THIRTY-SIXTH ANNUAL REPORT

ON THE

NEW YORK STATE MUSEUM OF NATURAL HISTORY,

BY THE

REGENTS OF THE UNIVERSITY

OF THE

STATE OF NEW YORK.

TRANSMITTED TO THE LEGISLATURE JANUARY 12, 1883.

ALBANY:
WEED, PARSONS & COMPANY.
1884.

Compliments of the author,

JAMES HALL,

State Geologist.

THIRTY-SIXTH ANNUAL REPORT

ON THE

NEW YORK STATE MUSEUM OF NATURAL HISTORY,

BY THE

REGENTS OF THE UNIVERSITY

OF THE

STATE OF NEW YORK.

TRANSMITTED TO THE LEGISLATURE JANUARY 12, 1883.

ALBANY:
WEED, PARSONS & COMPANY.
1883.

STATE OF NEW YORK.

No. 53.

IN SENATE.

JANUARY 12, 1883.

THIRTY-SIXTH ANNUAL REPORT

OF THE TRUSTEES OF THE STATE MUSEUM OF NATURAL HISTORY.

UNIVERSITY OF THE STATE OF NEW YORK,
OFFICE OF THE REGENTS, TRUSTEES OF THE STATE
MUSEUM OF NATURAL HISTORY,
ALBANY, *January* 12, 1883.

To the Legislature :

I have the honor to transmit the Thirty-sixth Annual Report of the Trustees of the State Museum of Natural History, as required by law.

H. R. PIERSON,
Chancellor of the University.

REPORT.

To the Honorable the Legislature of the State of New York:

The Regents of the University, as Trustees of the State Museum of Natural History, in accordance with the provisions of law, respectfully submit their Thirty-sixth Annual Report.

For a full account of the operations of the Museum for the past year the Trustees beg to refer to the reports of the Director and the State Botanist, which are herewith transmitted.

Owing to the crowded condition of the Museum building the increase of the collections has been made a secondary matter during the past year. The labors of the assistants have been chiefly expended in preparing specimens for exhibition, and in other ways giving to the collections their greatest scientific value.

Whenever the State shall provide the much-needed additional room a great expansion in the number and variety of the specimens can at once be made.

More than 50,000 specimens belonging to the State now in charge of the State Geologist only await space to be transferred to the State Museum. The want of a fire-proof receptacle for these vast and invaluable collections is each year more plainly felt by the Trustees. During the last year one of the largest and most valuable collections in natural history in the country, that of Amherst College, was totally destroyed by fire, owing to the want of a fire-proof building.

The work of the scientific staff in the Museum has been prosecuted with great assiduity and success during the past year. The scientific papers of the members of the staff which have been published in the annual reports of the Legislature have been of great interest to scientific men, and applications for them are received from all parts of the world. It is earnestly recommended that the means to continue these publications may be afforded. In past years there has been much irregularity in the publication of the reports and much disappointment in consequence has been occasioned. There would be a great advantage in a plan by which the scientific reports of the Museum could be printed under the direction of the Museum staff, instead of forming a part of the public printing. But as this would entail a considerable additional expense to the Museum it could only be done by an increase of the annual appropriation for its support.

The work of distributing collections of minerals among the academies of the State, under the authority of a concurrent resolution of the Legislature, has been carried out as fully as seemed to be called for. It has been the policy of the Trustees to give these collections only in cases where there was encouragement to believe that they would be a welcome and a useful addition to the educational equipments of the institution. The Trustees earnestly desire to see the Museum become a great center of educational influence for the State. With this view they seek to devise ways for aiding teachers of science in the institutions of learning throughout the State. They would gladly see the Museum used by them for study, and the staff of the Museum employed in aiding these students in fitting themselves for science teachers.

Respectfully submitted,

H. R. PIERSON,
Chancellor of the University.

DAVID MURRAY,
Secretary.

REPORT OF THE DIRECTOR.

ALBANY, *December* 23, 1882.

To the Honorable the Board of Regents of the University of the State of New York:

GENTLEMEN — I have the honor to communicate herewith the Annual Report upon the State Museum of Natural History, with some general account of the condition of the collections in the several departments, the additions which have been made thereto, and the work done in the institution during the past year.

The collections of the State Museum are all in good order and condition; and, so far as our facilities permit, are arranged for exhibition to the public. It is, however, impossible to extend these facilities very greatly for want of space in the building. Some additional table cases have been added during the past year, taking the place of a small working-room which had been separated from one of the public halls.

During the past month the collections of birds, mammals and skeletons have been removed and carefully cleaned and examined, and replaced in their cases in good order. That portion of the ethnological collection upon the same floor has likewise received careful attention and the perishable portions have been treated in the same manner as the stuffed skins of birds, etc., in order to insure their preservation.

All the alcoholic collections have likewise been examined and put in proper order. The small collections of Radiates and Echinoderms have been examined and rearranged in the cases, with additional specimens of corals obtained during the past year. The work of dusting and cleaning the conchological collection is now in progress, and this will be followed by the cleaning and rearrangement of the mineralogical collection.

It has been impossible to accomplish the proposed plan of presenting a systematic catalogue of the birds and mammals of the State, as intended; this work is, however, only deferred to a more favorable opportunity.

A catalogue of the Unionidæ of the several collections in the State

Museum was presented with the thirty-third report, but this is not yet printed. A catalogue of the land shells of the New York State collection, and of the land shells of the United States, in the State Museum, also of the Corbiculidæ of the New York State collections, were communicated at the same time, together with other important papers, which still remain in the hands of the State printer. It is already well known to your honorable board (though perhaps not so well known to the general public) that copies of these reports, beyond the usual document edition, are printed only by special order of the Legislature; and as no resolutions to this effect were passed for the printing of the thirty-second and thirty-third reports, they were, consequently, only published among the legislative documents. The same conditions have prevented the proper publication of the thirty-fourth report.

In consequence of this state of affairs, the appendices in part, and most of the scientific papers have been withdrawn, and were communicated with the thirty-fifth report. Two papers have been published in full or in abstract, through other channels. The thirty-fifth report is now in the hands of the State printer, and some progress has been made in the work.

This condition of the printing renders the working of the Museum extremely inconvenient and unsatisfactory; while it is very discouraging to all connected with the institution to have no printed evidence of work done during several preceding years. Another serious cause of delay and hindrance in every department of the work of the Museum is the unsettled and uncertain tenure by which we hold and occupy our working rooms. With the return of each successive Legislature the permanency of any existing plans or arrangement is threatened, and consequently it is impossible to carry out any systematic disposition of the material preparatory to working, or any final arrangement of that which has been studied and published, and which has become a part of the permanent collection of the Museum. Not only does this uncertainty hinder the progress of work, but often renders it necessary to do over again work which has been done in a temporary or tentative manner. The evil arising from all this is greater than can be expressed, and the final influences must reach beyond the present, for each succeeding year renders it more and more difficult to bring up the unfinished work of the past. It affects not only the actual collections, it affects every thing connected with the working of the institution, and modifies every report and its appended scientific papers. It affects in a greater or less degree every one connected with the work. There is a consciousness that the conditions which exist are unfavorable; and we cannot avoid the belief that a portion of the intelligent public appreciate this state of affairs, and see the unfortunate influence on the results of the Museum work.

The additions to the Museum collections during the year 1882 will be found recorded in detail in the lists appended.

In the Botanical Department there have been nineteen contributors of an aggregate of 285 species.

In the Zoölogical Department there have been added to the arranged collections specimens from six sources.

The whale skeleton, purchased nearly two years since, has been in the custody of Professor Ward, of Rochester, for maceration and preparation. We had expected to have it delivered at the Museum about the end of this year, but I am just now informed that it will not be ready before March next.

The Museum Library has received the addition of 103 books and pamphlets by donation, and thirty publications by purchase and exchange.

To the collections in mineralogy, geology and palæontology, there have been added by donations from eleven contributors 72 specimens, besides the collections made by persons connected with the Museum, which are for the most part, from necessity, packed in boxes.

The Current Work of the Museum.

The accompanying report of the Botanist, Mr. C. H. Peck, will give an account of the work in his department, and the addition to the herbarium of 142 species of plants, of which 68 are new to this collection. On the second floor of the Museum, a collection of fungi is arranged for public inspection.

The Unionidæ and other fresh-water shells, with numerous sections of the same, referred to in a former report as the work of Mr. Geo. B. Simpson, has been in part arranged in cases, and the collection is in progress toward completion. A collection of Unionidæ and other fresh-water shells, made by Dr. D. N. DeTarr, assistant in the Museum during the summer of 1881, has been arranged by him in cases provided for that purpose.

A considerable part of the insect collection, which was made by Mr. Lintner for the State Museum, has been placed for exhibition in one of the large table-cases on the second floor. Although subject to deterioration from the influence of light, the Director has deemed it proper to place some portion of this collection where it can be seen by visitors to the Museum.

In the Department of Osteology, Anatomical and Alcoholic Specimens, and the preparation of translucent sections of fossils and minerals, under the charge of Dr. J. W. Hall, the work has been continued as heretofore; except that the general duties of the Museum (in the absence of an assistant in the Zoölogical Department, and the work heretofore performed by the taxidermist) have fallen upon the assistant who has charge of this department.

In addition to the above large translucent sections of rocks and fossils, nearly 300 sections of shells of Brachiopoda have been prepared by Mr. Beecher by hand for microscopic study. These sections, many of them minute, are mounted on glass slides of the standard size, and each one labeled with the generic and specific name. The study of the minute structure of the shells of brachiopoda is of much importance in determining the generic relations of this class of fossils, and has heretofore been too much neglected, from the difficulty of obtaining satisfactory specimens. This work was commenced by me several years since, in connection with the revision of the genera of the Brachiopoda, of which about thirty plates have already been prepared as a part of the palæontological work of the State.

The present collection has already furnished some important facts in regard to the classification of the Orthidæ and Strophomenidæ, and I propose to examine in this manner the shells of all the genera of Brachiopoda, which are known in the Palæozoic formations of New York.

Among the miscellaneous work of the Museum during the past year, a small geological map of New York (drawn with pen and the area of the formations indicated by different modes of lining) has been prepared to accompany the article on the History of the Geological Survey of New York, to be published in the "Civil Service of the State of New York." We have also prepared a large colored map, preparatory to the publication of a geological map of the State, embodying the results of geological investigation since 1844, which is the date of the last published geological map of the State.

During the past summer a single paper of fifty-nine pages, on the fossil corals of the Niagara and Upper Helderberg groups, has been published in advance of the Thirty-fifth Report of the State Museum.

Collections in the Field.

