and the gallery containing the Systematic Collection of Crustacea, have been opened to the public. The room containing the Systematic Collection of Fishes and Selachians, having been provisionally arranged by Mr. Garman, is now accessible to the public. Excellent progress has been made in the completion of the new cases in the room devoted to the Systematic Collection of Mollusca, and a large part of the collections intended for exhibition have already been selected by Mr. Hamlin. Much has also been done by Mr. Allen in the selection of material for the Birds and Mammals of the Faunal collections still remaining incomplete.

The exchanges of the Library continue with regularity. To a few correspondents of the Museum, the publications have been distributed by the Smithsonian; the majority, however, have received them direct by mail or through the agency of booksellers.

To Messrs. Lyman, Cabot, and Pourtalès the Museum is in-

debted for voluntary work and other valuable assistance. To Carlile P. Patterson, the Superintendent of the Coast Survey, the Museum owes the maps accompanying my report of operations on the "Blake."

Beside the distribution of the "Blake" collections among specialists for final investigation, collections from the Entomological, Conchological, and Ornithological Departments have as usual been sent to well-known investigators, for examination. Important material has also been forwarded for study to Dr. W. K. Parker, to Professor Schiödte, and to Mr. F. M. Balfour.

The usual exchanges have been continued with our correspondents; details concerning them will be found in the special Reports of the Assistants of the Museum.

Collections for purposes of instruction have been sent to Bethel College, Kentucky, to the Boston Society of Natural History, and to the Taunton High School.

The number of visitors to the Museum is constantly increasing. This is undoubtedly due to the fact that the Museum is always open, the admission not being limited to appointed days alone. As we can give but a comparatively small exhibit of our Entomological collections, the work-rooms of the Entomological Department are open on special occasions; they have been visited by a number of specialists, and by classes desirous of seeing the Biological collections; Dr. Hagen has made great progress in their arrangement during the past year.

The instruction at the Museum has been in charge of Professors J. D. Whitney, Shaler, Dr. James, Dr. Faxon, Dr. Mark, and Messrs. Davis and Wadsworth. The special students have received the customary facilities for work in the different Laboratories.

The Sturgis-Hooper Professor of Geology, Mr. J. D. Whitney, has devoted the greater part of his time to the publication of the first part of the "Auriferous Gravels of California." Of this he has defrayed the principal cost, in addition to supplying the means, as in former years, not only for many incidental expenses, but also for the additional instruction in Lithology, given in the Department, under his supervision, by Mr. M. E. Wadsworth.

Professor N. S. Shaler has given an elementary course in Geology, consisting of lectures, and laboratory and field work; the

course has been attended by eighty-five persons. Also, courses in Palæontology and advanced Geology, attended by seven persons. Professor Shaler has also continued his usual summer course in connection with the Geological Survey of Kentucky.

Mr. Davis has this year taken charge of the elementary course in Physical Geography; this has been attended by forty-five persons. There have been no advanced students in Geology during the past year. The elementary instruction in Zoölogy was given by Dr. Mark; it consisted of lectures, three times a week, and laboratory work. This course was attended by eighteen students.

Dr. William James gave, as in former years, an elementary course of instruction in Vertebrate Anatomy and Physiology, to about ninety students belonging to the three upper classes of undergraduates.

My Laboratory at Newport was as usual opened to certain public teachers and assistants of the Museum. Mr. Faxon obtained there the bulk of the material for his papers on the development of Crustacea.

During the past summer, a number of microscopes and other apparatus have been obtained, to equip a temporary Biological Laboratory for elementary instruction. This course will be in charge of Professor Farlow and of Dr. Faxon.

Some of the classes in Natural History have now become so large that the want of proper accommodations is seriously felt. We cannot hope to remedy this evil until, in accordance with the conditions of the subscriptions to the Agassiz Memorial Fund, the next addition to the Museum is built. That is to be almost wholly devoted to laboratories, lecture-rooms, and work-rooms, and will give us all the necessary facilities for instruction in Biology and Geology.

The publications of the Museum during the past year have been more than usually important. Of the *Memoirs*, we have issued Part I. of No. 1 of Vol. VI., containing the Auriferous Gravels of the Sierra Nevada, by J. D. Whitney, pp. viii, 288, 10 plates, and a map. This volume has been published in connection with Professor J. D. Whitney and the Geological Survey of California; it contains an elaborate memoir on the presence of human remains in the auriferous gravels of California, with a plate of the celebrated Calaveras skull. Nos. 7 to 15 inclusive of the *Bulletin* have also been issued and distributed. They contain

Preliminary Reports on the Ophiurans of the "Challenger" expedition, by Theodore Lyman; two papers on the Development of Crustacea, by Walter Faxon; and Preliminary Reports of the dredging operations of the United States Coast Survey Steamer "Blake," containing articles on Sounding Apparatus in use on the "Blake," by Lieut.-Commander C. D. Sigsbee; on the Echini, Corals, Crinoids, Ophiurans, Worms, and Hydroids, by Messrs. Agassiz, Pourtalès, Lyman, Ehlers, and S. F. Clarke; also, a paper on the Classification of Rocks, by M. E. Wadsworth, and an account of the Dredging Operations of the "Blake," during the season of 1878-79, by Alexander Agassiz, addressed to Carlile P. Patterson, Superintendent of the Coast Survey; making in all pp. 250, with 32 plates.

In addition to these publications, Dr. Steindachner has continued in the Proceedings of the Vienna Academy his descriptions of new species of Fishes collected by the Thayer Expedition. Professor Alphonse Milne-Edwards has likewise continued to describe and figure the Crustacea of the "Bibb," "Hassler," and "Blake," in his great work on the Crustacea of Mexico; he also published in the "Comptes Rendus" a preliminary account of the remarkable gigantic Isopod discovered in the first "Blake" expedition, to which he has given the name of *Bathynomus giganteus*.

The first part of the final Report on the Sponges dredged by the "Blake" has been published in Germany by Professor Oscar Schmidt. It forms a beautifully illustrated quarto memoir, 32 pp., 4 plates.

The Museum has also supplied materials for the publication of the new edition of the Catalogue of the Diptera of the United States by Osten-Sacken, issued by the Smithsonian, as well as for Part VIII. of the Revision of the Trichoptera, by R. M'Lachlan. In addition to these publications, numerous papers have been written by the Professors and Assistants of the Museum for other serials than those of the Museum.

During the past winter I was again invited by the Hon. Carlile P. Patterson, Superintendent of the United States Coast and Geodetic Survey, to join the United States Coast Survey Steamer "Blake," Commander J. R. Bartlett, U. S. N., and to take charge of the dredging operations for the season of 1878-79. Three months were spent in exploring the deep-sea Fauna of the eastern part of

the Caribbean Sea, along the Windward Islands, from St. Thomas to Trinidad, and the season's work was completed at Barbadoes. Our success was great; for, thanks to the experience gained during a former season, there were none of the delays incidental to new work. The "Blake" was fitted for sea by her former commander, Lieut.-Commander C. D. Sigsbee, and it was my good fortune to find on board the majority of the officers with whom I sailed in the winter of 1877-78. Lieutenant W. O. Sharrer was the executive officer, and I have to thank him and the other officers for their cordial interest and efficient assistance. I was, as usual, accompanied by Mr. Garman. Although we spent but three months in dredging, the collections made are undoubtedly the most important and largest ever made on this coast, and, with those of former expeditions sent out under the auspices of the Coast Survey, make our deep-sea collections but little inferior to those of the "Challenger." We occupied during this season no less than 200 stations, and made over 230 hauls from the 100-fathom line to a depth of 2412 fathoms. For the details of our cruise I would refer to my Preliminary Report to the Superintendent of the Coast Survey, published in the Museum Bulletin (Vol. V. No. 14, Letter No. 3, May, 1879).

The collections have all been assorted into the groups destined for the specialists who are to work them up. The Mollusks have already been sent to Mr. Dall, the Sponges to Professor Oscar Schmidt, who will thus soon finish his monograph on the Sponges of the Gulf of Mexico, of which the first part has been issued. This memoir is to be a complete report on the Sponges collected by the "Blake" expeditions. The Corals, Echini, Alcyonoids, and Ophiurans have been submitted to Messrs. Pourtalès, Lyman, and Agassiz. The Fishes have been sent to Dr. Steindachner, and during the fall the Crustacea, Annelids, and Star-fish will be forwarded to Professors Alph. Milne-Edwards, E. Ehlers, and Perrier, who will incorporate this new material in the monographs they are preparing, based upon the collections of the first "Blake" expedition, already in their hands.

The exploration of the past winter plainly shows that we cannot expect very many novelties from the deeper waters of the Caribbean Sea and Gulf of Mexico; and although undoubtedly much remains to be done within the belt included between the 100 and 350 fathom line, the main characteristics of the deep-

water Fauna have most probably been sketched out. It now becomes extremely desirable to follow the course of the Gulf Stream to the north of the Bahamas, and, by running normals from the 100-fathom line to 2500 fathoms off the coast of the United States, to connect this isolated district with the deep-water Fauna proper of the Atlantic. This work, it is hoped, will be accomplished during the coming summer, the Superintendent of the Coast Survey having asked me to join the "Blake" for this purpose on her return from her winter's cruise.

ALEXANDER AGASSIZ.

CAMBRIDGE, September, 1879.

REPORT ON THE GEOLOGICAL DEPARTMENT.

By J. D. WHITNEY, *Sturgis-Hooper Professor of Geology.*

DURING the whole of the past year, instruction in Lithology was given, three times a week, by Mr. Wadsworth, to one special student, and to two undergraduates who had elected this subject among those offered in the post-graduate scheme of instruction, having previously qualified themselves for lithological work by special mineralogical study. As this appears to have been the first attempt in this country to give systematic instruction in Lithology, according to the modern methods, some details of the course followed may with propriety be added. The instruction consisted of lectures upon the macroscopic and microscopic characters of the rocks and their constituent minerals, and also of field and laboratory work. Besides the study of the laboratory collections, each student had assigned to him a separate district, which he was to map, studying the characters and relations of the rocks, and collecting the necessary specimens. Of the rocks thus collected, the student was required to make thin sections, and to examine them microscopically, writing a thesis upon the whole work. It was intended that the course should be sufficiently thorough to fit the student for practical field and laboratory research.

Mr. Wadsworth also continued his investigations of the Californian rocks, of which the thin sections had been made during the previous year, as mentioned in the last Report. Written descriptions of several hundred specimens were prepared, with the intention of publishing, in due time, a full account of the volcanic rocks of the Pacific coast. The chief results of this investigation, so far as the same had been completed up to February last, were embodied in an abstract published in the Bulletin of the Museum, with the title, "On the Classification of Rocks."

The larger portion of the time of the Sturgis-Hooper Professor

was given to the preparation of a work entitled "The Auriferous Gravels of the Sierra Nevada of California," which forms the first part of the first number of the sixth volume of the *Memoirs of the Museum*. The second number of this volume, containing a description of the fossil plants found in these gravels, by Mr. Lesquereux, was published a year earlier, and the remainder of the first number, completing the volume—which is entirely devoted to the Auriferous Gravels—will soon be issued.

For the purpose of procuring additional information in regard to certain points of importance in the California gravel region, and also to obtain a general idea of the most recent developments of the hydraulic mining interest, an arrangement was made with Professor W. H. Pettee, of the Michigan State University, to revisit the western slope of the Sierra Nevada, this gentleman having been previously employed in this same work as an assistant in the Geological Survey of California. Professor Pettee left Cambridge for that State early in July, and has been up to this time in the field visiting the most important gravel mining districts. His return may be expected early in December, and as soon thereafter as practicable the remaining portion of Volume VI. of the *Memoirs* will be put to press.

The Sturgis-Hooper Professor was himself in Europe from the beginning of May until the middle of September, and in the course of that time he took occasion (besides visiting a number of geological museums in Germany and France) to re-examine with care certain portions of the Alps, especially the glaciers of the Bernina Group, with reference to various points to be discussed in connection with the further description of the Californian gravels.

Mr. Wadsworth spent nearly the whole of the summer vacation on Lake Superior, studying the rocks associated with the copper and iron deposits of that region. The object of this investigation was to throw light on some of the mooted points in the geology of that most interesting and important mining district. In the course of his summer's work Mr. Wadsworth collected 846 specimens of rocks and ores. The results of this work will be published in the *Bulletin of the Museum*.