Almost the only geological collections made in the field during the past year were from the Oriskany sandstone in the vicinity of Knox, in Albany county, and from the Mohawk valley. The latter were from the fresh exposures along the outcrops made by the excavations on the line of the West Shore railroad. These collections represent the Laurentian, the Calciferous sandstone, the Trenton limestone and the Utica slate. A number of specimens from these collections will be available for the State Museum, and the remainder will go into the duplicate material for distribution. The interest in these collections is due to the fact that they illustrate the succession of beds, and the direct contact of the Calciferous sandstone with the Upper Laurentian gneiss, proving the absence of the Potsdam sandstone along the Mohawk valley.

A collection of specimens of the iron ores from Essex county has been made for the Museum.

COLLECTIONS ARRANGED IN THE TABLE-CASES OF THE MUSEUM.

A series of specimens from the Utica slate, illustrating the morphological development of *Triarthrus Becki*, has been labeled and arranged in the table-case of the palæontological series. This is the only series of the kind in the Museum, and is a very valuable addition to the collections of fossil Crustacea.

The largest addition to the arranged collections during the year is from the Niagara group of Waldron, Indiana. The specimens were selected from many thousand examples, and the whole arranged series represents a most complete exhibition of the Niagara fauna of Indiana. It is especially valuable for comparison with the same horizon in New York and elsewhere. This collection contains many typical specimens used in the illustration and descriptions of the species, and many very fine examples of other species. With the exception of the Schoharie collections, it is the largest and most complete representation of the fossils of a single locality in the State Museum.

A list of these additions is given elsewhere.

The specimens illustrated on the plates of Lamellibranchiata, in vol. v, part 1, Palæontology of New York (unpublished), have been numbered and arranged according to the plates, and a partial series selected for the Museum collections. The delay in the publication of this volume has been to the disadvantage of any final work in this series of fossils. The large collection of Devonian Lamellibranchiata, belonging to the State, cannot be made use of for the purposes of distribution, until the publication of this volume is completed.

A full set of the plates of the Lamellibranchiata, of vol. v, part 1, Palæontology of New York (as above), with manuscript descriptions of the figures, was sent to the Geological Survey of Kentucky, on application of Mr. Henry Nettelroth, who has in his charge the preparation of the report upon the fossil Mollusca of Kentucky.

The Director of the Museum, as State Geologist, has considered it a duty to furnish this information regarding unpublished work, from the fact of the long delay in presenting our own publications for the use of scientific workers.

A pamphlet of more than sixty pages, containing descriptions of a part of these fossils, was published in 1869. The manuscript descriptions of the remaining species for the then proposed vol. v, part 1, have long been ready for the press, and were communicated with the Museum report two years since, but up to this time have not yet been printed.

The collections made in previous years from the Lower Carboniferous limestone of Spergen Hill, Indiana, and from the Lower Silurian on the shores of Lake Champlain, have been unpacked, cleaned and ticketed; and a large portion of these are repacked in boxes for want of space to arrange them. The remainder are now accessible for the selection of duplicates.

DISTRIBUTION OF DUPLICATE FOSSILS AND MINERALS.

Every year shows an increasing number of applications for labeled collections of fossils and minerals. Some of these are outside of the regulations adopted by the Board of Regents for the distribution of collections; but the Director has in many instances felt constrained to listen to such applications, believing that it would inure to the advantage of the Museum. In such cases he has made liberal use of his private collections of rocks and iron ores of Northern New York and other localities, from which the State Museum does not possess duplicates.

In addition to the general distribution above named, there have been sent, by authority of the Regents, a small collection of Oriskany sandstone fossils and a large stump of *Psaronius erianus*, to McGill College, Montreal, and presented to the Peter Redpath Museum.

In anticipation of the early removal, to some public building, of the large collections of fossils which have long been in the custody of the State Geologist, a large portion of the drawers containing them, about 1,200 in number, have been carefully examined and in part rearranged, the specimens cleaned, etc. The fossil corals, occupying about 500 close drawers, have been systematically arranged, and are in a cleanly and proper condition for removal at any time. The greater part of the collection is packed in boxes, and these are ready for removal as soon as a proper place shall be provided.

It is my melancholy duty to record the death of Mr. James A. Hurst, who has for more than thirty years acted as the taxidermist of the State Museum. Nearly all the stuffed specimens of birds and mammals have been mounted by him; and through his care and watchfulness they have remained in very excellent condition. I shall consider it incumbent on me to communicate an obituary notice to the Regents for incorporation in the report, so soon as I shall be able to obtain the necessary data.

I am, very respectfully, your obedient servant,

JAMES HALL, *Director.*

ADDITIONS

TO THE COLLECTIONS OF THE STATE MUSEUM DURING THE YEAR 1882.

I. Botanical.

From Mrs. L. A. Millington, Glens Falls, N. Y., specimens of young plants of *Epilobium molle*, Torr., bearing thickened subterranean scale-like leaves.

From Miss M. Bowles, Columbia, Tenn., a specimen of *Polypodium incanum*, Pursh.

From C. D. Hill, Tunis, N. Y., a specimen of *Calystegia Sepium*, L., with pubescent stem and short flowers.

From J. F. Shoemaker, Luverne, Minn., specimens of *Oxybaphus nyctagineus*, Sweet.

From J. Howell, Arthur, Oregon, specimens of *Berberis Aquifolium*, Pursh; *Puccinia mirabilissima*, Pk., and *Dædalea vorax*, Harkness; also of wood of *Abies Douglasii*, injured by the *Dædalea*.

From S. B. Griswold, Albany, N. Y., a dried flower of the Century plant, *Agave Americana*.

From Charles E. Smith, Philadelphia, Pa., very fine specimens of both pistillate and staminate plants of *Corema Conradii*, Torr.

From C. F. Cornelius, Willow Brook, N. Y., a specimen of *Cynoglossum officinale*, L.

From Rev. Washington Rodman, Astoria, N. Y., specimens of a new edible fungus, *Agaricus Rodmani*, Pk.

From H. N. Johnson, Coeymans, N. Y., fine specimens of *Sagittaria pusilla*, Nutt.; also specimens of a singular form of *Thalictrum anemonoides*, Mx.

From W. C. Stevenson, Jr., Philadelphia, Pa., specimens of *Puccinia Myrrhis*, Schw.

From S. J. Bowman, Albany, N. Y., specimens of *Ranunculus multifidus*, Pursh.

From Hon. G. W. Clinton, Albany, N. Y., specimens of *Eragrostis pœoides*, Bv.; *E. Purshii*, Schrad.; *Tillæa simplex*, Nutt., and *Amarantus blitoides*, Wats.

From Felix von Thumen, Vienna, Austria, specimens of one hundred and ninety-one species of fungi.

From W. Russell, Albany, N. Y., per J. Gebhard, Jr., a fine specimen of the Chinese "leechee nut."

From E. L. Hankenson, Newark, N. Y., specimens of *Sedum reflexum*, L.; *Azolla Caroliniana*, Willd., and hybrid *Salix cordata* x *sericea*.

From W. M. CANBY, Wilmington, Del., specimens of *Tillæa simplex*, Nutt.

From CLARENCE LOWN, Poughkeepsie, N. Y., specimens of the very rare ferns, *Cheilanthes vestita*, Sw.; *Asplenium Bradleyi*, D. C. Eaton, and *Asplenium ebenoides*, R. R. Scott; the last one new to the State.

From Prof. W. R. DUDLEY, Ithaca, N. Y., specimens of sixty-two species of plants, several of which are new to the Herbarium.

II. ZOOLOGICAL.

A specimen of *Macrosila quinquemaculata*, the tomato sphinx, from R. F. WELLER, Washington Valley, Kent Co., Rhode Island.

Thyræus abbotii, on grape vines, from J. VANDELOO, Albany, N. Y.

Specimen of *Blatta*, from W. R. ROSS, Greenbush, N. Y.

Large specimens of *Meandrina clivosa*, *Madrepora convexa* and *Favasites*, the latter polished; purchased from Mr. WOODMAN, New York city.

A pair of "dead-locked" elk horns, purchased of Mr. E. F. PHILBROOK, Des Moines, Iowa.

Collection of land and fresh-water shells from Georgia, purchased from Prof. R. E. CALL, David City, Nebraska.

III. GEOLOGICAL AND MINERALOGICAL.

Five samples of *Conularia crustula*, White, Upper Coal Measures, Kansas City, Mo.; by exchange from W. J. PARRISH, Kansas City, Mo.

A polished specimen of crystalline limestone, from G. E. WOODRUFF, Canton, St. Lawrence Co., N. Y.

Slab containing impression and fragment of *Lepidodendron*, from FRANK GOULD, Esq., Oneonta, N. Y.

Fragment of *Lepidodendron*, from MEIGS CASE, M. D., Oneonta, N. Y.

Two large specimens of Galena, from Galena, Ill., from DUNCAN CAMPBELL, Esq.

Numerous specimens of gypsum in florescent forms and calcite from Mammoth Cave, Ky., From HENRY RUSSELL, Esq., Albany.

Ten specimens of fossils from the Portage group, Perry, N. Y., in exchange from the PERRY UNION SCHOOL, J. P. Bishop, principal, Perry, Wyoming Co., N. Y.

Odontornithes (toothed birds). Casts of bones of *Hespiromis regalis*, twenty-six specimens, from Prof. O. C. MARSH, Yale College Museum, New Haven, Conn.

Ramphorhynchus phyllurus, Marsh (plaster cast), from the lithographic limestones, Jurassic formation of Bavaria; the original specimen is the only one yet found showing the membranes of the tail and wings; from Prof. O. C. MARSH, Yale College Museum, New Haven, Conn.

Two specimens of *Dicranograptus bicornis*, Kenwood, Albany, from JAMES F. FLANNERY, Albany.

Ten slabs of Trenton limestone with identified fossils from Dutchess and Orange counties; from Prof. W. B. DWIGHT, Vassar College, Poughkeepsie, N. Y.

Twelve specimens of graptolites from the Moffat Shales of Hartfell, Scotland, from JAMES DAIRON, Esq., of the Geological Society, Glasgow, Scotland.

IV. ETHNOLOGICAL, ETC.

A stone formerly marking a point in the boundary line between New York and Pennsylvania. For deposit in the historical collections of the Museum. From Dr. DAVID MURRAY, Secretary Board of Regents.

Several specimens of prepared flax brought from Albany by Col. Rochester in 1822, from Mrs. GATES.

V. TO THE LIBRARY.

1. *By Donation.*

Report of the Commissioner of Agriculture for 1880.

Bulletin American Geographical Society, New York. 1881, Nos. 2, 3, 4, 5; 1882, No. 1.

Journal of the American Geographical Society, New York. Vols. XII, XIII. From the SOCIETY.

Geological Survey of Michigan, vol. IV.

Circulars from John Hopkins University, No. 13, February, 1882. Baltimore.

Population and Resources of Alaska.

Fourth Annual Report of the U. S. Geological Surveys. (King)

Bulletin of the United States Geological and Geographical Surveys, vol. VI, Nos. 2, 3.