REPORT OF N. S. SHALER, *Professor of Palæontology.*

DURING the past academic year, the instruction in the department of Palæontology, and a part of the instruction in Geology, has been given by myself and by Mr. William M. Davis, Instructor in Geology.

The courses of instruction have been as follows, viz.: —

1st. An elementary course in Geology, consisting of lectures, and field and laboratory work. This course has been attended by eighty-five persons during the past year.

2d. An elementary course in Physical Geography and Meteorology. This course was attended by forty-five persons during the past year.

3d. A course in Palæontology, with laboratory work. This course was attended by five students during the last academic year.

4th. A course in Historical Geology, with laboratory work. This course was attended by two students.

5th. A summer course of instruction in field Geology was given in connection with the work of the Kentucky Geological Survey. The field chosen was the eastern part of Kentucky and the neighboring parts of Virginia and Tennessee. During the term of the school, over two hundred miles of measured sections were made across the most interesting part of the Cumberland region of the Appalachian mountain system.

During the last academic year, some progress has been made in the arrangement of the collections of rocks and fossils, which are set aside for the use of students. Mr. George H. Squier was employed during the winter months in bringing these collections into shape. During the autumn, he made extensive collections in Southeastern Virginia, and in the months of May and June he was similarly employed in Central New York. These collections have done much to fill up the gaps in the students' cabinet.

The rapid increase in the number of students in this department has led to a very unwholesome crowding of the lecture-room. With the present average attendance of the largest class, there are but one hundred and seventy cubic feet of space to each person. Unless more room can be provided it will be necessary to remove the elementary classes to some other University building, — a change which will be very undesirable, as it will separate the students from the collections.

REPORT ON THE MAMMALS AND BIRDS.

By J. A. ALLEN.

DURING the past year the additions to the departments of Mammals and Birds have been numerous and important. A few small lots have been obtained by exchange, but by far the greater part have been purchased, and are the gift of Mr. Agassiz. The collection of Mammals has been increased by the addition of some one hundred and thirty mounted skins, and by nearly the same number unmounted, representing about one hundred and fifty species, nearly all of which were new to the collection. The mounted specimens embrace many large and expensive pieces, among which may be mentioned a Narwhal, an adult Atlantic Walrus, a Camel, a Zebra, a Lion, a pair of Saiga Antelopes, Sea Lions, Seals (including the Crested Seal and the Sea Leopard), an Orang-Outang, and some twenty species of Monkeys and Lemurs. A considerable number of skins previously in the collection have also been mounted. There have been added to the osteological series twenty-six mounted and nearly the same number of unmounted skeletons, about thirty skulls, and nearly twenty skeletons, the principal bones of which have been mounted separately for the comparative series.

The collection of Birds has been increased by the addition of over four hundred and fifty mounted skins, representing some four hundred and twenty-five species, nearly all new to the collection. There have also been added about one thousand unmounted skins, representing over four hundred species, two thirds of which were new to the collection. Fifty-five skeletons, about one half of them mounted, have been added; also thirty skulls, seventy-five sterna, and about twenty separately mounted pelves. To the Oölogical Department have been added the nests and eggs of twenty-six species, all North American, and

mostly rarities. About six hundred skins previously in the collection have been mounted, making the total number of mounted birds added during the last year something over one thousand.

Among the noteworthy special collections added by purchase may be mentioned a collection of skins and skeletons of both Mammals and Birds from San Luis Potosi, Mexico, numbering seventy-three mammals and three hundred and thirty birds; two hundred and five bird-skins (forty-five species) from the island of Santa Lucia, W. I.; sixty-seven bird-skins (thirty-three species) from Yucua, Venezuela; one hundred and forty-five bird-skins (twenty-five species), and sixteen skins of Mammals, from the island of Grenada, W. I. By exchange there have been added one hundred and twenty-five bird-skins (eighty species) from Australia; forty-two bird-skins (thirty-eight species) from New Caledonia and Loyalty Islands; fifty species of bird-skins from Cochin China; and a small collection of mounted birds from Porto Rico, W. I.

The mounted specimens, both of Mammals and Birds, have been selected mainly to complete the North American Faunal collection, and to supply material for the South American and Australian Faunal collections, which are now both well advanced. The additions have been duly catalogued, and the collections continue in a satisfactorily safe condition.

REPORT ON THE REPTILES, BATRACHIANS, SELACHIANS,
AND FISHES.

By S. W. GARMAN.

REPTILES AND BATRACHIANS.

THE largest addition to these departments for the year comes from the West India collections made during the "Blake" expeditions and subsequently. They contain many species new to the Museum, some of them new to science, and a large number of desirable duplicates for exchanges. By purchase, important representatives of the faunæ of the East Indies and Australia were obtained, and a skeleton of the Matamata Tortoise, *Chelys mata-mata*. A collection made in Borneo by W. T. Hornaday, Esq., adds several genera and a large number of species not previously in our collection. Some of the species are undescribed. Dr. Edward Palmer's collection contains some valuable Mexican species. The Kentucky Geological Survey, under Professor Shaler, contributes a valuable lot of specimens collected by Professor C. J. Norwood. A number of Massachusetts species were obtained from N. Vickary. A large lot of type specimens of North American Reptiles and Batrachians has been received through Professor Baird, from the United States National Museum. Thirty species, represented by series of specimens, from Algeria, Spain, and Southern France, have been secured in exchange for North American species from Mr. Fernand Lataste.

Mrs. C. N. Willard sends a fine collection of Florida Reptiles, and Professor John T. Humphreys another from North Carolina.

Richard M. Kemp, Esq. has made several additions to his donations from the Florida Keys.

Messrs. Bullard, Goodrow, and R. Woodward are to be credited with contributions of duplicates of Massachusetts Reptiles.

A box intended for the Museum, shipped from India in 1873 by Rev. M. M. Carleton, was discovered in the Custom-House a short time ago. The greater portion of its contents belong to this department. About half of them are in tolerable condition.

The collections of the Rev. B. G. Snow, from the Marshall Islands, were received this season; they contain a few specimens of Saurians. F. Lagois, Esq., Dr. Aug. Stahl, James Gall, Esq., George S. Johnson, David Morgan, and Amedé Gasquet, Esq., have contributed generously to the collections from the West Indies. A number of Batrachians were sent to Dr. W. K. Parker. With one exception, all the collections received during the past year have been identified. In the exhibition rooms a number of changes and additions have been made, and a large part of the collection in store has been overhauled and put in fresh alcohol.

SELACHIANS AND FISHES.

In importance and size, the deep-sea collection of the "Blake" expedition stands first among the acquisitions of the year. Soon after their arrival these were catalogued and a series sent to Dr. Steindachner to work up with those of last year's dredgings.

Among the in-shore and fresh-water fishes taken while collecting the Reptiles of the West Indian Islands there are some valuable specimens of new species. Professor Baird sends, from the United States National Museum, a large number of types taken by the members of the Fish Commission in their operations in the deeper water off the eastern coast of the United States and British Provinces.

Various North American fresh-water fishes have been received from Professor C. J. Norwood, Dr. William A. Hudson, and Dr. Palmer. R. M. Kemp, Esq. forwarded several rare forms, thrown on the beaches of the Keys during the "epidemic" of October, 1878.

In a collection of twenty-seven specimens, Mrs. C. N. Willard sent species belonging to twenty-five genera, several of these representing species rare along our southeastern coast. Several desirable specimens were received from Samuel Powel, Esq., whose experience in collecting and knowledge of the species themselves enable him to select the most valuable.

F. Lagois, Geo. S. Johnson, and Jens Peterson, U. S. N., made welcome additions to the West Indian collection. A collection was sent from the Marshall Islands by the Rev. B. G. Snow.

From Newport, R. I., Mr. Agassiz sent young fishes of several species. Mr. J. W. Fewkes brought with him from the Mediterranean sixty specimens of small species, and young in perfect condition.

Absence in the field during the earlier half of the year has crowded its work into the six months just ended. In that time more than nine tenths of the collections for the Synthetic and the North American rooms have been selected and placed on the shelves; the entire collection on exhibition receiving new alcohol and labels. The collections received have been well cared for; many specimens have been identified, and about three thousand numbers have been added to the catalogue from collections previously on hand.

A number of adult Lepidostei were sent to Mr. Balfour of Cambridge. A great deal of work will be necessary to put this enormous collection in fair condition, as well as the greater part of the collection of the younger stages.

REPORT ON INSECTS.

 By DR. H. A. HAGEN.

ADDITIONS to the Collection of Insects:—

- Mr. A. Danforth. A *Belostoma*, from Lynn.
- Mr. H. Edwards. Several biological specimens from California.
- Mr. E. Law, from Malden. Biological specimens.
- Mr. S. Dimmock. Neuroptera.
- Mr. E. Austin. A lot of United States Coleoptera, new to the collection.
- Mr. F. Pourtalès. A complete set of Silkworms and Silk, from Milan, Italy; biological specimens.
- Mr. Dury, Cincinnati, O. U. S. Lepidoptera.
- Mr. N. S. Shaler. Cave insects from Mammoth Cave, Kentucky.
- Mr. F. W. Putnam. Insects from Nicaragua in alcohol.
- Mr. H. H. Lyman, Montreal, Canada. Neuroptera.
- Mr. L. Avery. Myriapods from Camargo, Mexico.
- Mr. H. I. Bowditch. Parasites of man.
- Mr. B. Neumoegen. Lepidoptera from Arizona.
- Mr. A. Agassiz. Insects collected by Mr. S. W. Garman in the West Indies.
- Mr. H. K. Morrison. A large lot of Neuroptera and Pseudo-neuroptera from Nevada and Colorado (bought).
- Mr. Palmer. A large lot of biological specimens from Mexico.
- Mr. H. Moody, Malden. Biological specimens.
- Mr. C. A. Dohrn, Stettin, Germany. A large lot of Staphylinidæ and Cave Insects.
- Mr. A. Fish, Maine. United States Pterophoridæ.
- Mr. Fr. Mueller, Itajahy, Brazil. A large lot of Neuroptera and biological specimens.
- Mr. R. M'Lachlan, London. A valuable species of Neuroptera.
- Mr. A. Willitson, New Haven, Conn. *Amblycheila* from Kansas.

Mr. A. Menge, Danzig, Prussia. Types of the spiders described in his monograph.

Miss E. Sargent, Worcester, Mass. Biological specimens.

Mr. H. A. Hagen. Biological specimens, raised Insects.

The additions to the collection by Mr. C. A. Dohrn, Fr. Mueller, A. Menge, and H. Edwards are very important, and fill prominent gaps of the collection.

Scientific publications, based entirely or in part on the collection of the Museum, consist of the new edition of the Catalogue of the Diptera of the United States, by Osten-Sacken, published by the Smithsonian Institution, and Part VIII. of the monographic revision of the European Trichoptera by R. M'Lachlan, published in London, and several papers by Dr. H. A. Hagen.

The work done by the assistant in charge of the Entomological Department consists in the arrangement of the biological collection of the Hymenoptera, of the Cave Articulatæ (the collection of which begins to be quite important), and of the Chernetidæ, the monograph of which is nearly completed. The Termitina, lately arrived, have been studied, and several parts of their anatomy and embryology are nearly ready for publication.

The large collection of Trichoptera is rearranged, and fills forty boxes. The Biological Collection, to which most of the time was given, is so far advanced, that it will be possible to finish the arrangement during the next two years.

The Library of the department has been rearranged, the Catalogue completed, and the numerous duplicates exchanged for works not represented. The Entomological Library contains about 2,000 volumes and above 3,000 pamphlets.

I may state that during the past year we have had a larger number of visits than usual from scientific students, both native and foreign, to study the biological as well as the systematic part of our Entomological Collections.

REPORT ON THE CRUSTACEA.

 By WALTER FAXON.

THE most valuable additions to the collection during the past year have come from the dredgings of the "Blake" expedition. These have been sent to M. Alphonse Milne-Edwards, Paris. All of the Cymothoids of the Museum (over 100 jars) have been loaned to Professor Schiödte, of Copenhagen, who is engaged upon a monograph of that group of Isopods. A collection of dry *Crustacea*, selected to illustrate the morphology of the class, has been presented to Bethel College, Kentucky.