Second Report, U. S. Entomological Commission on the Rocky Mountain Locust.

Beiträge zur Paläontologie von Osterreich-Ungarn.

The Geological and Natural History Survey of Minnesota. Ninth annual report. From Prof. N. H. WINCHELL.

United States Entomological Commission, bulletin No. 7.

Anales del Museo Nacional de Mexico Tomo II.

Smithsonian Report, 1880.

Official Gazette U. S. Patent Office, vol. 21, Nos. 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26; vol. 22, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25 and 26; errata, etc., vol. 21, January 3, to June 27, 1882.

Alphabetical list of patentees and inventors for the half year, January to June, 1882, inclusive; do. July to December, 1881, inclusive.

Memoirs of the Boston Society of Natural History, vol. 3, No. 5.

Circulars of Information of the Bureau of Education, No. 6, 1881, and No. 1, 1882.

Department of Agriculture, special report, Nos. 31, 42, 43, 44, 45, 46, 47, 48, 49, 52.

Library of Harvard University, bibliographical contributions, No. 13; Fossil Insects, by Samuel H. Scudder.

Official Gazette U. S. Patent Office, vol. XX, July 5, to December 27, 1881. (Index, etc.)

Carcenologiske Bidrag til Norges Fauna of G. O. Sars. Christiana, 1879.

Enumeratio Insectorum Norvigicorum Fasciculum, V. H. Siebke. Christiania, 1880.

Bidrag Nordenfjeldske Narges Insektfauna. John Sahlberg, Christiana, 1880.

Bidrag til Kundskaben om Norges Lepidopterfauna. J. Sparre Schneider, Christiania, 1881.

Ett försök att Bestämma en del af de Utaf. H. Strom beskrifna Narksa Insekter. H. D. J. Wallengren, Christiania, 1880.

Bemaerkninger til H. Siebke's Enumeratio Insectorum Norvegicorum. Fasecals v. Pars, 1 etc. W. M. Schoyen, Christiania, 1880.

Department of Agriculture — Florida, its Climate, Soil, Productions and Agricultural Capabilities. Washington, 1882.

Book list. Bernard Quaritch, June, 1882.

Studies from the Biological Laboratory John Hopkins University, Baltimore, vol. II, No. 3, June, 1882.

Fragments of the Coarser Anatomy of Diurnal Lepidoptera. S. H. Scudder, 1882.

Science Observer, vol. IV, Nos. 1, 2.

Bulletin of the Library Company of Philadelphia. July, 1882.

Sitzungsberichte und Abhandlungen, Jahrgang 1881. Dresden, 1882.

First Annual Report of the Bureau of Ethnology. J. W. Powell, 1879–1880.

United States Commission of Fish and Fisheries — Commissioner's Report of 1879–1882.

Bulletin of the American Museum of Natural History, Central Park, New York, vol. 1, Nos. 2, 3.

Bacteria, by Chas. S. Dolley, M. D., Rochester, N. Y.

Zwölfter Bericht der Naturforschenden Gesellschaft in Bamberg, 1882.

Accessions to Indian Museum, Calcutta, 1881. Appendix A.

Auditor of Accounts, annual report, city of Boston, Mass., 1881, 1882.

American Museum of Natural History, 13th annual report. February 15, 1882.

Archives du Musée Teyler, Serie II, 2d Partie.

Sitzungsberichte und Abhandlungen der Naturwissenschaftlichen Gesellschaft, Isis in Dresden, 1822 ; Januar bis Juni.

Bulletin de L' Institut National Genevois. Tome XXIV, 1882.

R. Biblioteca Nazcionale in Firenze Sezione di Scienzi Fisiche e Naturale 1 Eccher (A), 2, 3 Tommasé (D), 4 Cavanna (G), 5 Mencci (F).

Annual Report of the Commissioner of Patents for the year 1881. Washington, 1882.

2. *By Purchase and Exchange.*

Journal of the Cincinnati Society of Natural History. July, 1882, vol. V, Nos. 2, 3.

American Journal of Science and Art, 3d series. Vol. XXIII, 133 to 138, inclusive ; vol. XXIV, 139, 140, 141, 142, 143, 144.

American Naturalist, vol. XVI, 1 to 12 inclusive.

Encyclopædia Britanica, vols. XIII and XIV.

The Butterflies of North America, by W. H. Edwards. Second series, part X.

Proceedings of the Davenport Academy of Natural Sciences, vol. III, part 2, 1882.

APPENDIX A.

List of Niagara Fossils from Waldron, Indiana, arranged in Table Cases in the State Museum of Natural History. September, 1882:

Species.		Examples.
1.	Buthrotrephis gracilis var. crassa, H. (typical)............	1
2.	Receptaculites subturbinatus, Hall	2
3.	“ sacculus (type specimen)..................	1
4.	Astylospongia præmorsa, Goldf	8
5.	Deudrograptus (s. g. Chaunograptus) novellus H. (type) ...	1
6.	Streptelasma (Duncanella) boreale, Nich.................	16
7.	Aulopora precius, Hall................................	2
8.	Streptelasma radicans, Hall............................	12
9.	Zaphrentis celator, Hall	2
10.	Favosites Forbesi, var. occidentalis, Hall..................	11
11.	“ “ “ “ “ (slab)...........	1
12.	“ “ “ “ “ (bases)	2
13.	“ “ “ “ “ (small cells)......	2
14.	“ “ “ “ “ (typical) incipient growth of a colony on *Meristella nitida*	1
15.	Favosites Forbesi var. occidentalis, Hall (typical), cell-tubes elongate and a very extended epitheca..................	1
16.	Favosites Forbesi var. occidentalis, Hall (typical), pyriform specimen	1
17.	Favosites Forbesi var. occidentalis, Hall, attached to crinoid stems........	2
18.	Favosites Forbesi var. occidentalis, Hall, double carallum...	1
19.	“ “ “ “ “ epitheca decorticated,	1
20.	“ “ “ “ “ (typical), showing opercula to the cells..........	1
21.	Favosites Forbesi var. occidentalis, Hall, with cell-tubes exposed........	1
22.	Favosites Forbesi var. occidentalis, Hall, longitudinal section,	1
23.	“ “ “ “ “ transverse section...	1
24.	Lichenalia concentrica, Hall, large specimen (typical)	1
25.	“ “ “.	4
26.	“ “ “ poriferous side	5
28.	“ “ “ var. maculata, poriferous side..	1
29.	Saccocrinus Christyi, Hall (two figured specimens, typical).	7
30.	Lyriocrinus Melissa, Hall (one type specimen)............	8

Species.	Examples.
31. Eucalyptocrinus crassus, Hall, series from young to mature individuals	20
31. Eucalyptocrinus crassus, Hall, arms, calyx and a portion of the column	1
32. Eucalyptocrinus crassus, Hall, elongate forms of calices	2
33. " " " three heads lying bedded in the shale parallel and side by side	1
34. Eucalyptocrinus ovalis, Troost., showing variation in size	5
35. " constrictus, Hall (type)	1
36. Roots of Eucalyptocrinus	1
37. " " "	1
38. Eucalyptocrinus cælatus, Hall, series showing variation in size and form	13
39. Eucalyptocrinus cælatus — typical, a very fine specimen consisting of the body with the arms and a portion of the column. The column and roots have been extended and restored from other individuals so that the entire size and appearance of a perfect specimen is produced	1
(Placed in a wall-case on account of the size of the specimen.)	
40. Niagara shale, with Eucalyptocrinus cælatus (3), Eucalyptocrinus ovalis (1), Eucalyptocrinus crassus (1), Eucalyptocrinus column, with attached Favosites (1), Spirifera radiata (3), Rynchonella Indianensis (2), Spirifera crispa var. (1), Rhynchotreta cuneata (1), Streptelasma (Duncanella) boreale (1), Favosites Forbesi, var. occidentalis (1), Trematoporo echinata (1), Trematopora osculum (1)	1
41. Lecanocrinus pusillus, Hall (1 type specimen), and series showing form and variation	7
42. Ichthyocrinus subangularis, Hall (2 type specimens)	3
43. Poteriocrinus ? calyx, Hall (type)	1
44. Dendocrinus ancilla, Hall (type)	1
45. Macroslytocrinus striatus, Hall	6
46. " " var. granulosus (types of var.)	5
47. " " fasciatus, Hall (typical)	4
48. Cyathocrinus Polyxo, Hall	5
49. Stephanocrinus gemmiformis, Hall	5
50. Codaster (Stephanocrinus ?) pulchellus, Miller & Dyer (typical)	6
51. Codaster pentalobus, Hall (type)	1
52. Slab with Eucalyptocrinus crassus, Lyriocrinus Melissa, Favosites Forbesi, var. occidentalis	1
53. Shale, with Saccorinus Cristyi, bearing the impressions of segments of a crinoid column. Eucalyptocrinus crassus, Hall	1
54. Cyathocrinus nucleus, Hall (typical)	4
55. Glyptocrinus Carleyi, Hall (typical)	3
56. Eucalyptocrinus crassus, longitudinal section	2
57. " " transverse sections	4
58. Ampheristocrinus typus, Hall (types)	3
59. Pterinea brisa, Hall, typical	3
60. Ambonychia acutirostra, Hall	1

Species.		Examples.
61.	Goniophora speciosa, Hall, type	1
62.	Conularia infrequens, type	1
63.	Strophostylus cyclostomus, Hall, a series from small to large individuals	12
64.	Strophostylus cyclostomus, Hall, showing columella	2
65.	" " " var. with elevated spire	4
66.	Platystoma Niagarense, Hall, a series showing gradation in size	10
67.	Platystoma Niagarense, Hall, showing form of aperture	2
68.	" " " var. with last volution free for a portion of its extent	2
69.	Two slabs containing Platystoma Niagarense	2
70.	Platystoma plebeium, Hall	1
71.	Cyrtolites sinuosus, Hall	1
72.	Orthoceras annulatum, Sow., typical	1
73.	" "	1
74.	" " typical longitudinal section	1
75.	" " bedded in shale	1
76.	" " compressed specimen	1
77.	" " small specimen	1
78.	" medullare, Hall, longitudinal section	1
79.	" simulator, Hall, typical	1
80.	" " "	4
81.	Trochoceras Waldrenense, Hall	2
82.	Orthoceras Amycus, Hall (type)	1
83.	Nautilus Oceanus	1
84.	Crania Siluriana, Hall; three specimens on Eucalytocrinus crassus, one specimen on Platystoma Niagarense, two specimens on Meristina Maria	4
85.	Strophemena rhomboidalis, Wilc., seven specimens showing exterior form, three specimens showing muscular markings on interior of valves	10
86.	Strophodonta striata, Hall	5
87.	Meristina Maria, Hall, series showing gradation in form and size	11
88.	Meristina nitida, a series showing gradation in form and size,	18
89.	Strophodonta profunda (typical)	1
90.	Streptorhynchus tenuis, Hall	1
91.	Rhynchonella Stricklandi, in series	15
92.	" Whitii, in series	21
93.	" acinus, in series	16
94.	" neglecta, in series, 1 type of var	19
95.	" Indianensis, in series, 3 types of var	18
96.	Meristella rectirostra, Hall (types)	12
97.	Leptaena transversalis, Wahl	2
98.	Rynchonella Stricklandi with Favosites Forbesi, var. occidentalis, Hall	1
99.	Spirifera radiata with Platystoma Niagarense	1
100.	Spirifera radiata, Sowerby, in series	12
101.	" eudora, Hall	2
102.	" crispa, Hisinger, in series	19
103.	" " var. simplex, in series	9

Species		Examples.
104.	Pentamerus fornicatus var. H. Type of var.	1
105.	Anastrophia internascens, Hall, in series	15
106.	Rhynchotreta cuneata var. Americana, Hall, types of var. in series	17
107.	Small shells washed from the soft shales	+50
108.	Eichwaldia reticulata, Hall	15
109.	Chonetes Nova-Scotica, Hall	1
110.	Slab with Rhynchonella Whitii, Rhynchonella Indianensis, Platystoma Niagarense	1
111.	Cornulites proprius, Hall, on Spirifera radiata	1
112.	“ “ “ on Trematopora osculum	1
113.	“ “ “ on Rhynchonella Stricklandi, a type	1
114.	Cornulites proprius, Hall, on various objects, 1 type specimen on trematopora	6
115.	Cornulites proprius, Hall, on Platystoma Niagarense, a type	1
116.	“ “ “ apices on gasteropods	3
117.	“ “ “ “ “ Meristina	3
118.	“ “ “ separate tubes	3
119.	Dalmanites verrucosus, Hall, series of heads	7
120.	“ “ “ tails	3
121.	Slab with Dalmanites verrucosus (tail), Strophodonta striata, Trematopora osculum	1
122.	Lichas breviceps, Hall, thorax and tail	1
123.	“ “ “ tail	1
124.	“ “ “ glabellas	2
125.	Slab with Dalmanites vigilans (heads) five, Dalmanites vigilans with cornulites, one; Lichas breviceps (head), one; Cyphaspis Christyi (heads), two; Streptorhynchus subplana, one; Lichenalia concentrica, one, Trematopora spiculata, one; Trematopora subimbricata, one; Trematopora echinata, two	1
126.	Calymene Niagarensis, Hall	6
127.	Cyphaspis Christyi, Hall	1
128.	“ “ “ enrolled	3
129.	“ “ “ and hypostoma of Lichas Boltoni var occidentalis	1
130.	Dalmanites vigilans, Hall, entire specimen typical	1
131.	“ “ “ head	1
132.	“ bicornis, Hall, frontal margin	1
133.	“ verrucosus, Hall, frontal margin	2
134.	Homalonotus delphinocephalus, Green	1
135.	Illænus (Bumastus) Ioxus, Hall (typical) glabella	1
136.	“ “ “ “ “ tail	1
137.	“ armatus, Hall (1 typical) 2 glabellas, 1 pygidium	3
138.	Lichas Boltoni (Bigsby) var. occidentalis, Hall, glabella and hypostoma	1
		+620

Making altogether eighty-two species which are represented in more than six hundred and twenty examples.

The Bryozoans not arranged in the cases at the Museum occupy fifteen drawers. This collection includes the type specimens of all the new species described in volume X of the *Transactions of the Albany Institute*, and also the specimens used in describing the species figured in the documentary edition of the Twenty-eighth Report.

The following list includes specimens mostly from other classes which have been selected and prepared for the collections, but for which there is no space to arrange them in the cases at the Museum :

Fucoids	1
Sponges	14
Favosites spinigerus	14
" Forbesi, var. occidentalis	1
Streptelasma	3
Chætetes	3
Lichenalia	5
Ceramopora	3
Slabs of Brachiopoda	26
Orthis hybrida	16
" " var	12
" elegantula	24
Nucleospira pisiformis	14
Crania setigera	10
Miscellaneous	10
Alrypa reticularis	25
Retzia evax	25
Orthis biloba	10
Tripilesia putillus (types)	2
Pholidops ovalis	11
Zygospira minima (type)	1
Lingula gibbosa (types)	2
Cœlospira disparilis	16
Streptorhynchus subplana	18
Strophodonta striata	7
Chonetes	10
Spirifera bicostata var. petita (types of var.)	6
Lamellibranchiata (1 type)	16
Gasteropoda	4
Cornulites	10
Coleolus spinulus, type	1
Crustacea, several typical specimens	31
Crinoidea	38
	399

The entire collection is represented in more than 1,019 examples.

APPENDIX B.

List of Genera and Species of Brachiopoda, of which Sections have been Prepared for the Microscope.

Orthis testudinaria.
" Vanuxemi.
" biforata.
" Iowensis.
" borealis.
" perveta.
" ? Strophomenoides.
" Penelope.
" elegantula.
" tricenaria.
" occidentalis.
" Tulliensis.
" Clytie.
" plicatella.
" hybrida.
" impressa.
" flabella.
" subquadrata.
" concinna.
Strophodonta magnifica.
" concava.
" demissa.
" arcuata.
" perplana.
" reversa.
" nacra.
" striata.
Strophomena alternata.
" rhomboidalis.
Strophonella semifasciata.
Chonetes coronata.
Streptorhynchus hipparionyx.
" subplana.
" crenistria.
Tropidoleptus carinatus.
Rensselæria ovalis.
Atrypa aspera.
Pentamerella arata.
Crania Hamiltoniæ.
Eichwaldia reticulata.
Productus subulatus.
Retzia evax.
Spirigera Roysii.
Leptocoelia concava.
" imbricata.
Vitulina pustulosa.
Spirifera laevis.
" zigzag.
" fimbriata.
" mucronata.
" Hungerfordi.
Spiriferina spinosa.
Syringothyris textus.
Cyrtina Hamiltonensis.
Orthyris spiriferoides.
Camarella congesta.
Trematospira nobilis.
" camura.
Stricklandinia.
Meristina maria.
Leptaena sericea.
Nucleospira pisiformis.
Lingulepis pinnaeformis.
Rhychonella capax.
Anastrophia internascens.
Zygospira modesta.
Ambocoelia umbonata.
" præumbona.
Rhynchotreta cuneata.

p 73-75

REPORT OF THE BOTANIST,

CHARLES H. PECK.

REPORT OF THE BOTANIST.

Hon. DAVID MURRAY, LL. D.,

Secretary of the Board of Regents of the University:

SIR — Since the date of my last report, specimens of one hundred and forty-two species of plants have been mounted and placed in the State Herbarium, of which sixty-eight were not previously represented therein. The specimens of the remaining species represent new forms or varieties of species before represented, or exhibit some features or characters not well shown by the older specimens. A list of the species of which specimens have been mounted is hereinafter given and marked (1).

By reason of the veto, by the Governor, of the appropriation for the reimbursement of the expenses of the Botanist for the years 1880 and 1881, it was not deemed prudent by me to advance any more money to meet these expenses. I have, therefore, been obliged to devote myself to the accomplishment of such work as could be done with the materials already on hand, and I have no additions to the Herbarium by the collecting of the Botanist, to report. This interruption of the work is to be regretted since it delays its completion and thereby increases the cost. If it shall be deemed best to continue the work of supplying deficiencies in the Herbarium and of developing a knowledge of the cryptogamic botany of our State, it is desirable that either the salary of the Botanist be increased sufficiently to enable him to meet the necessary expenses out of his own pocket, or else that an appropriation for these expenses be made in advance.

As usual, numerous specimens have been contributed to the Herbarium by various correspondents and other co-laborers in botany. A list of the contributors and of their respective contributions is marked (2).

Some of the contributed specimens represent plants that are new to the Herbarium and have not before been reported, others are rare plants from newly-discovered localities, or specimens that exhibit some peculiar variation in the species, and for these or other reasons are worthy of notice. New stations of rare plants, remarks and observations are recorded in a section marked (3).

Among the contributed specimens is a new species of edible fungus belonging to the genus Agaricus, subgenus Psalliota, and closely related to the common edible mushroom, and its near relative the horse mushroom. The mushrooms are so interesting by reason of their frequent use as an article of food, and the three species mentioned are so variable and so intimately related to each other, that in pursuance of a plan already adopted in two previous reports (in which synopses of the subgenera Amanita and Lepiota have been given), I have thought best to give a full descriptive synopsis of all our New York species of the subgenus Psalliota. In this monograph the descriptions have been revised and made more complete, the dimensions of the spores have been given and copious remarks have been added with the design of pointing out more clearly the distinguishing features of the species and of aiding in their discrimination. It is marked (4).

(1.)

PLANTS MOUNTED.

Not new to the Herbarium.

Ranunculus abortivus, *L.*
Raphanus Raphanistrum, *L.*
Brassica Sinapistrum, *Boiss.*
Viola Selkirkii, *Pursh.*
Geranium maculatum, *L.*
Acer rubrum, *L.*
Trifolium repens, *L.*
Rubus triflorus, *Rich.*
Opuntia Rafinesquii, *Engelm.*
Tiarella cordifolia, *L.*
Mitchella repens, *L.*
Viburnum nudum, *L.*
Heracleum lanatum, *Mx.*
Tanacetum vulgare, *L.*
Vaccinium corymbosum, *L.*
V. Pennsylvanicum, *Lam.*
Nyssa multiflora, *Wang.*
Scutellare galericulata, *L.*
Marrubium vulgare, *L.*
Apocynum cannabinum, *L.*
Polygonum orientale, *L.*
Fraxinus Americana, *L.*
F. pubescens, *Lam.*
Quercus alba, *L.*
Q. Prinus, *L.*
Q. rubra, *L.*
Q. coccinea, *Wang.*
Q. tinctoria, *Bart.*
Populus tremuloides, *Mx.*
P. grandidentata, *Mx.*
Potamogeton crispus, *L.*
P pusillus, *L.*
P pectinatus, *L.*
P. gramineus, *L.*
Smilax hispida, *Muhl.*
Trillium grandiflorum, *Salisb.*
Polygonatum giganteum, *Diet.*
Uvularia sessilifolia, *L.*
Heteronthera reniformis, *R. and P.*
Eleocharis tuberculosa, *R. Br.*
Scleria pauciflora, *Muhl.*
Carex stricta, *Lam.*
C. Muhlenbergii, *Schk.*
C. cephalophora, *Muhl.*
C. Emmonsii, *Dew.*
C. Pennsylvanica, *Lam.*
C. tenera, *Dew.*
C. lagopodioides, *Schk.*
C. adusta, *Boott.*
C. granularis, *Muhl.*
C. gracillima, *Schw.*
C. cristata, *Schw.*
C. mirabilis, *Dew.*
C. virescens, *Muhl.*
C. vulpinoidea, *Mx.*
C. plantaginea, *Lam.*
C. laxiflora, *Lam.*
Zizania aquatica, *L.*
Stipa avenacea, *L.*
Aira flexuosa, *L.*

Bromus racemosus, *L.*
Poa trivialis, *L.*
Eragrostis pilosa, *Bv.*
Aspidium Boottii, *Tuckm.*
Osmunda cinnamomea, *L.*
Agaricus serotinus, *Schrad.*
A. æruginosus, *Curt.*
Agaricus sapidus, *Kalchb.*
Polyporus adustus, *Willd.*
P. hispidioides, *Pk.*
Trametes mollis, *Sommf.*
Corticium læve, *Pers.*
C. incarnatum, *Pers.*
C. lilacinofuscum, *B. and C.*

New to the Herbarium.