A general systematic collection, and one illustrating the Crustacean Fauna of North America have been placed on exhibition.

LIST OF DONATIONS.

"Blake" Expedition. *Crustacea* dredged in the Gulf-Stream, by A. Agassiz.

Gardiner, E. G. *Tanais* from Annisquam, Mass.

Putnam, F. W. *Cambarus* and *Palæmonetes exilipes* from Kentucky (collected in 1874-75).

Kentucky Geological Survey (N. S. Shaler, Director). *Cambarus* and *Palæmonetes exilipes* from Kentucky (collected by S. W. Garman).

Smith, S. I. *Pinnixa* from Buzzard's Bay, Mass.

REPORT ON THE WORMS.

By E. L. MARK.

THE collection of Worms has been increased since my last report by a large number of species from the "Blake" expedition of 1878-79 to the Caribbean Islands, and a few specimens have also been received from Mr. J. H. Blake.

The work upon the collection has been limited to the care necessary to prevent loss, from evaporation of alcohol, my time having been wholly consumed with lectures and laboratory work on elementary zoölogy.

The instruction given by me during the past year consisted of three lectures per week, delivered to about eighteen students, and the supervision of the laboratory work of the same students.

REPORT ON THE CONCHOLOGICAL DEPARTMENT.

By CHARLES E. HAMLIN.

SINCE the last annual report, the selection, mounting, and arrangement of shells for the North American Faunal Collection, previously begun, have been finished; and progress has been made in the preparation of specimens for the Systematic Collection, in readiness for the new exhibition cases, now approaching completion. In connection with this work, and mainly as a part of it, a review has been made of several important families of Marine and Land Shells, involving the determination of many species.

The exchanges of the department having last year necessarily fallen into arrears on our part, much time was given during the winter and spring to the making up of suites of specimens for several American and foreign correspondents. More labor of the same kind still remains to be done.

We have sent to Dr. W. D. Hartman, of West Chester, Penn., a full series of *Partulæ*, selected for his use in preparing a descriptive and analytical catalogue of the species of that perplexing and much neglected genus. This has required an examination (heretofore deferred) of the great stock of *Partulæ* acquired through purchase of the Pease Collection.

In the spring some two thousand specimens of shells, from our abundant duplicates, were furnished to Professor Hyatt, for illustrating a portion of his course of lectures to the Boston teachers.

A collection of shells belonging to Mount Holyoke Seminary has, by request, been named and returned, and work of like character has been performed for several individuals.

Miss Anthony has been busily and faithfully engaged throughout the year in cleaning specimens and mounting them for exhibition.

The transactions in exchange have been as follows:—Seventeen packages of Mollusca have been received, containing five thousand nine hundred specimens of six hundred and seventy species. Eleven packages have been sent to as many correspondents, including three thousand seven hundred specimens of six hundred and ninety species.

The most important receipts have come from Count Emil Kornis of Hungary, and Messrs. A. M. de Cisneros of Cuba, C. E. Beddome of Tasmania, F. L. Button and O. N. Sanford of California, and Sanderson Smith of New York.

REPORT ON RADIATA AND PROTOZOA.

By L. F. POURTALÈS, *Keeper of the Museum.*

THE most valuable accessions probably ever received in this department are the collections made by Mr. Agassiz, in the dredging expedition of the United States Coast Survey Steamer "Blake," of which fuller mention is made in his Report. It is of course premature to enter into details, as the sorting has been only commenced, but an idea of the size of the collection may be conveyed by comparison with those which are at least partly determined. The deep-sea corals, with which I have been more particularly occupied, have been sorted according to locality and species, so that every species from one locality is kept separate from the same species of another locality, in order to trace the vertical and horizontal distribution. Of these lots, for the true Corals there are 471, representing from thirty to forty species.

The Hydrocorallinæ sorted in the same way form 332 lots, but the number of species I am not quite prepared to state. New forms are not very numerous, as the West Indian deep-sea Fauna has been quite thoroughly investigated in late years, thanks to the opportunities offered by the Coast Survey; but very fine specimens of some of the species obtained by the "Challenger" expedition have been dredged by the "Blake," and added to our collections. Of other species which we had already, a larger number of specimens, or better-preserved ones, have enabled me to correct or complete former determinations.

The Alcyonoid Polyps are also very numerous and very fine; and I hope to be able soon to work them up, together with those of my former collection, which has been returned by Professor Koelliker, who much to my regret has not found time to study them.

Among the Echinoderms, the most abundant are the Ophiuridæ and Astrophytidæ, which, sorted on the same principle mentioned

for the Corals, by Mr. Lyman assisted by Miss Clark, fill about eight hundred bottles.

The Echini and Star-fishes are not so numerous, but are represented by very interesting forms.

Of Crinoids, a very large collection of *Pentacrinus* was obtained, of all ages, and probably at least two species; also a few specimens of *Rhizocrinus*, one imperfect *Holopus*, and a considerable number of *Comatulæ* of several species. The *Holothuriæ* are also numerous and well preserved.

The new forms in the large collection of Sponges have been sent to Professor Oscar Schmidt of Strassburg, who has worked up the former collections.

In the exhibition rooms, I have only added during the past year a small collection of Foraminifera, partly represented by models, and part of the systematic collection of *Acalephs*. Also, part of the *Echinoderms*, *Polyps*, and *Acalephs* for the North American Faunal Collection.

REPORT ON THE LIBRARY.

 By MISS F. M. SLACK.

DURING the year ending September 1, 1879, the Library has received 1,089 volumes, 884 parts, and 3,600 pamphlets, from the following sources:—

	VOLUMES.	PARTS.	PAMPHLETS.
Library of Dr. H. A. Hagen	762		3000
Gift of A. Agassiz	170	152	474
Purchase	110	385	11
Exchange or gift	47	347	115
	<hr/>	<hr/>	<hr/>
	1089	884	3600
Also added by binding parts and pamphlets	267		
	<hr/>		
	1356		1356
Number of volumes at close of last year			11,970
			<hr/>
Number of volumes now in the Library			13,326

[A.]

INVESTED FUNDS OF THE MUSEUM

IN THE HANDS OF THE TREASURER OF HARVARD COLLEGE, SEPT. 1, 1879.

Sturgis-Hooper Fund,	\$70,142.52
Gray "	51,750.00
Agassiz Memorial "	{ 297,933.10
Teachers and Pupils' Fund,	
Permanent "	117,469.34
Humboldt "	7,740.66
Agassiz Building "	2,197.05
	<u>\$554,796.68</u>

[B.]

FACULTY OF THE MUSEUM.

 CHARLES W. ELIOT, *President.*
ALEXANDER AGASSIZ, *Curator.*

THEODORE LYMAN.

JOSIAH D. WHITNEY, *Secretary.*

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 OFFICERS.

ALEXANDER AGASSIZ,	<i>Curator.</i>
JOSIAH D. WHITNEY,	<i>Sturgis-Hooper Professor of Geology.</i>
HERMANN A. HAGEN,	<i>Professor of Entomology.</i>
NATHANIEL S. SHALER,	<i>Professor of Palæontology.</i>
WILLIAM JAMES,	<i>Assist. Prof. of Physiol. and Comp. Anat.</i>
L. F. POURTALÈS,	<i>Keeper.</i>
THEODORE LYMAN,	<i>Assistant in Zoölogy.</i>
CHARLES E. HAMLIN,	<i>Assistant in Conchology and Palæontology.</i>
JOEL ASAPH ALLEN,	<i>Assistant in Ornithology.</i>
WALTER FAXON,	<i>Assistant in Zoölogical Laboratory.</i>
W. M. DAVIS, JR.,	<i>Assistant in Geological Laboratory.</i>
S. W. GARMAN,	<i>Assistant in Herpetology and Ichthyology.</i>
E. L. MARK,	<i>Assistant in Zoölogical Laboratory.</i>
M. E. WADSWORTH,	<i>Assistant in Lithology.</i>
PAULUS ROETTER,	<i>Artist.</i>
MISS F. M. SLACK,	<i>Librarian.</i>





MUSEUM BUILDING SEEN FACING THE NORTHWEST CORNER.

ANNUAL REPORT

OF

THE CURATOR

OF THE

MUSEUM OF COMPARATIVE ZOOLOGY

AT HARVARD COLLEGE,

TO THE

PRESIDENT AND FELLOWS OF HARVARD COLLEGE,

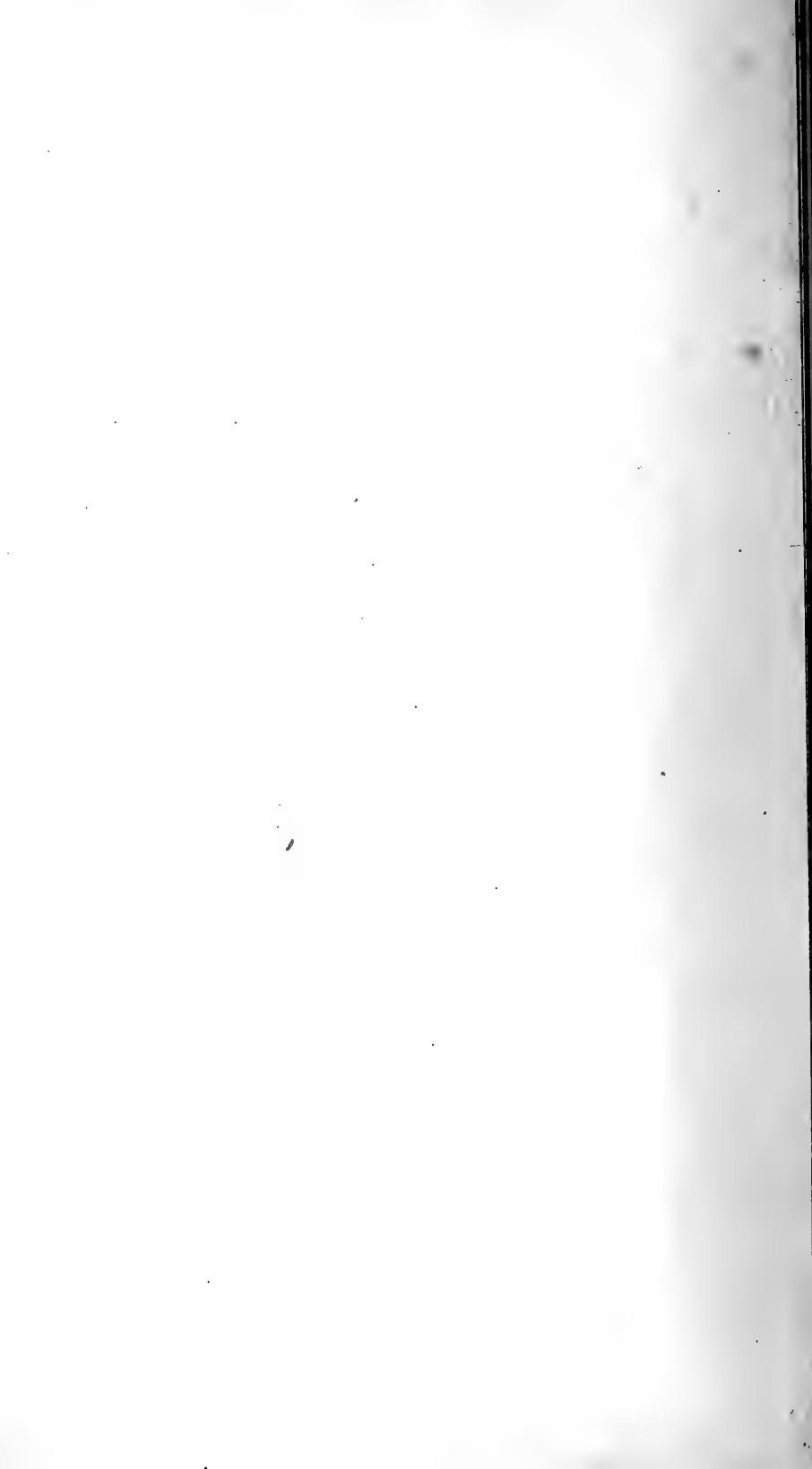
FOR

1879-80.