Malva crispa, *L.*
Tillæa simplex, *Nutt.*
Sedum acre, *L.*
Amarantus blitoides, *Wats.*
Sagittaria pusilla, *Nutt.*
Eragrostis Purshii, *Schrad.*
Agaricus alluviinus, *Pk.*
A. rubrotinctus, *Pk.*
A. albus, *Schæff.*
A. pascuus, *Pers.*
A. sinuatus, *Fr.*
A. fastibilis, *Fr.*
A. sulcatipes, *Pk.*
A. hærens, *Pk.*
A. tiliophilus, *Pk.*
A. nitidipes, *Pk.*
A. epimyces, *Pk.*
Hygrophorus fuligineus, *Frost.*
H. flavodiscus, *Frost.*
Marasmius salignus, *Pk.*
Polyporus immitis, *Pk.*
P. fraxinophilus, *Pk.*
Irpex crassus, *B. and C.*
I. mollis, *B. and C.*
Corticium effuscatum, *C. and E.*
Thelephora rosella, *Pk.*
Cyphella læta, *Fr.*
Phoma cucurbitale, *B. and C.*
Sphæropsis Caryæ, *C. and E.*
Discella hysteriella, *Pk.*
D. albomaculans, *Pk.*
Glœosporium fraxinea, *Pk.*
Septoria cannabina, *Pk.*
S. Sicyi, *Pk.*
Septoria Cirsii, *Niessl.*
S. Calystegiæ, *Sacc.*
S. musiva, *Pk.*
Phyllosticta Cratægi, *Pk.*
P. variabilis, *Pk.*
Protomyces macrosporus, *Ung.*
Ustilago pallida, *Schrœt.*
Acalyptospora Populi, *Pk.*
Macrosporium transversum, *Pk.*
Alternaria tenuis, *Nees.*
Ellisiella caudata, *Sacc.*
Botrytis ceratioides, *Pk.*
Dactylium dendroides, *Fr.*
Verticillium Lactarii, *Pk.*
Cercospora Tiliæ, *Pk.*
C. Lepidii, *Pk.*
C. Daturæ, *Pk.*
C. varia, *Pk.*
C. longispora, *Pk.*
Ramularia Vaccinii, *Pk.*
R. Ranunculi, *Pk.*
R. Hamamelidis, *Pk.*
R. aquatilis, *Pk.*
Asterophora Pezizæ, *Cd.*
Peziza lætiruba, *Cke.*
P. singularia, *Pk.*
Tympanis Nemopanthis, *Pk.*
Cenangium betulinum, *Pk.*
Triblidium clavæsporum, *Pk.*
Ascomyces deformans, *Berk.*
Gymnascella aurantiaca, *Pk.*
Valsa tomentella, *Pk.*
Sphærella fraxinea, *Pk.*
Venturia curviseta, *Pk.*

(2.)

CONTRIBUTORS AND THEIR CONTRIBUTIONS.

Mrs. L. A. Millington, Glens Falls N. Y.

Epilobium molle, *Torr.*

Miss M. Bowles Columbia, Tenn.

Polypodium incanum, *Pursh.*

C. D. Hill, Tunis, N. Y.

Calystegia Sepium, *L.*

J. F. Shoemaker, Luverne, Minn.

Oxybaphus nyctagineus, *Sweet.*

Charles E. Smith, Philadelphia, Penn.

Corema Conradii, *Torr.*

C. F. Cornelius, Willow Brook, N. Y.

Cynoglossum officinale, *L.*

Rev. Washington Rodman, Astoria, N. Y.

Agaricus Rodmani, *Pk.*

H. N. Johnson, Coeymans, N. Y.

Sagittaria pusilla, *Nutt.*
Thalictrum anemonoides, *Mx.*

W. C. Stevenson, Jr., Philadelphia, Pa.

Puccinia Myrrhis, *Schw.*

S. J. Bowman, Albany, N. Y.

Ranunculus multifidus, *Pursh.*

Hon. G. W. Clinton, Albany, N. Y.

Tillæa simplex, *Nutt.*
Amarantus blitoides. *Wats.*
Eragrostis poæoides, *Bv.*
E. Purshii, *Schrad.*

J. Howell, Arthur, Oregon.

Puccinia mirabilissima, *Pk.*
Dædalea vorax, *Hark.*
Berberis Aquifolium, *Pursh.*
Wood of Abies Douglassii.

S. B. Griswold, Albany, N. Y.

A flower of the Century plant, Agave Americana, *L.*

W. M. Canby, Wilmington, Del.

Tillæa simplex, *Nutt.*

W. Russell, Albany, N.Y.

A specimen of the Chinese "leechee nut."

E. L. Hankenson, Newark, N. Y.

Sedum reflexum, *L.*
Azolla Caroliniana, *Willd.*
Salix cordata x sericea.

Felix von Thumen, Vienna, Austria.

Agaricus geophyllus, *Sow.*
A. mitis, *Fr.*
A. sphinctrinus, *Fr.*
Polyporus cinnabarinus, *Jacq.*
P. pergamenus, *Fr.*
P. cuticularis, *Fr.*
Merulius molluscus, *Fr.*
Dædalea mollis, *Sommf.*
Craterellus sinuosus, *Fr.*
C. cornucopioides, *Fr.*
Thelephora sebacea, *Pers.*
T. fastidiosa, *Fr.*
Stereum lobatum, *Kze.*
Stereum sanguinolentum, *Fr.*
Corticium roseum, *Fr.*
C. radiosum, *Fr.*
C. Juniperina, *Karst.*
Hirneola Auricula-Judæ, *Berk.*
Clavaria fistulosa, *Fr.*
C. Kunzei, *Fr.*
C. cristata, *Holmsk.*
Pistillaria quisquilaris, *Fr.*
Typhula filiformis, *Fr.*
Tremella disciformis, *Fr.*
Geaster triplex, *Jungh.*
Mycogala parietinum, *Rost.*

Æcidium Lampsanæ, *Schultz.*
Æ. Thalictri, *Grev.*
Æ. Pastinaceæ, *Rost.*
Æ. Onosmatis, *Thum.*
Æ. Lithospermi, *Thum.*
Æ. Symphyti, *Thum.*
Æ. Ligustri, *Strauss.*
Æ. Orchidearum, *Desm.*
Æ. Xylostei, *Wallr.*
Æ. Frangulæ, *Schum.*
Æ. Tussilaginis, *Pers.*
Puccinia Oxyriæ, *Fckl.*
P. Asteris, *Schw.*
P. Anemones, *Pers.*
P. Wilcoxiana, *Thum.*
P. crassivertex, *Thum.*
P. Artemisiarum, *Duby.*
P. Brachypodii, *Fckl.*
P. Morthierii, *Kornick.*
P. Cirsii, *Lasch.*
Urocystis primulicola, *Magn.*
Synchytrium Taraxaci, *DeBy.*
Ceratitium Oxyacanthæ, *Desm.*
C. laceratum, *Sow.*
Uredo cancellàta, *D. and M.*
U alpestris, *Schroet.*
U. Iridis, *Duby.*
U. digitariæcola, *Thum.*
Coleosporium ochraceum, *Bon.*
C. Campanulacearum, *Fr.*
Uromyces Cacaliæ, *Lev.*
U. Lathyri, *Fckl.*
U. Iridis, *Lev.*
Cronartium ribicola, *Dictr.*
Melampsora Euphorbiæ, *Castr.*
M. Balsamiferæ, *Thum.*
M. Lini, *Tul.*
Podosphaeria biuncinata, *C. and P.*
P. Kunzei, *Lev.*
Uncinula flexuosa, *Pk.*
U. macrospora, *Pk.*
U circinata, *C. and P.*
Calocladia penicillata, *Lev.*
Microsphaeria Viburni, *Schw.*
Erysiphe Martii, *Lev.*
E. lamprocarpa, *Lev.*
Phyllactinia guttata, *Lev.*
Sphaerotheca Castagnei, *Lev.*
S. Niesslii, *Thum.*
Stigmatea Chætomium, *Fr.*
S. confertissima, *Fckl.*
Capnodium pelliculosum, *B. and Br.*
Ceratostoma spurium, *Fr.*
Massaria fœdans, *Fr.*
M. inquinans, *Tul.*
Epichloe typhina, *Tul.*
Cryptospora nigro-annulata, *Rehm.*
Phyllachora Ulmi, *Fckl.*
Ascomyces Quercus, *Cke.*
A. cœrulescens, *Mu.*
A. alutaceus, *Thum.*
Exoascus Alni, *Fckl.*
E. Betulæ, *Fckl.*
Botryosphaeria Berengeriana, *DeNott.*
Calosphaeria tumidula, *Sacc.*
Anthostomella Yuccæ, *Thum.*
Zignoella punctiformis, *Sacc.*
Rœsleria hypogaea, *P. and T.*
Gibberella pulicaris, *Sacc.*
Coleroa Alchemillæ, *Fr.*
Ombrophila Mortheriana, *Rehm*
Bulgaria inquinans, *Fr.*
Durella macrospora, *Fckl.*
Mollisia excelsior, *Karst.*
Helotium scutula, *Karst.*
H. stigmarion, *Rehm.*
Peziza striata, *Nees.*
P. flavofuliginea, *A. and S.*
P. carpinea, *Fr.*
Hypoderma Lauri, *Duby.*
Lophium decipiens, *Karst.*
Lophodermium petiolicolum, *Fckl.*
Gnomonia errabunda, *Awd.*
Phelonitis strobilina, *Fr.*
Cladosporium fasciculare. *Fr.*
C. Martianoffianum, *Thum.*
C. diaphanum, *Thum.*
C. ampelinum, *Pass.*
Cercospora beticola, *Sacc.*
C. Solani, *Thum.*
C. Smilacis, *Thum.*
C. Thalictri, *Thum.*
C. acerina, *Hart.*
C. persica, *Sacc.*
C. Rhamni, *Fckl.*
C. Bupleuri, *Pass.*
Triposporium Juglandis, *Thum.*
Macrosporium Ravenelii, *Thum.*
M. diversisporium, *Thum.*
Fusicladium Aronici, *Sacc.*
F. dendriticum, *Wallr.*
F. orbiculatum, *Thum.*
F. pyrinum, *Bon.*
Dendryphium curtum, *B. & Br.*
Sporidesmium Macluræ. *Thum.*
Ramularia Hellebori, *Fckl.*
R. didyma, *Ung.*
R. Nemopanthis, *C. & P.*
Sporotrichum pulviniforme, *Thum.*
Isaria farinosa, *Fr.*
Fusisporium Buxi, *Fr.*
F. lacteum, *Desm.*
F. chenopodinum, *Thum.*
Cystispora foliicola, *Lib.*
C. Therryana, *Thum.*
Sphacelia segetum, *Lev.*
Glœosporium filicinum, *Rost.*
G. Sibiricum, *Thum.*
G. ampelophagum, *Sacc.*
G. affine, *Sacc.*
G. Robergei, *Desm.*
G. Pisi, *Oud*
G. paradoxum, *Sacc.*
G. sphaerelloides, *Sacc.*
Pestalozzia Planimi, *Vize.*
P. Acaciæ, *Thum.*
P. lignicola, *Cke.*
Diplodia carpinea, *Thum.*

Diplodia Incarvilleæ, *Thum.*
D. Henriquesii, *Thum.*
D. Molleriana, *Thum.*
D. fœniculina, *Thum.*
D. radiciperda, *Thum.*
Dothichiza Sorbi, *Lib.*
Micropera Pinastri, *Sacc.*
Phoma negundicola, *Thum.*
Aposphæria suffulta, *Thum.*
Asteromella vulgaris, *Thum.*
Phyllosticta Bolleana, *Thum.*
P. nuptialis, *Thum.*
Ascochyta Lactucæ, *Rostr.*
Septoria æsculina, *Thum.*
S. leguminum, *Desm.*
Myxosporium colliculosum, *Berk.*
Hendersonia Foueroyæ, *Thum.*
Henriquesia lusitanica, *P. & T.*
Heliscus Lugdunensis, *S. & T.*
Helminthosporium turcicum, *Pass.*
Fusarium globulosulum, *Pass.*
Fusidium stachydis, *Pass.*
Epidochium ambiens, *Desm.*
Botrytis cinerea, *Pers.*
Exosporium Rubi, *Nees.*
Penicillium glaucum, *Lk.*
Passalora bacilligera, *Fr.*
Stachybotrys lobulata, *Berk.*
Septosporium curvatum, *Rabh.*
Coniothecium didymum, *D. & M.*
C. Mollerianum, *Thum.*
Hydnum amicum, *Quel.*
H. septentrionale, *Fr.*
Irpex paradoxus, *Fr.*
Microcrassus candidus, *Cohn.*
Ectostroma Mulgedii, *Thum.*
E. Macluræ, *Thum.*

Prof. W. R. Dudley, Ithaca, N. Y.

Sisymbrium canescens, *Nutt.*
Draba arabisans, *Mx*
Alyssum calycinum, *L.*
Hypericum Canadense, *L.*
Dianthus Armeria, *L.*
Trifolium hybridum, *L.*
Lespedeza Stuvei, *Nutt.*
Prunus pumila, *L.*
Poterium Canadense, *Gr.*
Agrimonia parviflora, *Ait.*
Rubus neglectus, *Pk.*
Cratægus coc. v. macracantha,
Potentilla recta, *Willd.*
P. fruticosa, *L.*
P. palustris, *Scop.*
Saxifraga aizoides, *L.*
Chærophyllum procumbens, *Lam.*
Lonicera hirsuta, *Eaton.*
L. oblongifolia, *Muhl.*
L. Xylosteum, *L.*
L. Tartarica, *L.*
Scabiosa australis, *Wulf.*
Tragopogon pratensis, *L.*
Polymnia Uvedalia, *L.*
Coreopsis discoidea, *T. & G.*
Pyrola sec. v. pumila, *Paine.*
Moneses uniflora, *Gr.*
Gerardia purpurea, *L.*
Lobelia Kalmii, *L.*
Calamintha acinos, *Clærv*
Onosmodium Carolinianum, *D. C.*
Amarantus blitoides, *Wats.*
Rumex Brittanica, *L.*
Quercus Muhlenbergii, *Engelm.*
Myrica Gale, *L.*
Naias major, *All.*
Sagittaria variabilis, *Engelm.*
Aplectrum hyemale, *Nutt.*
Spiranthes Romanzoviana, *Chapm.*
Iris pseudacorus, *L.*
Juncus alp. v. insignis, *Fr.*
Elocharis rostellata, *Torr.*
Scirpus Smithii, *Gr.*
S. planifolius, *Muhl.*
S. pauciflorus, *Lightf*
Carex Steudelli, *Kunth.*
C. tetanica, *Schk.*
C. Grayii, *Carey.*
C. hirta, *L.*
C. flaccosperma, *Dew.*
C. Hitchcockiana, *Dew.*
Oryzopsis Canadensis, *Torr.*
Aira cæspitosa, *L.*
Panicum virgatum, *L.*
P. hispidum, *Muhl.*
Eragrostis capillaris, *Nees.*
Botrychium simplex, *Hitch.*
B. matricariæfolium, *Braun.*
Ophioglossum vulgatum, *L.*
Isoetes Engel. v. gracilis, *Engelm.*
Azolla Caroliniana, *Willd.*

Clarence Lown, Poughkeepsie, N. Y.

Cheilanthes vestita, *Sw.*
Asplenium ebenoides, *Scott.*
Asplenium Bradleyi, *D. C. Eaton.*

(3.)

NEW STATIONS, REMARKS AND OBSERVATIONS.

The first thirteen species noticed are new to the Herbarium, the first eleven have not before been reported.

SISYMBRIUM CANESCENS, *Nutt.*

Watkins Glen, Schuyler county. *Professor W. R. Dudley.* In the manual, this plant is reported to have been found at Lucifer Falls, Tompkins county, by J. W. Chickering, but Prof. Dudley writes that he has searched for it in vain in that locality.

MALVA CRISPA, *L.*

Roadside, Petersburgh, Rensselaer county. Escaped from gardens and sparingly naturalized.

LYCHNIS DIURNA, *L.*

With the preceding species. Also escaped from gardens and door-yards.

LONICERA XYLOSTEUM, *L.*

South Hill near Ithaca. A single shrub was found growing in a pasture where there was an abundance of *Lonicera Tartarica,* L. *Dudley.* Both species have also been introduced about Albany where the latter also takes the lead in establishing itself.

SCABIOSA AUSTRALIS, *Wulf.*

Established about Union Springs, Cayuga county. *Dudley.*

CALAMINTHA ACINOS, *Clærv.*

Roadsides near Ithaca. Introduced. *Dudley.*

AMARANTUS BLITOIDES, *Wats.*

About Albany. *G. W. Clinton.* Union Springs and Frontenac Island, Cayuga lake. *Dudley.* Introduced from the West. In its foliage it resembles the very common *Amarantus albus,* but it has long prostrate spreading stems and branches and much larger seeds than that species.

IRIS PSEUDACORUS, *L.*

Near Ithaca. Also established in two localities in alluvial soil near Cayuga lake. *Dudley.*

CAREX HIRTA, *L.*

South Hill, Ithaca. Near the Delaware, Lackawana and Western railroad and apparently introduced. *Dudley.*

CAREX FLACCOSPERMA, *Dew.*

South Hill, Ithaca. *Dudley.* A stout form of *Carex laxiflora* var. *intermedia* sometimes occurs about Albany, which resembles this species in general aspect but it is readily distinguished from it by its much longer scales and different perigynia.

ASPLENIUM EBENOIDES, *R. R. Scott.*

Near Saugerties, Ulster county. Growing on limestone rocks in company with the walking fern, *Camptosorus rhizophyllus. C. Lown.* Mr. Lown had previously found a few specimens of this extremely rare fern about four miles south-east of Poughkeepsie. In this case as in all others it was associated with *Camptosorus rhizophyllus* and *Asplenium ebeneum,* the three growing within a foot of each other. In the Saugerties locality the *Asplenium ebeneum,* though present, was several feet distant.

SEDUM ACRE, *L.*

Roadside, Petersburgh. Escaped from cultivation and sparingly naturalized.

SAGITTARIA PUSILLA, *Nutt.*

In the New York Flora this species is recorded as occurring on "muddy banks of the Hudson where the water is brackish, as at West Point and Peekskill." The habitat attributed to it in the Manual is, "inundated shores, from eastern New Jersey and Philadelphia southward near the coast." It was recently detected by *Mr. H. N. Johnson* along the river shore at Coeymans, a few miles below Albany. This is a long distance from the usual stations of the plant and far above the reach of brackish water.

THALICTRUM ANEMONOIDES, *Mx.*

Coeymans. *Johnson.* This species manifests a strong disposition to produce double flowers. A few years ago Mr. Johnson took some of the plants from their native habitat and set them in his garden. The past season they developed double flowers. The exterior sepals are green and bract-like, but the inner, which are numerous, are white and petal-like. No stamens exist in any of the flowers and no pistils in some, thus indicating that the stamens have been transformed into petals.

ALYSSUM CALYCINUM, *L.*

University grounds, Ithaca. Introduced. *Dudley.*

DRABA ARABISANS, *Mx.*

Esty Glen and shore of Cayuga lake. *Dudley.*

LEPIDIUM CAMPESTRE, *L.*

Near Ithaca. *Dudley.* Also near Coeymans and rapidly spreading over the State.

LESPEDEZA STUVEI, *Nutt.*

Ithaca. *Dudley.*

RUBUS NEGLECTUS, *Pk.*

West shore of Cayuga lake. *Dudley.*

POTENTILLA RECTA, *Willd.*

Near Moravia. *Dudley.*

AGRIMONIA PARVIFLORA, *Ait.*

Freeville and Danby, Tompkins county. *Dudley.*

CRATÆGUS COCCINEA var. MACRACANTHA.

College campus, Ithaca and Union Springs. The thorns on the specimens are four to four and a half inches long.

PRUNUS PUMILA, *L.*

South Hill, Ithaca. *Dudley.* Some of the fruit is swollen into a pale, soft body, ovate or obovate in form and pointed at the apex. This is the result of an attack by a fungus, *Exoascus Pruni,* Fckl. This fungus also attacks the fruit of the wild plum, *Prunus Americana,* Marshall. I have also seen the fruit of our wild black cherry, *Prunus serotina,* swollen in a similar manner but the cause in this case was from an attack of an insect, the larvæ of which were found in the affected fruit.