CAMBRIDGE:

UNIVERSITY PRESS: JOHN WILSON AND SON.

1880.



REPORT.

TO THE PRESIDENT AND FELLOWS OF HARVARD COLLEGE:—

It is now twenty years since the foundation of the Museum. During that time the Museum building has more than trebled in size, and its collections are unsurpassed in some departments. Thanks to the active co-operation of the assistants, the large collections have been kept in excellent order, and rapid progress has been made in the arrangement of the rooms intended for public exhibition. With the present additions to the building it will become possible to complete the exhibition-rooms containing the Zoölogical collection, and to begin in the course of two or three years the arrangement of the Palæontological exhibition-rooms.

Although I gave the plans proposed for the completion of the northern wing of the Museum, and of the northwestern corner-piece in 1875, yet these have from various causes undergone very important modifications, so that at the risk of some repetitions I here give the final plans as they have been adopted, and from which the wing building has been completed, and the northwestern corner-piece begun during the past year.

The changes in the plans are mainly due to the incorporation of the building of the Peabody Museum with the building originally planned for the Museum, and to the modifications involved in the limitations laid upon the space to be devoted to exhibitions. The explanations of the plans will show the general distribution of the available space which leaves full freedom for the development of any branch of the Museum by its simple removal to a new section of the building as soon as it has outgrown the limits assigned to it here.

In the north wing, which is now completed, the basement will be devoted to the storage of the alcoholic collections, intended for specialists, and to suitable workrooms for the assistants. The first story will contain the Synoptic room, the Palæontological exhibition-rooms, and the storage-rooms for Palæontology and Geology. The gallery floor of the first story will contain the workrooms for the assistants and specialists in Geology and Palæontology, as well as the rooms devoted for the present to Comparative Anatomy. The second story and its gallery is entirely devoted to exhibition-rooms, containing the Systematic and Faunal collections; while the mansard story contains the Entomological Department with its workrooms, the Conchological Department, and the storage and workrooms devoted to Birds, to Mammals, to Radiates, and to Articulates, into which specialists will be admitted under the supervision of the Museum assistants.

In the northwestern corner-piece there will be only three exhibition-rooms, one Faunal room devoted to Europe, and two large rooms intended for the Atlantic and Pacific Oceans. Three large laboratories adjoining the palæontological and geological workrooms of the assistants, will be devoted to undergraduates and students in Geology and Palæontology.

Three similar laboratories will be devoted to Biology, the materials for study to be drawn either from the alcoholic and other stores of the Museum, or from the vivarium and aquarium which are to occupy the greater part of the basement of the corner-piece. In the former we shall hope to keep an ample supply of all the common types necessary for dissection and for embryological study, such as frogs, salamanders, guinea-pigs, fowls, rabbits, etc., while it is proposed to keep the large aquarium well stocked with the principal fresh-water and marine animals. The proximity of Cambridge to the sea will make it a comparatively easy task to supply the aquarium not only with the marine animals common on the north of Cape Cod, but also those of its southern shores. I anticipate no difficulty in keeping a supply of marine animals not only for demonstration, but also for original work, hoping thus to do away with much of the desultory work unavoidable for those who pass their summers on the seashore. I do not, of course, propose to replace observation in the field to the original investigator by this means, but I do hope by bringing the larger number of our marine animals within the reach of the

students during their winter course of instruction, together with books, apparatus, etc., then in use to simplify work, both for pupil and teacher, and to lessen the strain which the summer schools bring upon our already overburdened instructors.

The Aquarium room is large enough not only to supply this need, but also to give excellent facilities for following out any special line of investigation in the Anatomy or Embryology of our marine animals, under the very best circumstances.

To facilitate the working of the establishment, a small gas engine will supply the necessary power for the elevators and the pumping of the water for the aquarium.

The gallery floor of the first story will contain the Curator's room, and the Library rooms, which will have in addition to the reading-room a shelving capacity of 50,000 volumes, exclusive of the special libraries in the rooms of the assistants. In the mansard there will be a couple of rooms intended for the artist of the Museum, or for special investigations, and a large lecture-room, with a seating capacity for 325 persons.

The want of proper accommodations for the instruction of undergraduates and other classes in the Museum is becoming a very serious matter, but it is hoped that the needed room in the addition to the new building will become available before the evil becomes intolerable.

Instruction has been given at the Museum by Professors Whitney, Shaler, Farlow, Dr. James, and by Messrs. Faxon, Mark, Davis, and Wadsworth. For the details of the courses I would refer to the special reports of Professors Whitney and Shaler, and to the detailed report on the Biological courses prepared by Dr. Farlow and Mr. Faxon.

The collections of the second Blake Expedition to the Caribbean Islands have been sent for final revision to Messrs. Milne-Edwards and Perrier of Paris, to Dr. Steindachner, Professor O. Schmidt, Dr. Ehlers, Professor Carus, Sir Wyville Thomson, and Messrs. Brady. The collections of bottom samples have been sent to Mr. John Murray of Edinburgh for examination.

Materials have also been supplied from our collections for study to Professor Schwalbe of Jena. A selected collection of Echini was sent to Dr. H. Ludwig to assist him in preparing a new edition of the Echinoderms of Bronn's Thierreich. A collection of Trichoptera has been sent to Mr. R. M'Lachlan of London, one

of Staphylinidæ to Mr. Fauvel, and one of Brenthidæ to Mr. Power for identification and publication with other material.

The second and concluding Part of the Final Report on the Sponges of the "Blake" by Professor Oscar Schmidt of Strasbourg has been published. It forms a quarto Memoir of sixty pages, handsomely illustrated by five Plates.

Dr. Steindachner has continued his descriptions of Fishes from South America, based in great part on the Collections of the Museum, in the Proceedings of the Vienna Academy.

The collection of the Echini of the "Challenger" Expedition, entrusted to me for description, has been returned to England this spring, and I have forwarded the final Report to Sir Wyville Thomson, together with the complete edition of sixty-five Plates illustrating this Memoir.

The Museum publications have been more than usually important and numerous.

The Bulletins contain contributions to the Natural History of the depths of the sea, by Messrs. Pourtalès, Lyman, Dall, and myself. In addition there have been published papers by Messrs. Faxon, Fewkes, Allen, and Wadsworth on Crustacea, Siphonophoræ, Bats, and Lithology.

The Report on the Florida Reefs, prepared by Professor Louis Agassiz for the Superintendent of the Coast Survey, has been published as one of the Museum Memoirs. It is finely illustrated by lithographic plates, drawn many years ago by the late A. Sonrel.

In connection with Professor Whitney the Museum has also completed the Auriferous Gravels of California, completing Vol. VI. of the Memoirs, fully illustrated with plates, maps, and heliographs of scenery.

No. 2 of Vol. VII. of the Memoirs, "Climatic Changes of Later Geological Times," also published in connection with Professor Whitney, is well advanced.

The increase of the Library has been large, and our exchanges continue on a satisfactory footing. The total number of volumes now in the Library exclusive of pamphlets is over 14,000. Nearly 800 volumes were added during the past year, and about 1300 pamphlets and parts of volumes.

The special Reports of the assistants give the details of the departments in their charge. The work on the collection of

Worms, in charge of Dr. Mark, has been limited to the necessary care of the specimens and to short studies of some of the parasitic worms added to the collections during the past year. As soon as the collections of Annelids sent for identification to Europe have been returned a more detailed report of the collection can be made.

The most important additions during the past year have been the collection of Palæozoic Fossils purchased from Messrs. Dyer, Walcott, and Gebhard. The Dyer collection filled no less than 200 boxes besides a few large slabs. It has been brought together by Mr. Dyer during the past twenty years, and is an unrivalled collection of Invertebrates mainly from the Cincinnati group.

The Walcott collection represents mainly the Trenton limestone, and is specially rich in Trilobites. The material upon which Mr. C. D. Walcott based his important investigations on the structure of Trilobites forms a part of this collection.

The Gebhard collection is an important one in the palæontological history of the State of New York. It is the result of the work of three generations, Mr. Gebhard, from whom the collection was purchased, having materially increased it as he received it from his grandfather through his uncle, both of whom were zealous collectors of the fossils in the vicinity of Schoharie.

A beginning has also been made to supply our deficiencies of North American Vertebrate Fossils. Mr. Garman spent some time at the west, and brought back an excellent collection of Tertiary Vertebrates, mainly from the Bad-lands.

To supply our desiderata towards the Faunal collections now preparing of South America, India, and Africa, we have received by purchase a large number of Birds and Mammals, both skins and skeletons.

The arrangement of the North American Faunal room is practically completed, and I hope during the coming year to open the South American Faunal room to the public. The cases for the systematic collection of Molluscs have been completed, and Mr. Hamlin is now arranging the room for exhibition.

All the old exhibition-rooms have now been thoroughly repaired, and the appearance of the rooms open to the public has been greatly improved.

We have received from Mrs. T. M. Brewer the collection of birds' eggs which the late Dr. Brewer bequeathed to the Museum.

During the past five or six years Dr. Brewer constantly added to his already large collection, and thanks to his interest in our Oölogical collection it is second only, for American Birds, to that of the Smithsonian Institution.

The collection of deep-sea Invertebrates from the Western Caribbean made by Commander J. R. Bartlett of the United States Coast Survey, Steamer "Blake," while running lines of soundings during the winter of 1879-80 is an important addition to the collections made by the "Blake" in the Gulf of Mexico and from the Windward Islands. The Fauna of that part of the Caribbean does not differ from that of the Eastern portion. During the last part of June and during July Mr. Patterson, the Superintendent of the Coast Survey, placed the "Blake" again at my disposal to run lines of dredgings normal to the East Coast of the United States. The expedition was entirely successful; large and interesting collections were made during the cruise, which extended from the Northeastern edge of George's Shoal to a line east of Charleston, S. C., directly across the Gulf Stream. I have given an account of this expedition in Letter No. 4, addressed to the Hon. Carlile P. Patterson, Superintendent United States Coast and Geodetic Survey. The number of stations occupied during this cruise is unusually large, thanks to good weather and the untiring zeal of Commander Bartlett and Mr. Sharrer, the executive officer, as well as all the officers and crew of the "Blake," to whom deep-sea dredging has now become a second nature. As the northern ground covered by this expedition is the extension into deep water of the area examined by the United States Fish Commissioners, a part of the Collections has been entrusted to Professors Verrill (Cephalopods) and Smith (Crustacea). The osseous fishes have been placed in the hands of Mr. Goode for identification.

The Museum has suffered a heavy loss in the death of Mr. Pourtalès. From his early youth, first as student and afterward as colleague and scientific adviser, he had held the most intimate relations with Professor Agassiz, and had been familiar with every step in the history of the Institution founded by him. In the laboratory, in the field, on their long voyages they had worked together to one end, and long before he was officially connected with the Museum he had not only contributed largely to its collections but was identified with its general progress. Since his

appointment after my father's death as Keeper of the Museum, he has not only taken charge of his own department, but on him has devolved, during my frequent and prolonged absences, the management of the Museum and the execution of plans requiring for their success entire sympathy with the spirit in which they were conceived. I can never replace the friend who has thus, for nearly ten years, been my other self in the administration of the Museum, and the Institution would indeed be fortunate should it find in his successor the learning, the modesty, the industry, or the executive ability which, combined with his rare scientific attainments, made him invaluable in his post at Cambridge.

This is not the place to enter into any details regarding his scientific career. I may, however, recall the great influence his investigations have had upon Marine Zoölogy. Following Bailey in his microscopic investigations upon the nature of the sea-bottom on the East Coast of the United States, he extended like researches little by little, until under the enlightened support of the then Superintendent of the Coast Survey, Professor Bache, he became through his extensive dredging operations in the deep waters of the Straits of Florida (1866, 1867, 1868) the pioneer of deep-sea zoölogical explorations in America. His publications on this subject are to be found mainly in the Reports of the United States Coast Survey, in Silliman's Journal and in the Memoirs and Bulletins of the Museum of Comparative Zoölogy. The former were published while he was still an assistant in the Coast Survey. His later publications, under the auspices of the Museum, were chiefly devoted to the deep-sea corals, crinoids and polyps of the "Bibb," "Hassler" and "Blake" expeditions after he became attached to the Museum. They bear witness not only to the range of his learning but to the breadth of view which he brought to all his investigations.

ALEXANDER AGASSIZ.

CAMBRIDGE, September 1, 1880.

REPORT ON THE GEOLOGICAL DEPARTMENT.

By J. D. WHITNEY, Sturgis-Hooper Professor of Geology.

DURING the past year instruction has been given in this department as follows: The Sturgis-Hooper professor lectured through the whole college year on Economical Geology, twice a week, to students in the fourth year of the Engineering Course of the Lawrence Scientific School. Mr. Wadsworth lectured during the latter part of the year on Lithology, to an audience of teachers and professors, with an average attendance of about fourteen persons. He also gave practical instruction in Micro-lithology, through the whole year, to graduates and teachers from the Boston Public Schools.

Cases for the lithological collections, which will hold a large number of specimens, have recently been put up in the geological lecture-room, and Mr. Wadsworth has begun to arrange the material in this department, so as to make it accessible for examination and study. There have been three valuable additions made to this collection since the date of the last report. One of these illustrates a section across New Hampshire and Vermont, and was procured from Mr. Huntington; another was collected by Professor Pettee, in California; and the third by Mr. Wadsworth, in Newfoundland, and in the Carboniferous formation of Nova Scotia. About 200 thin sections have also been added during the year, mostly of rocks from Lake Superior, making the whole number available for study about 1,400.

Several collections of rocks and minerals have been examined for individuals desiring information in this department. Among these were suites of specimens from Leadville and Florissant, and a large collection made by Rev. Selah Merrill, D.D., in Palestine.

Mr. Wadsworth has devoted a large part of his time, during

the year, to the preparation of a paper on the Iron and Copper Regions of Lake Superior, which forms the first number of the first volume of the Geological Series of the Bulletin of the Museum. It contains 157 pages, and is illustrated by six plates.

The time of the Sturgis-Hooper professor has been chiefly occupied in continuing the publication of the "Auriferous Gravels of the Sierra Nevada," which is now completed, forming Vol. VI. No. 1 of the Memoirs of the Museum, and containing xvi and 569 pages, with twenty-four illustrations,—maps, plates of sections, and heliographs of scenery,—and two large folding maps, one of which is in two sheets. This work, with the Memoir of Mr. Lesquereux on the fossil plants of the same formation, completes the sixth volume of the Memoirs.

It was the intention of the Sturgis-Hooper professor to include within the volume on the gravels an account of the glacial and surface geology of the Sierra Nevada; but finding the work likely to expand to dimensions too large for convenience, if all this matter were to be included in one volume, it has been divided into two portions. A memoir entitled the "Climatic Changes of Later Geological Times" has been prepared, and a portion of it (120 pages) is already in type, and will be published synchronously with the gravel volume. The remainder, which is nearly all written, will be put in type and issued during the coming winter. This work will form No. 2 of Vol. VII. of the Memoirs. It will contain a full description of the phenomena observed in the Cordilleras, indicating changes of climate during the later geological periods, followed by a discussion of the bearing of these facts on climatic changes in general, especially those which have occurred during the most recent geological epochs, and which the author believes to be still in progress.

REPORT OF PROF. N. S. SHALER ON THE INSTRUCTION IN GEOLOGY AND PALÆONTOLOGY.

THE following courses of instruction have been given by myself and by my assistant, Mr. Wm. M. Davis, instructor in Geology:—

1. A course in Physical Geography and Meteorology, three hours a week, to forty-five undergraduates. This course was given by Mr. Davis alone.

2. A course in Elementary Geology and Palæontology, three hours a week, with a parallel course in elementary field and laboratory work, to one hundred and sixteen undergraduates from various departments of the University. This course was given by myself, with the assistance of Mr. Davis.

3. A graduate course in Palæontology, open only to those who had taken courses in Elementary Geology and in Zoölogy. It was attended by six students.

4. A graduate course in advanced field-work, open to those who had taken Elementary Geology, attended by two students.

5. A graduate course in the history of geological opinions, open only to those who had the requisite knowledge of Geology and Palæontology. The course was attended by three students.

6. A summer course in field-work, designed to afford an opportunity for advanced students, to those familiar with Geological Surveying, was given upon selected localities in Virginia, Tennessee and Kentucky. Seven persons attended the instruction in this course.

My private assistant, Mr. George H. Squier, has been employed during one half the year in making collections in the field, and in arranging the collections for the use of students in Geology and Palæontology.

During the year I have made use of a small outbuilding belonging to the Museum for the purpose of doing some limited work in chemical geology and assaying. In connection with this work, two or three of the more advanced students who had acquired a general knowledge of chemistry were given some training in

ore analysis. I am satisfied that it will be well if this laboratory is maintained, so that those students who propose hereafter to devote themselves to practical geology may acquire a knowledge of the processes of assaying, and perhaps be led to a study of the problems of chemical geology. There are now half-a-dozen students in this department who are fitted by previous chemical training for such work, and who desire to pursue it.

A circular, descriptive of the several courses in this department, and in that under the direction of Professor Whitney, has been prepared by the officers of those departments, and printed by the college for the use of students.

REPORT ON INSTRUCTION IN ZOÖLOGY AT THE MUSEUM.

By WALTER FAXON, *Instructor in Zoölogy.*

DURING the winter of 1878-79, the plan of instruction in Zoölogy given at the Museum underwent a complete revision, and important changes were made in the scheme of courses. The courses as now arranged having had a year's trial, it seems a fitting time to state their scope and aims.

Four courses involving instruction in Zoölogy were given at the Museum during the past academic year : —

1. General Zoölogy (lectures). Dr. E. L. Mark.
2. Biology (laboratory work and lectures). Prof. W. G. Farlow and Dr. Walter Faxon.
3. Advanced Zoölogy (laboratory work and lectures). Dr. Walter Faxon.
4. Physiology and Hygiene (lectures). Ass't. Prof. Wm. James.

The first course is designed to meet the wants of those students who devote most of their time while in the University to other departments of learning, but who wish to become acquainted with those fundamental facts and principles of Zoölogy which at the present time it behooves every educated man to know. Hence no time is spent in this course in practical dissection in the laboratory, microscopic manipulation, or preparation of specimens. The whole course consists of two lectures a week, with demonstration from specimens on the lecturer's table.

This course was attended by 56 students.

The second course is intended for those students whose tastes incline them specially towards scientific studies. It serves as a preparation for both Advanced Botany and Advanced Zoölogy, only such as have taken it being allowed to carry their biological studies any further. It is also recommended to those who propose

to follow the medical profession in after years. Although elementary, the course is eminently practical, involving a large amount of laboratory work, use of the microscope, and mechanical preparation of specimens. The work done in the laboratory may be said to be the basis of the course, the lectures supplementary, and, as far as practicable, in direct connection with it.

For this course twelve new microscopes, of Zeiss' and Véric's make, were furnished through the liberality of Mr. Agassiz, making together with those already in the laboratory about two dozen available instruments. A good outfit of re-agents, etc., was also provided by the College.

In this course the outlines of both Botany and Zoölogy are taught by means of the study of a comparatively few forms of plants and animals selected with a view to illustrate the more important modifications of plant and animal structure.

The first academic term is devoted to the study of plants.

The instruction was given by Professor Farlow, who reports as follows:—

“The course in Biology, Natural History 5, of the undergraduate elective studies, was divided into two portions, of which the botanical portion, under my charge, was held in the Museum laboratory, beginning at the opening of the term and extending to the mid-year examinations. The number of students who pursued the course to the close of the work with me was 35. They were distributed among the several classes as follows: Seniors 8; Juniors 16; Sophomores 4; Freshman 1; Graduate 1; Scientific 1; Unmatriculated 4. Besides this number were three or four from the professional schools who attended only a portion of the course. Some delay was experienced in beginning the laboratory work in consequence of the late arrival of the microscopes from Europe; but, in the absence of microscopes, extra lectures were given so that the time of the students was fully occupied. Later in the season only one lecture a week was generally given, as it was found that the students required most of the time to enable them to perform their laboratory work thoroughly. The course began with a study of the structure of the typical vegetable cell and its principal modifications, and afterwards an attempt was made to give the students a general view of the vegetable kingdom by examining a single type of the different subdivisions, beginning with the lower forms, as yeast and the nostocs. For the study of the lower orders, living and alcoholic material was provided by the instructor, and ferns and flowering plants were furnished by the director of the Botanic Garden.

“The course for the present year was tentative, and whether a successful result was reached or not cannot be known until it shall have been seen

whether the students have been better prepared for pursuing more advanced studies hereafter. I have had reason to be pleased with the diligence and activity of the class, and feel that, although we have labored under several disadvantages necessarily attendant upon the introduction of a new course, the students have done all in their power to profit by the instruction and to make the position of their instructor a pleasant one."

The work of the term assigned to Zoölogy was begun by the study of the structure of the animal cell as shown in the tissues of the fresh-water polyp (Hydra). Besides seeing, describing, and drawing every point in the structure of the Hydra, each student is required to stain and mount on glass slides microscopic sections for permanent preservation; and these mounted preparations are taken into consideration at the end of the year, when the student undergoes examination on the work of the year.

This was followed by study of *Amæba*, Sea-Anemone, Starfish, Lobster, Oyster, and Clam.

By presenting to the student a few forms typical of the chief great groups of the animal kingdom, an idea is given of the most important modifications of structure. But through these few forms, naturally so widely separated from each other, the beginner is unable to take the important lesson in comparative study without which any elementary course in Natural History would seem to me grossly defective. In order to afford this lesson in the study of homologies, as complete a series of Echinoderms as possible was placed before each student, who, with a number of clearly related forms before him, is now led to determine the identical structural parts in the different forms, and to realize the fact that all these forms, superficially so different from each other, are but modifications of one type of structure.

The history of the development of three or four Invertebrates was given by means of lectures, preparations, and diagrams; and even here it was found possible in the spring of the year to demonstrate with fresh specimens many phases in the development, such as the segmentation of the egg and various stages in the larval life of the animals under consideration.

Owing to the extreme shortness of time allotted to the zoölogical half of this course, the study of a vertebrate animal, with which the course was to have closed, had to be omitted last year. Another year the plan can doubtless be carried out more nearly to meet the programme; but the instructor wishes to suggest the

advisability of making the course in Biology cover two years. This would raise the character of the advanced courses in Botany and Zoölogy, and tend to relegate them to the graduate courses.

The course in Biology last year was attended by thirty-six students (one Freshman, four Sophomores, sixteen Juniors, eight Seniors, one student in the Lawrence Scientific School, one candidate for the degree of A.M., and five unmatriculated students). Most of these students intend to study medicine.

Nine hours a week are required of each student.

The third course (Advanced Zoölogy) can be followed in the future only by those who have passed the examinations in Biology. The members of the class last year had during the preceding year taken a general course in Elementary Zoölogy, and were thus prepared to study more thoroughly certain groups of animals. The early part of the year was devoted to the study of the morphology of the class of Crustacea. The students being few in number, it was found practicable to place the amplest amount of material in their hands, and to deal with the morphological problems with a delightful freedom from diagrams and text-books. The interest shown by the students in their work was attested by the fact that some of them of their own accord embodied the results of their studies in original essays, which were presented before the Harvard Natural History Society.

The Radiates were next taken up in a similar way; and the last third of the year was devoted to the study of the development of the chick within the egg.

This course was taken by three Seniors, one Junior, and one student of the Lawrence Scientific School, — nine hours a week throughout the year.

The fourth course consists of one lecture a week on Human Physiology. It is a voluntary course, open to all students of the University. About thirty students attended the lectures during the last year.

In addition to these four courses given last year, a course in Entomology (with laboratory work), by Prof. H. A. Hagen, is offered to graduates who are properly qualified to pursue the study. This course was not given last year, having accidentally been omitted from the list of electives.

The Museum assistants are also allowed to take students specially qualified in any special department of Zoölogy or Palæontology.

REPORT ON THE MAMMALS AND BIRDS.

BY J. A. ALLEN.