SEDUM REFLEXUM, *L.*

Thoroughly established by the roadside near Newark, Wayne county. *E. L. Hankenson.*

EPILOBIUM MOLLE, *Torr.*

Sphagnous marsh in "Cheney's woods," near Glens Falls. *Mrs. L. A. Millington.* The specimens sent are young plants and they show at the base a dense cluster of very small thick subterranean scale-like leaves, which might easily be mistaken for a cluster of small tubers. They are arranged in pairs on opposite sides of the stem, as are the leaves, and they appear whitish, thick and starchy like cotyledonous leaves. Their office is apparently similar to that of cotyledonous leaves, that is, to store up nutriment upon which the plant can draw at some subsequent period of its existence. They do not appear upon the base of old plants or those which have flowered and fruited. They are also found at the base of young plants of *Epilobium palustre.*

LONICERA OBLONGIFOLIA, *Muhl.*

Michigan Hollow, near Danby. *Dudley.*

SAXIFRAGA AIZOIDES, *L.*

Cliffs of Taghanic ravine, near Ithaca, growing with *Primula Mistassinica* and *Pinguicula vulgaris. Dudley.*

CHÆROPHYLLUM PROCUMBENS, *Lam.*

In "Negundo woods," near Ithaca. *Dudley.*

MITCHELLA REPENS, *L.*

Near Moravia. *M. F. Merchant,* M. D. This is the form that produces white berries, concerning which Dr. Merchant writes, "I have observed them quite closely for nearly three years and have watched their flowering two seasons and their fruiting three. The flowers are not dimorphous in this patch, but are all of one form, all having long exserted stamens and short pistils. The fruit is copious and without any tendency to change or approach the red-fruited form. The plants are thrifty and spreading and there are none of the red-fruited plants in the immediate vicinity."

COREOPSIS DISCOIDEA, *T. & G.*

Shores of Dryden lake. *Dudley.*

LOBELIA KALMII, *L.*

Farley's Point, Cayuga lake, growing along the shores and in meadows. A variety with stout stem and large flowers. *Dudley.*

PYROLA SECUNDA var. PUMILA, *Paine.*

Deep moss in a fir-tree swamp near Freeville. *Dudley.*

CALYSTEGIA SEPIUM, *L.*

Tunis, Lewis county. *C. D. Hill.* The specimen differs from the ordinary form of the plant in having the stem pubescent, the leaves narrow and the flower tube very short. The flowers appear as if they were double, but in their dried and pressed condition this appearance may be deceptive.

RUMEX BRITANNICA, *L.*

Shores of Owasco lake inlet. *Dudley.*

COREMA CONRADII, *Torr.*

Shawangunk mountains, Ulster county. *C. E. Smith.* Long Island is the only locality in the State from which this pretty little evergreen heath-like shrub has previously been reported. Judging from the localities usually ascribed to it in the manuals, this new station is much farther inland than the plant usually occurs. Its presence here gives an additional botanical interest to the Shawangunk mountains which have already furnished several very rare and interesting species of plants.

QUERCUS MUHLENBERGII, *Engelm.* (*Q. castanea*, Muhl.)

"Big Gully" near Union Springs. *Dudley.* This is the *Q. Prinus* var. *acuminata* of the Manual, *Q. acuminata*, Mx., but it is regarded by Dr. Engelmann as quite distinct from *Q. Prinus*. It is a rare species in our State, its proper home being, according to Dr. Engelmann, in the Mississippi valley. In the New York Flora it is attributed to Chemung county on the authority of Dr. Knieskern. There are two forms of it; one having lanceolate narrow leaves, five to six inches long and one and a half to two inches broad, with acuminate apex and sharp teeth; the other having broadly ovate or obovate leaves, six or seven inches long and four or five inches broad, with broader and more rounded teeth. Our specimens belong to the narrow-leaved form.

MYRICA GALE, *L.*

Locke pond, Cayuga county. *Dudley.*

SAGITTARIA VARIABILIS var. HASTATA, *Engelm.*

Summit marsh, Spencer, Tioga county. *Dudley.* The specimen shows long linear and lanceolate phyllodia; also stolons giving rise to young plants. The variations in this well-named Sagittaria are exceedingly numerous. Specimens collected at Coeymans have the leaves of variety *latifolia*, but all the flowers staminate on some plants, thus passing to the diœcious inflorescence of variety *obtusa*. Specimens of variety *gracilis* from the same place have, in some cases, all the leaves without lobes, in others some leaves are lobed, others, lobeless. A specimen of this variety from Long lake has the fruiting heads almost sessile, as in *S. heterophylla*. Specimens of variety *hastata* and variety *angustifolia* also sometimes occur with diœcious inflorescence.

NAIAS MAJOR, *All.*

Foot of Cayuga lake. A slender form with long internodes and long narrow leaves. Black lake, a shallow pond four miles below Cayuga lake. A short, stout, dark or purplish-colored leafy form with dichotomous recurved habit and slightly curved and more distinctly reticulated fruit. *Dudley.*

APLECTRUM HYEMALE, *Nutt.*

West Dryden. *Dudley.*

SCIRPUS SMITHII, *Gr.*

Shore of Cayuga lake, near Union Springs. *Dudley.*

CAREX STEUDELII, *Kunth.*

Six-mile creek, near Ithaca. *Dudley.*

ERAGROSTIS PURSHII, *Schrad.*

Waste places about Albany. *Clinton.* This southern grass is rapidly extending its range northward. Last year it was reported from Yonkers, this year it appears to be well established at Albany. It appears, like many other introduced plants, to follow the lines of the railroads which are a powerful agency in extending the distribution and range of species and in intermingling the floras of different localities. This grass closely resembles its congener, *E. pilosa,* from which it is most readily distinguished by the naked axils of its panicle.

ERAGROSTIS CAPILLARIS, *Nees.*

Ithaca. *Dudley.* A dwarf form three or four inches high.

CHEILANTHES VESTITA, *Sw.*

Two miles below Poughkeepsie on the east side of the river. It occurs also on the west side of the river, but in blasting the rocks for the West Shore railroad, its station may have been destroyed. *C. Lown.*

ASPLENIUM BRADLEYI, *D. C. Eaton.*

Shawangunk mountains, Ulster county. *Lown*

BOTRYCHIUM SIMPLEX, *Hitch.*

Danby. *Dudley.* The specimens are well developed and belong to the varieties *incisum* and *subcompositum.*

BOTRYCHIUM MATRICARIÆFOLIUM, *A. Braun.*

McLean, Tompkins county. *Dudley.* Both these species and the more rare *B. lanceolatum,* Angst., occur in Petersburgh, Rensselaer county, growing together.

ISOETES ENGLEMANNI var. GRACILIS, *Engelm.*

Locke pond. *Dudley.*

AZOLLA CAROLINIANA, *Willd.*

Foot of Cayuga lake. *Dudley.* Sodus bay. *Hankenson.* The Cayuga lake specimens are much more dense and compact in habit than the Sodus bay specimens.

(4.)

NEW YORK SPECIES OF PSALLIOTA.

"Stem annulate, distinct from the hymenophorum; lamellæ free." *Hymen, Europ.*, p. 278.

The name of the subgenus Psalliota is derived from the Greek word Ψαλλιον (Ψελλιον), a bracelet or armlet. Its application to these Agarics was probably suggested by the annulus or ring which encircles the stem. The species of this subgenus correspond in structure to those of the subgenus Lepiota in the Leucospori or white-spore series and to those of the subgenus Annularia in the Hyporhodii or pink-spore series. The tendency of the flesh in some species of Psalliota to change color when cut or bruised corresponds also to a similar tendency in some of the Lepiotæ. No corresponding subgenus has yet been established in the Dermini or ochraceous-spore series, nor in the Coprinarii or black-spore series. The Agarics belonging to the subgenus Psalliota are generally of medium or large size and rather attractive in appearance until the lamellæ have assumed the blackish color of age. They are most abundant in late summer or autumn, but in warm wet weather some of them occur early in the season also. The pileus is more or less fleshy but usually rather brittle or easily broken. It may be either smooth, fibrillose or scaly. Sometimes even individuals of the same species exhibit pilei with all these characters. The fibrillose pileus of a young individual may become either smooth or scaly with age. No species having a viscid pileus appears yet to have occurred either in our State or in Europe, though an Ohio species *A. fabaceus*, Berk., is described as having the pileus viscid when moist. The lamellæ are generally close or crowded and rounded at their inner extremity and not attached to the stem. They change color with advancing age, becoming darker as they grow older. This change of color is in great measure due to the development of the spores which cause the lamellæ to assume their own brown or blackish-brown hue. The lamellæ of young plants are generally whitish or pallid, changing in some species, directly from this color to the brown color of maturity, and in others, assuming an intervening pinkish rosy or reddish hue before taking on the final dark or sombre color. The exceptional *A. fabaceus* is described as having the lamellæ brown even in the young plant, but even in this case they are said to become darker with age. In the common mushroom, *A. campestris*, they may become moist or subdeliquescent when old, thus indicating a relationship with the inky species of the genus Coprinus. The stem is fleshy and furnished with an annulus or ring, which in some species varies in its degree of development, and in others is more or less thin and somewhat evanescent. The spores in our species are quite small, elliptical or subelliptical in outline and do not vary greatly in dimensions in the different species.

Fries groups the European species in two sections which he names "Edules," and "Minores." The former group includes the larger and more fleshy species. Several of them are edible and have long been used as an article of food. No representatives of the "Minores" have yet been found in our State. Of the "Edules" we have several species which may again be divided into two sub-groups depending on their usual habitats. Those which grow in open places, manured grounds or cultivated fields generally have a thicker, firmer pileus and a comparatively shorter stouter stem than those that grow in copses groves and woods. It is among these especially that the most notable succulent "mushrooms" are found.

SYNOPTICAL TABLE OF THE SPECIES.

Growing in fields, open places or cultivated grounds	2
2. Lamellæ at first whitish or pallid.....	3
2. Lamellæ at first pinkish or flesh colored.................	A. campestris.
3. Lamellæ narrow, stem solid	A. Rodmani.
3. Lamellæ broader, stem stuffed or hollow...........	A. arvensis.
1. Growing in woods, copses or groves........................	4
4. Stem bulbous	5
4. Stem not bulbous	6
5. Pileus smooth....................................	A. silvicola.
5. Pileus squamulose................................	A. placomyces.
6. Pileus two inches or more in diameter.........	A. silvaticus.
6. Pileus less than two inches in diameter	A. diminutivus.

AGARICUS CAMPESTRIS, *L.*

Common Mushroom. Edible Mushroom. Field Agaric.