MAMMALS. — The additions to this department during the year number about sixty mounted skins, representing nearly as many species new to the collection; eighty unmounted skins, sixteen skeletons, and twenty skulls. Noteworthy among these are the skeleton of a large finner whale and the skull of a hump-backed whale taken at Provincetown, a mounted skeleton of a gorilla, and finely-mounted skins of a large old male Bornean orang (*Simia Wurmbi* Owen), a hairy tapir (*Tapirus Roulini*), a young hippopotamus, a Javan rhinoceros, several large African antelopes, *Potamochoerus Edwardsi*, a proboscis monkey, and various other species of monkeys and lemurs. Quite a large number of skins previously received have also been mounted.

An important addition to the palæontological department consists of a large collection of remains of extinct mammals from the Bad-lands of north-eastern Wyoming, made by Mr. S. W. Garman, numbering not far from five hundred specimens, and representing about twenty species. The collection includes large suites of the skulls and other bones of all the more common species of the locality explored.

About one-half of the collection of alcoholic bats (numbering about six hundred specimens) has been placed in the hands of Dr. Harrison Allen for elaboration.

BIRDS. — About two thousand skins have been added to the collection of birds, two hundred of them mounted; and about four hundred have been mounted from specimens previously in the collection. About two-thirds of the additions are from South and Central America and the West Indies; the larger part of the remainder are from North America, purchased with special reference to supplying deficiencies in the North American series. The more important special collections include one hundred and

seventy specimens from Nicasio, California; two hundred and sixty from Aspinwall, Panama; fifty from Pernambuco, Brazil, embracing several rare species; four hundred and twenty from various Mexican, Central American, and South American localities, selected from the duplicates of the Boston Society of Natural History, consisting to a large degree of virtually type specimens; three hundred and fifty from the island of Grenada, W. I.; about one hundred and twenty-five from Santa Lucia, W. I.; and smaller lots from St. Kitts, Martinique, and Porto Rico. Nearly all, as well as the mammals, were added by purchase, and are the gift of Mr. Agassiz.

The department of Oölogy has been increased by the addition of the valuable collection of eggs left to the Museum by the late Dr. Thomas M. Brewer of Boston, numbering about three thousand five hundred lots, and not far from one thousand species. A few rare nests and eggs have been presented by Mr. H. D. Minot of Boston.

The room for the exhibition of the South American and Australian collections has been furnished with cases, to which the large amount of material already gathered for these collections will soon be removed. Two new workrooms have been completed in the attic, to which will immediately be removed the collections of Osteology and skins of birds and mammals.

Besides the identification and intercalation of the additions, a systematic catalogue of the bird skins has been begun during the last year; and already upward of one thousand species have been critically revised or determined, covering the *Psittaci*, the *Trochilidae*, and the *Oscines* from the *Turdidae* to the *Icteridae*. This catalogue, when completed, will show at a glance not only what species are in the collection, but the number of specimens of each and the localities represented. Of the considerable number of families thus far revised, about twenty to seventy-five per cent of the known species are represented, the average being not far from one-third.

In regard to the further increase of the collections, it may be added that a large order for material to complete the osteological collection, both for the mounted and unmounted series, has been placed in the hands of Prof. H. A. Ward of Rochester, fully covering the classes of mammals and birds, the order to be gradually filled as opportunity may favor.

REPORT ON THE FISHES, SELACHIANS, REPTILES,
AND BATRACHIANS.

BY S. W. GARMAN.

FISHES.

THREE-FOURTHS of the labor of the year has been done in this department. As a result, in addition to incidental work in the care of the collection, correspondence, &c., about 12,000 numbers have been added to the catalogue, all the storage cans have been overhauled, and nearly fifty large sets of duplicates made ready for shipment to correspondents. The acquisitions have been the most important for some years. Among them are several excellent skeletons of North American species, secured by purchase. A very fine specimen of *Ceratodus* was furnished by Sir Wyville Thomson. In exchange for American duplicates, we have about sixty Red Sea and Indian Ocean species; for South American duplicates, about fifty species from the Adriatic were obtained. From Professor Baird of the National Museum we have received another instalment of the series of East Coast fishes, and from the Coast Survey many deep-sea fishes, obtained by the steamer "Blake." Numerous fresh-water fishes from India and the West Indies have been secured by purchase, and by collection a number of species, with duplicates, from the Rocky Mountains. Many of the additions are rarities, and were selected for the purpose of supplying deficiencies. The larger shipments have been made to the Paris Museum, Smithsonian Institution, Butler University, Ind.; Bethel College, Ky.; Illinois Natural History Society, and Dr. Day of England. Specimens have also been sent to Sir Wyville Thomson, Dr. G. E. Manigault, the Boston Natural History Society, and others. The deep-sea fishes were forwarded to the Fish Commission. Various changes and additions have been made in the exhibition series. The selection and preparation of specimens for the rooms yet to be filled continues.

SELACHIANS.

Beyond some identifications and changes of alcohol, little has been done on the Selachians. A beautiful specimen of *Stegostoma* for the exhibition room is the most noteworthy purchase of the year. Some rare deep-water species, hitherto desiderata, have been secured by the dredging operations of the Coast Survey steamer "Blake." An examination of a greater portion of the tanks and cans discovered very little change in the condition of the specimens.

REPTILES AND BATRACHIANS.

A considerable amount of time has been devoted to the preparation of specimens for exhibition in the rooms soon to be opened. A large number of species has been secured by purchase, exchange, donation, and collecting in the field since the preceding report, many of them in the way of rarities and desirable duplicates. A tolerably complete series from the East Indies was the largest purchase. Various collectors in the West Indies have made substantial additions to the collections from their respective localities. The European correspondents of the Museum have sent valuable Asiatic, African, and European species; and from the Boston Society it has additions to the number in some species previously lacking. To the North American representation a fine lot has been added by collection in the Territories and by purchase from the Gulf States. Among the skeletons purchased there are several turtles from North America, South America, and Australia. An important series of fossil tortoises was collected in the Bad-land regions of the West. The donations include New England species in various stages of development, and of value for exhibition and exchanges.

REPORT ON INSECTS.

BY DR. H. A. HAGEN.

THERE have been presented to the Museum a large number (42) of additions, among them many biological specimens. The most important are from Dr. Fritz Mueller of Brazil; from Dr. G. J. Engeleman, St. Louis, Mo.; from Dr. C. A. Dohrn, Stettin, a type of the parasite of the beaver (*Platypssylla*); from J. H. Hubbard, Detroit, Mich., *Cave articulata*; from Dr. Ch. V. Riley, a pair of *Hornia*; from Dr. Rougemont, Neufchatel, Switzerland, *Helicopsyche* from Naples; from the Museum, in Tokio, Japan, a large lot in exchange.

Scientific publications, based in part or entirely on the collection of the Museum, consist of the European Trichoptera, by Mr. R. M'Lachlan, London; the American Staphylinidæ, by Mr. Fauvel, Lille, France; the Brenthidæ, by Mr. G. Power, Rouen, France; and several papers by Dr. H. A. Hagen.

The condition of the collection is very satisfactory. Miss M. Clark has spread and set a very large number of specimens. The two hundred new boxes ordered for the department allowed a considerable extension of the arrangement of the insects. All the Hymenoptera are arranged, filling nearly five cabinets; of the Hemiptera a part is arranged; the Odonata are rearranged, and fill nine cabinets. The Biological collection is finished for the Hemiptera as far as the Cicadæ.

A large number of microscopical slides have been added to the collection.

A very remarkable lot of deformities of Coleoptera, published types, was presented by Dr. J. L. Le Conte and Dr. Horn, of Philadelphia, and by Mr. C. L. Harrison, New Haven, Conn.

The answering of scientific or biological questions on obnoxious insects has become an important work for the department. For-

merly there arrived, on the average, perhaps four letters a week ; now more than twice that number are received. At least one day a week is now devoted to answering such letters.

The Library has been increased by very valuable books. Nearly all the papers by Th. W. Harris are now in the Library, some of them being very scarce.

The collection of *Brenthidæ* has proved to be a very rich one. It has been examined by Mr. G. Power. It contains 306 named species. The last published catalogue by Mr. Harold counts only 276 species, of which 147 are represented in the collection. There have been placed in the exhibition room a small general systematic collection, contained in 27 large boxes, six of them containing transformations, and the North American Faunal collection in six boxes.

REPORT ON THE CRUSTACEA.

 BY WALTER FAXON.

THE whole of my time during the past year was devoted to the students of Zoölogy at the Museum. No work upon the collection of Crustacea was done, except that necessary for the preservation and storage of new collections received during the year.

As in the two preceding years, the most important additions to the collection have come from the "Blake" Expedition.

List of additions to the collection of Crustacea:—

- Alex. Agassiz. Collections of the "Blake" Expedition.
- K. D. Atwood. Large collection of deformed lobster claws, from Portland, Maine. (Purchased.)
- E. Cole. Specimens from off St. Lucia. 278 fms.
- Walter Faxon. Specimens from Newport, R. I.
- J. W. Fewkes. *Phyllosoma* from Villa Franca.
- S. W. Garman. *Crustacea* from the West Indies, collected 1878-79.
- C. F. Gissler. *Bopyrus* parasitic on *Palæmonetes vulgaris*.
- E. H. King. *Cambari* from West Liberty, Ia.
- F. Lagois. Collection made at St. Barts and St. Kitts, W. I.
- Edward Palmer. *Astacus*, *Apus*, *Branchipus*, *Estheria*, and *Amphipoda*, from Mexico.
- H. J. Perry. *Cambarus* from Black Lake, N. Y.
- B. G. Snow. Collections from Ebon, Marshall Islands, and Caroline Islands.
- C. N. Willard. Small collection from Old Point Comfort, Va. Zoölogical Station, Trieste. *Nephrops Norvegicus*.

REPORT ON THE CONCHOLOGICAL AND PALÆONTOLOGICAL DEPARTMENTS.

BY CHARLES E. HAMLIX.

DURING the year very extensive and important additions have been made, by purchase, to the collections of Fossil Invertebrata, the extent of which can at present be indicated no further than by stating the number of packages received. They are:—

Sixteen boxes specimens from the Upper Silurian and Devonian strata of Schoharie, N. Y., and vicinity, being the collection of Mr. Wm. D. Gebhard.

One hundred and ninety-three boxes specimens, and thirty-three large slabs and fragments, chiefly from the Lower Silurian of Cincinnati and other parts of Ohio, comprising the entire collection of Mr. C. B. Dyer, of Cincinnati.

Thirty-three boxes and nine barrels fossils of the Trenton Limestone and Utica Slate of Central New York, from Mr. C. D. Walcott, of Trenton Falls, N. Y.

Thirty-two species, two hundred and six specimens, invertebrate fossils from Mount Lebanon, Palestine, collected by and bought of Rev. William Bird.

As the Gebhard collection came without names, the larger part of February and March was given to the assortment of the specimens and the determination of the Mollusca from the Lower Helderberg groups and the Oriskany Sandstone.

The month of April was spent by me at Cincinnati, in assorting and packing the Dyer collection. This, and that of Mr. Walcott, remain for the present in the packages.

Considerable time has been devoted to the determination of the Mollusca of the Bird collection, and those of another, chiefly from Mount Lebanon, made by and belonging to Rev. Selah Merrill.

The selection of fossil species designed to make part of the Systematic Collection of Mollusca has been completed, and the Tertiary species have been mounted.

The difficulty of procuring suitable tablets has greatly delayed the work of remounting the recent shells set apart for exhibition in the Systematic Collection, but since the receipt of tablets the mounting has been in progress, and arrangement in the new cases will keep pace with the mounting.

Owing to the pressure of other work, conchological exchanges have been carried on only with a few old and valued correspondents. Offers of new exchanges have been necessarily declined.

Intervals of time not otherwise occupied have been given to revision of recent Lamellibranchiata, which, discontinued in 1877, was in part resumed last year.

Miss Anthony, besides her usual work of cleaning and mounting specimens, has rendered efficient help in assorting fossils.

The receipts of shells by exchange have been six packages, comprising three thousand, nine hundred and forty-five specimens of two hundred and fifteen species. Consignments sent in return have numbered five packages, one thousand, seven hundred, and forty-two (1742) specimens of two hundred and forty-eight (248) species.

REPORT ON THE LIBRARY.

By Miss F. M. SLACK.

THE accessions to the Library during the year ending September 1, 1880, have amounted to 772 volumes, 866 parts, and 424 pamphlets, from the following sources.

	VOLUMES.	PARTS.	PAMPHLETS.
Gift	102		77
Exchange	64	230	
Purchase	249	439	104
A. Agassiz	157	187	243
Museum Publications	2	10	
Binding parts and pamphlets	198		
	<u>772</u>	<u>866</u>	<u>424</u>

The number of volumes (exclusive of pamphlets) now in the Library is 14,098.

[A.]

INVESTED FUNDS OF THE MUSEUM.

IN THE HANDS OF THE TREASURER OF HARVARD COLLEGE, SEPT. 1, 1877.

Sturgis-Hooper Fund	\$70,142.52
Gray	51,750.00
Agassiz Memorial "	{ 297,933.10
Teachers & Pupils' Fund,	
Permanent "	117,469.34
Humboldt "	7,740.66
Agassiz Building "
	<u>\$552,599.63</u>

[B.]

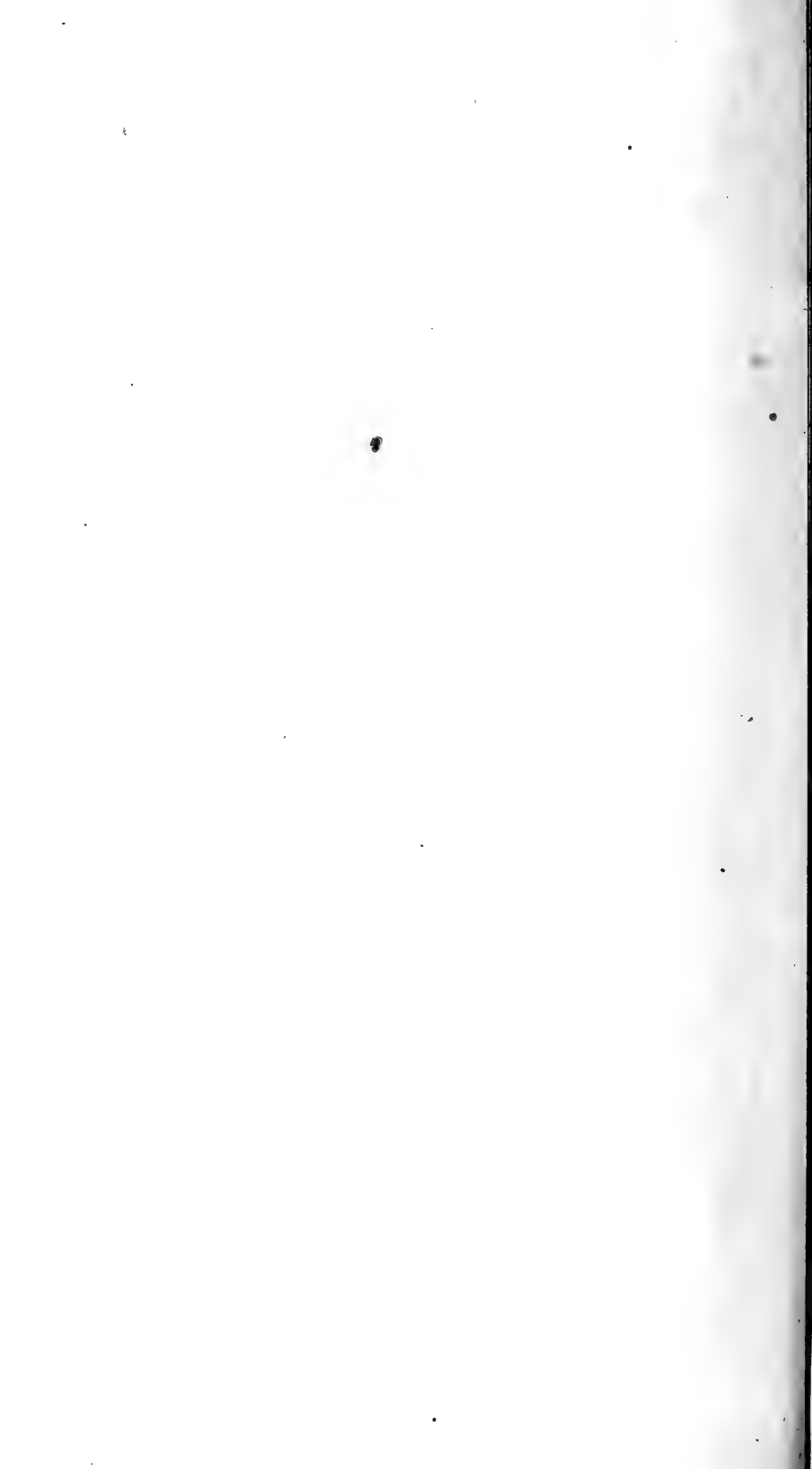
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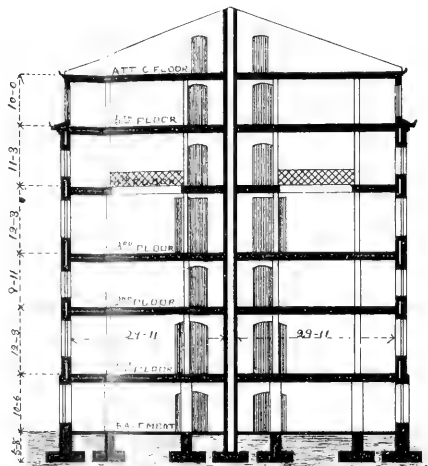
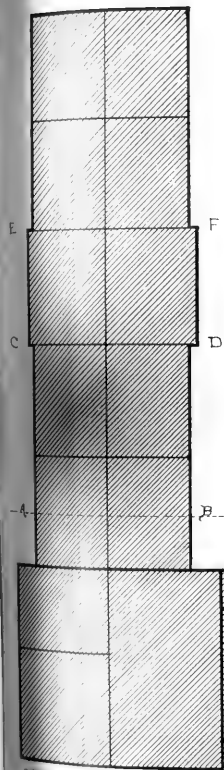
CHARLES W. ELIOT, *President.*ALEXANDER AGASSIZ, *Curator.*JOSIAH D. WHITNEY, *Secretary.*

THEODORE LYMAN.

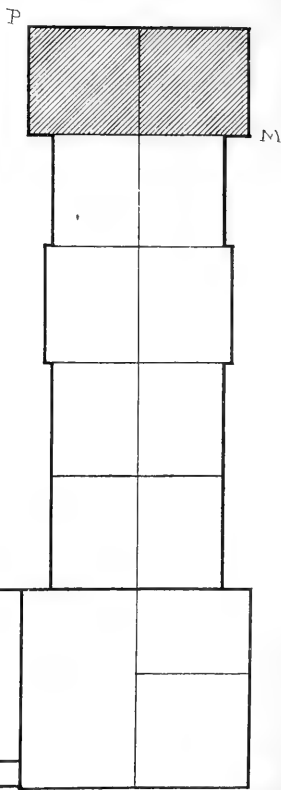
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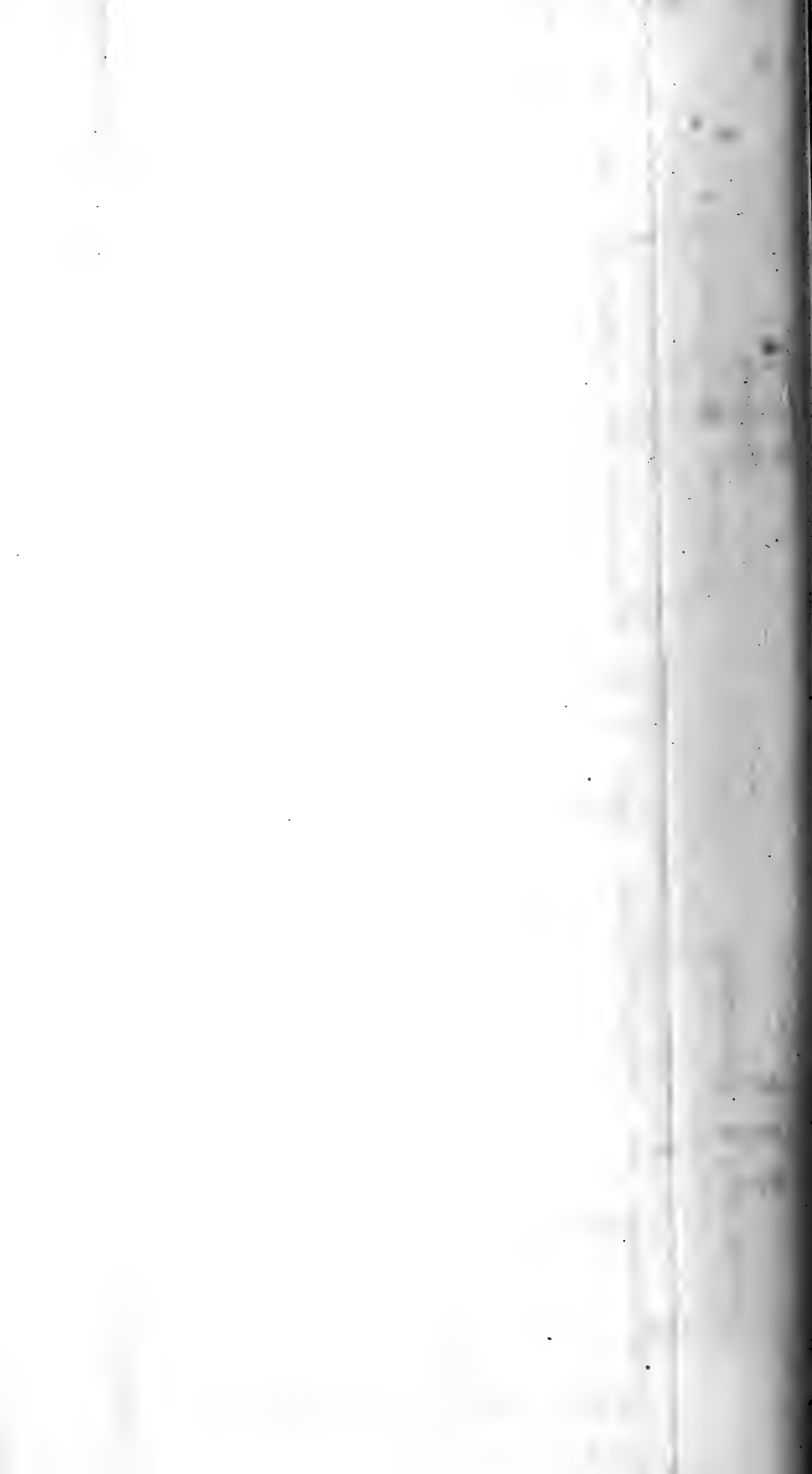
ALEXANDER AGASSIZ,	<i>Curator.</i>
JOSIAH D. WHITNEY,	<i>Sturgis-Hooper Professor of Geology.</i>
HERMANN A. HAGEN,	<i>Professor of Entomology.</i>
NATHANIEL S. SHALER,	<i>Professor of Palæontology.</i>
WILLIAM JAMES,	<i>Assist. Prof. of Physiol. and Comp. Anat.</i>
THEODORE LYMAN,	<i>Assistant in Zoölogy.</i>
CHARLES E. HAMLIN,	<i>Assistant in Conchology and Palæontology.</i>
JOEL ASAPH ALLEN,	<i>Assistant in Ornithology.</i>
WALTER FAXON,	<i>Assistant in Zoölogical Laboratory.</i>
W. M. DAVIS, JR.,	<i>Assistant in Geological Laboratory.</i>
S. W. GARMAN,	<i>Assistant in Herpetology and Ichthyology.</i>
E. L. MARK,	<i>Assistant in Zoölogical Laboratory.</i>
M. E. WADSWORTH,	<i>Assistant in Lithology.</i>
J. W. FEWKES,	<i>In charge of Radiates.</i>
PAULUS ROETTER,	<i>Artist.</i>
MISS F. M. SLACK	<i>Librarian.</i>





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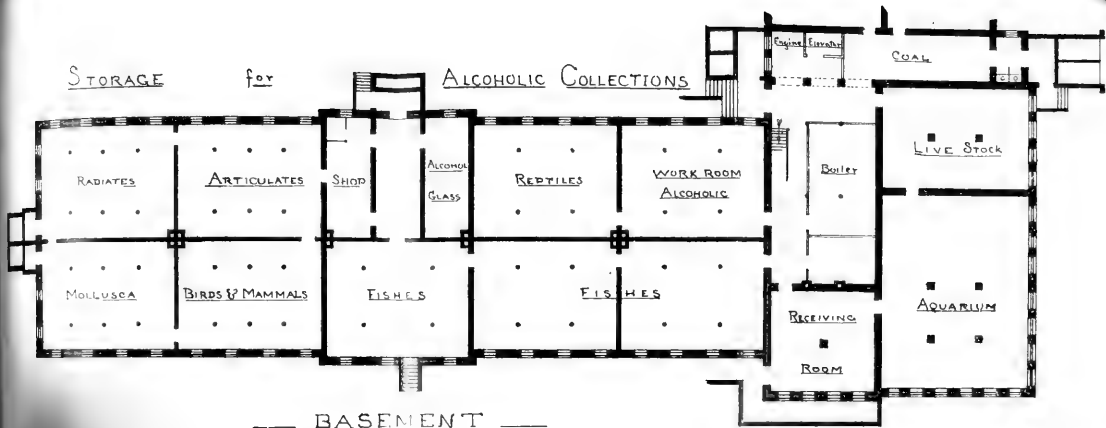
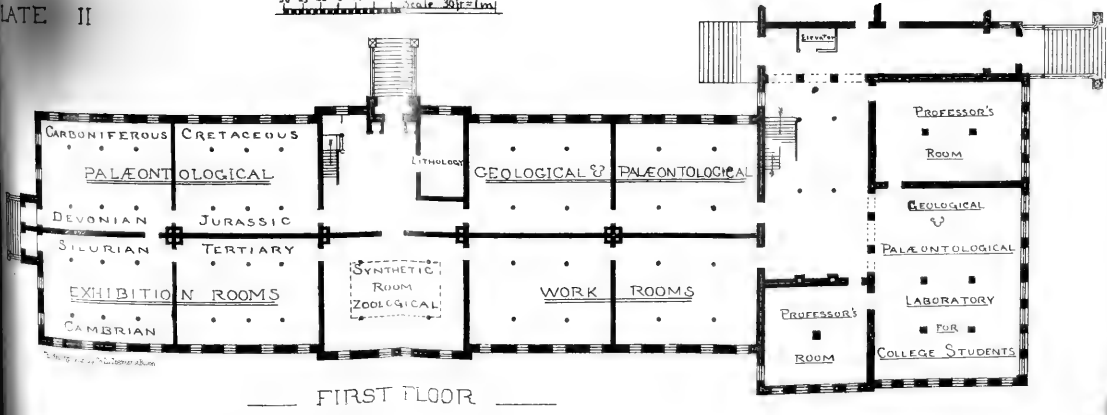
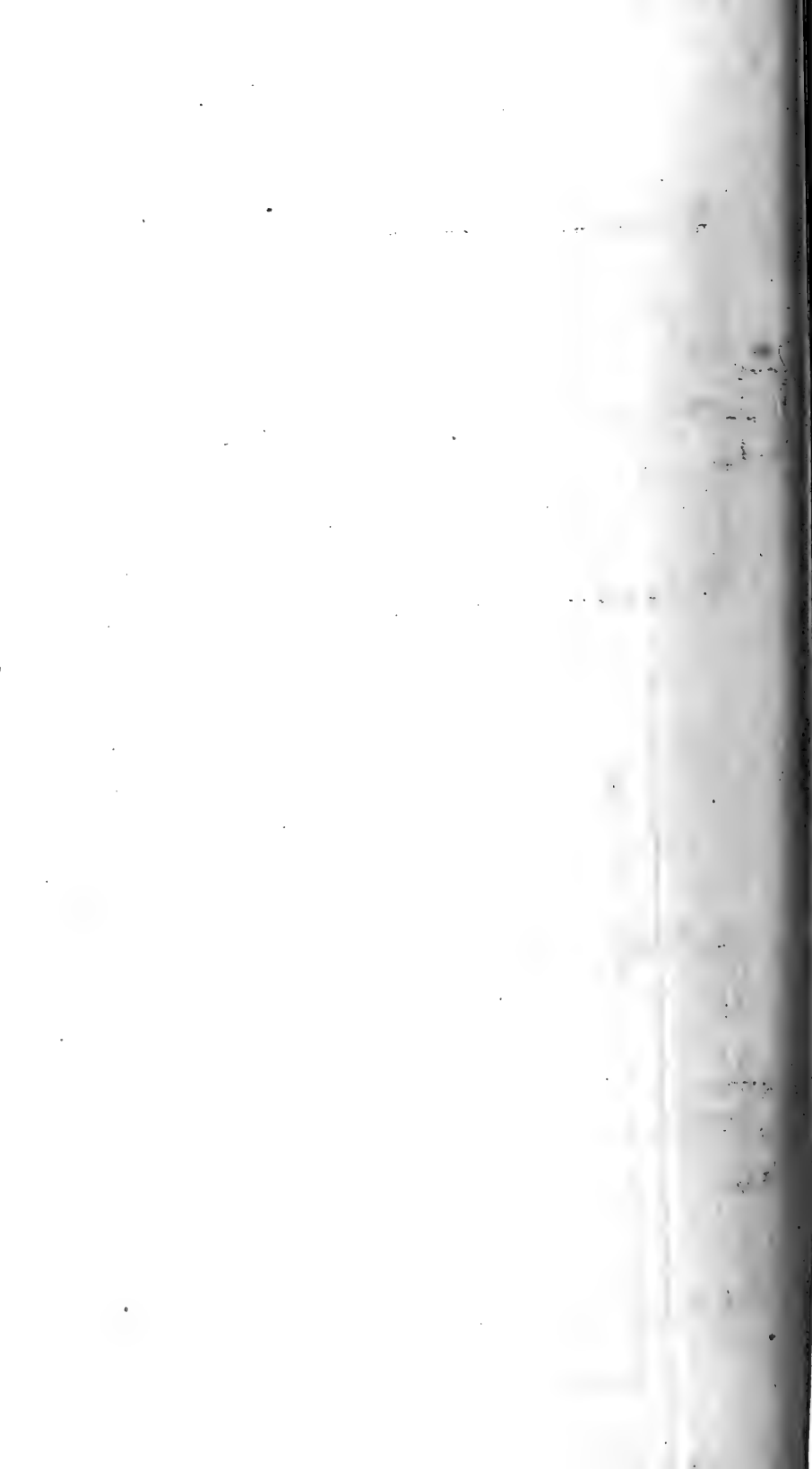
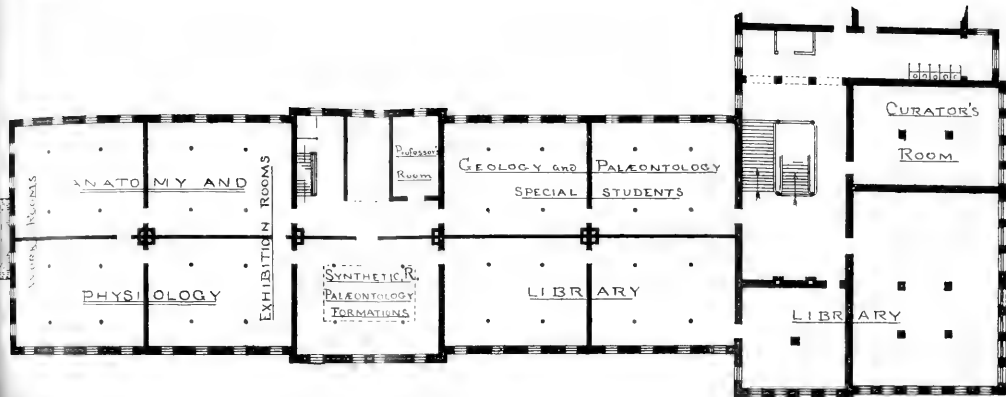


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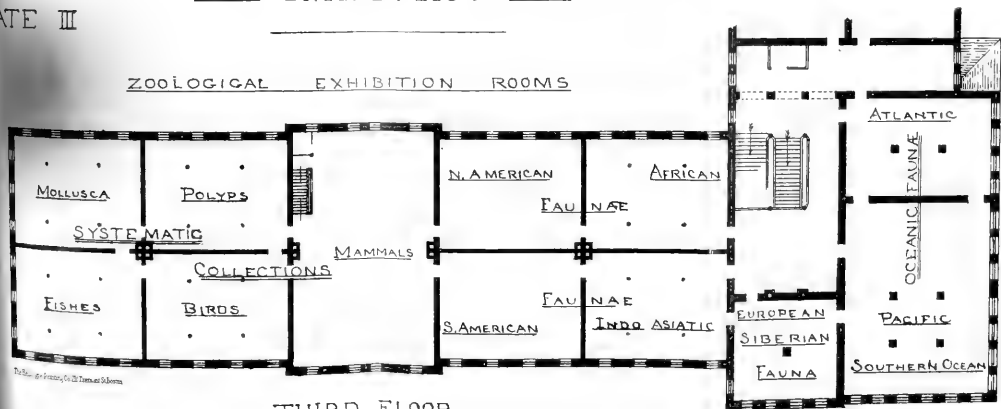






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ZOOLOGICAL EXHIBITION ROOMS

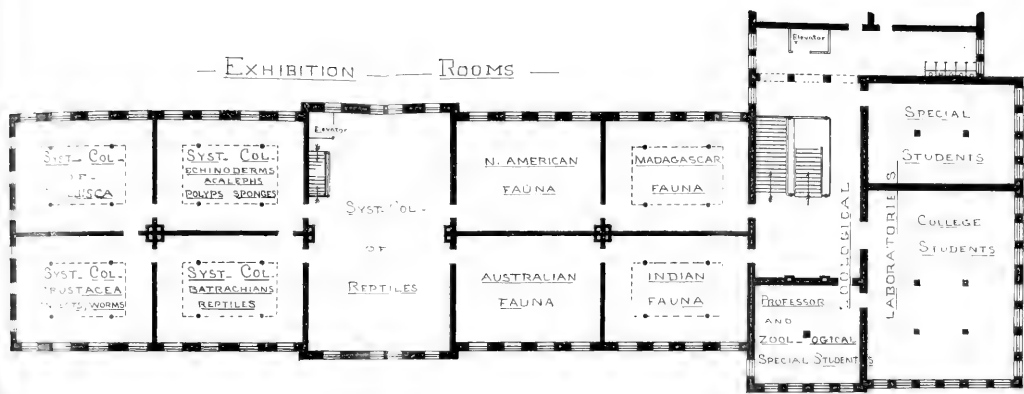


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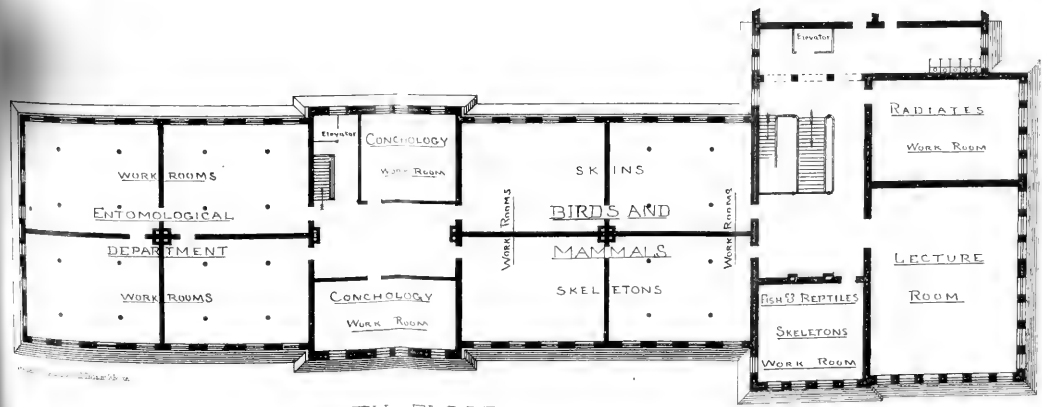


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— FOURTH FLOOR —

PLATE IV



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