Pileus at first hemispherical or convex, then expanded with decurved margin or nearly plane, smooth silky floccose or hairy squamulose, the margin extending beyond the lamellæ, the flesh rather thick, firm, white; lamellæ free, close, ventricose, *at first delicate pink or flesh color,* then blackish-brown, *subdeliquescent;* stem equal or slightly thickened toward the base, *stuffed,* white or whitish, nearly or quite smooth; annulus at or near the middle, more or less lacerated, sometimes evanescent; spores elliptical, .00025 to .0003 in. long, .00016 to 0002 in. broad.

Plant 2 to 4 in. high, pileus 1.5 to 4 in. or more broad, stem 4 to 8 lines thick.

Fields, pastures, manured grounds, mushroom beds, etc.

This is the well-known "edible mushroom," a species which is more extensively cultivated and more generally used as food than any other. With proper attention to its characteristic features there is no need of its being mistaken for or confused with any deleterious or poisonous species.

The pileus is nearly always regular in shape, rather thick and moderately firm, hemispherical or convex when young but usually becoming more flattened or nearly plane with age.

In its young state it is adorned with fine silky or hairy fibrils which sometimes, with advancing age, form minute persistent tufts or scales and sometimes disappear altogether, leaving the surface quite smooth. The decurved margin usually extends a little beyond the extremity of the lamellæ. The cuticle or skin is more or less readily separable from the flesh, which is white, but sometimes manifests a tendency to change color slightly when cut or bruised, and to exhibit pinkish or reddish stains. The color of the pileus in the wild form is usually white or whitish with us, but in the cultivated forms it is often ochrey-brown or pale tawny, and varieties sometimes occur in which it is brown.

The lamellæ have a very beautiful and delicate pinkish hue which is apparent as soon as they are exposed to the light by the separation of the concealing veil from the margin of the pileus. This color gradually becomes darker with advancing age until it finally changes to a dark brown or almost black hue. This character is one of the best by which to distinguish the "edible mushroom" from all other Agarics, except its nearest allies, *A. Rodmani* and *A. arvensis*. And even from these, when young, it may readily be distinguished by the primary color of its lamellæ. The subgenera Annularia and Pluteus in the pink-spore series contain species the lamellæ of which exhibit similar pinkish colors, but these never change to brown or blackish-brown as the plant matures or becomes old. In the mushroom the lamellæ are rounded at their inner extremity and not attached to the stem, so that generally in mature specimens there is a small free space between it and them.

The stem is commonly short in proportion to the breadth of the pileus, its length being, in most cases, less than the horizontal diameter of the pileus. Ordinarily it is cylindrical in shape, though now and then instances occur in which it may either be slightly thickened or slightly narrowed toward the base. The central portion of the stem is a little softer in texture than the external portion, hence it is said to be stuffed. The annulus encircles it at or near the middle. It is sometimes quite thin and flabby and is then easily torn and destroyed.

The mushroom, like many other plants which have been the subject of long and extensive cultivation, has given rise to several forms which exhibit quite marked distinctive features. These forms differ so much from the original typical form that they have received distinguishing names and are called varieties. The following are the principal ones.

Var. *albus.* White variety. Pileus smooth or slightly silky-fibrillose, white or whitish, stem short.

This is our most common variety. It occurs in unfrequented streets, waste places, cultivated grounds and especially in rich pastures where the grass is kept short. It usually appears in August and September, but sometimes in warm, wet weather it is found early in the season. A very large form with the pileus six or seven inches broad sometimes occurs.

Var. *praticola.* Meadow variety. (A. praticola, *Vitt.*) (A. pratensis, *Handbook.*) Pileus adorned with reddish scales, flesh somewhat tinged with pink. This variety must be uncommon with us. I have seen no examples of it, nor of the three following varieties:

Var. *umbrinus.* Brown variety. Pileus smooth, brown; stem stout and minutely scaly.

Var. *rufescens.* Reddish variety. Pileus reddish, minutely scaly; lamellæ at first white; stem elongated; flesh turning bright red when cut or bruised. This departs so decidedly from the ordinary characters of the type, especially in the white color of the young lamellæ, that it seems to merit separation as a distinct species.

Var. *villaticus.* Villa variety. (A. villaticus, *Brond.*) Plant large, pileus scaly; stem scaly, coated or subvolvate by the inferior veil. In the Handbook of British Fungi this is placed as a variety of *A. arvensis,* but most authors regard it as a variety of *A. campestris.*

Var. *hortensis.* Garden variety. Pileus brownish or ochrey-brown, bearing hairy fibrils or minute scales. This is often cultivated and is occasionally exposed for sale in the markets of Albany.

Var. *Buchanani.* Buchanan's variety. Pileus white, smooth, depressed in the center, the margin naked; stem stout; annulus thin, lacerated. A rare variety sometimes occurring in mushroom beds.

Var. *elongatus.* Long-stem variety. Pileus small, smooth, convex, the margin adorned with the adherent remains of the lacerated veil; stem long, slender, slightly thickened toward the base; annulus slight or evanescent. This is also a variety of mushroom beds.

Var. *vaporarius.* Green-house variety. (A. vaporarius, *Vitt.*) Pileus brownish, coated with long hairs or fibrils; stem hairy-fibrillose, becoming transversely scaly. Conservatories, cellars, etc. Not differing greatly from Var. *hortensis.*

AGARICUS RODMANI, *Pk.*

Rodman's Mushroom.

Pileus rather thick, firm, at first convex, then nearly or quite plane, with decurved margin, smooth or rarely slightly rimose-squamose on the disk, white or whitish, becoming yellowish or subochraceous on the disk, the flesh white, unchangeable ; lamellæ close, *narrow,* rounded behind, free, reaching nearly or quite to the stem *at first whitish, then pink or reddish-pink,* finally blackish-brown ; stem short, subequal, *solid,* whitish, smooth below the annulus, often furfuraceous or slightly mealy-squamulose above ; annulus variable, thick or thin, entire or lacerated, at or below the middle of the stem ; spores broadly elliptical or subglobose, generally uninucleate, .0002 to .00025 in. long, .00016 to .0002 in. broad.

Plant 2 to 3 in. high ; pileus 2 to 4 in. broad ; stem 6 to 10 lines thick.

Grassy ground and paved gutters. Astoria, Long Island. *Rev. W. Rodman.* Washington Park, Albany. May to July.

This species is intermediate between *A. campestris* and *A. arvensis,* from both of which it may be distinguished by its narrow lamellæ, solid stem and smaller, almost globose, spores. In size, shape of the pileus and general appearance it most resembles *A. campestris,* but in the whitish primary color of the lamellæ and in the yellowish tints which the pileus often assumes, it approaches nearer to *A. arvensis.* The pileus, which is usually smooth, occasionally manifests a tendency to crack into small areas or scales on the disk. The flesh is quite thick and firm, its thickness generally much exceeding the breadth of the lamellæ. This character, together with the solidity of the stem, indicates a disposition in the species to produce flesh rather than fruit and may make it more desirable for cultivation than the common mushroom. The length of the stem, in all the specimens I have seen, is less than the breadth of the pileus. Its shape is nearly cylindrical. The annulus is generally rather thick and sometimes projects both above and below in such a manner that it appears like a grooved band or collar surrounding the stem. In some instances it is so near the base that it suggests the idea of a volva. Its lower or exterior surface is occasionally rimose, thereby indicating another point of resemblance between this species and *A. arvensis.* In this respect, as well as in its solid stem and narrow lamellæ, it also approaches *A. augustus,* a large and showy European species which has not yet occurred with us, but which may be known by its lamellæ changing at once from the pallid color of immaturity to the dark-brown hue of age, without exhibiting any intervening pinkish tints.

The species is respectfully dedicated to its discoverer. Its edible qualities are deemed equal to those of the common edible mushroom. It has been tested by Mr. G. Rodman. It is apparently a rare species, but may be more common than is supposed, for it may possibly have been heretofore confused with the common mushroom, which it much resembles in color, the pileus being at first white or whitish, although it soon assumes yellowish tints or becomes a pale ochrey-red or russet color on the disk.

AGARICUS ARVENSIS, *Schæff.*

Horse Mushroom. Plowed-land Mushroom.

Pileus at first convex or conical-campanulate, then expanded, at first more or less floccose or mealy, then smooth, white or yellowish, flesh white; lamellæ close, free, generally broader anteriorly, *at first whitish, then pinkish,* finally blackish-brown; stem equal or slightly thickened toward the base, smooth, *hollow or stuffed* with a floccose pith; annulus rather large, thick, the lower or exterior surface often cracked in a radiate manner; spores elliptical, .0003 to .0004 in. long, .0002 to .00025 in. broad.

Plant 2 to 5 in. high; pileus 3 to 5 in. or more broad; stem 4 to 10 lines thick.

Cultivated fields and pastures. Summer and autumn.

This species is so closely related to the common mushroom that it is regarded by some authors as a mere variety of it. Even the renowned Persoon is said to have written concerning it, "It appears to be only a variety of *A. campestris.*" Cordier says of it, "Distinguished from *A. campestris* by its pure white color, more pale lamellæ, its white flesh not changing color when cut or bruised, its lamellæ remaining pale a long time and not deliquescing." Fries also says that it is commonly not distinguished from *A. campestris,* but that it is diverse in some respects; its white flesh being unchangeable, its lamellæ never deliquescing, remaining a long time pale and not becoming dark red in middle age. Berkeley says of it, "A coarse, but wholesome species, often turning yellow when bruised."

In size the horse mushroom often exceeds the common mushroom, its pileus, according to the Handbook, sometimes attaining a breadth of eighteen inches and its stem a thickness of one to two inches. The white color of the pileus often becomes tinged with yellow, either with age or in drying. The pale primary color of the lamellæ, the thick, well-developed annulus and the hollow stem are available features for distinguishing it from its close allies. It is less common with us than *A. campestris,* to which in edible qualities it is very similar. A. Georgii, *Sow.*, A. pratensis, *Scop.*, A. edulis, *Krombh.*, and A. exquisitus, *Vitt.*, are synonyms.

AGARICUS SILVICOLA, *Vitt.*

Silvan Mushroom.

Pileus convex or subcampanulate, sometimes expanded or nearly plane, *smooth, shining,* white or yellowish ; lamellæ close, thin, free, rounded behind, generally narrowed toward each end, *at first whitish, then pinkish,* finally blackish-brown ; *stem long,* cylindrical, stuffed or hollow, white, *bulbous ;* annulus either thick or thin, entire or lacerated ; spores elliptical, .00025 to .00032 in. long, .00016 to .0002 in. broad.

Plant 4 to 6 in. high; pileus 3 to 6 in. broad; stem 4 to 8 lines thick.

Woods, copses and groves or along their borders. Summer and autumn.

Many authors place this as a variety of *A. campestris,* but as it occurs with us its characters are very constant and well marked and enable it to be distinguished from that species with great facility. It generally attains a larger size, has a smoother, more shining pileus, which is usually tinged with yellow, it has the primary color of the lamellæ whitish, and its stem is longer and proportionately more slender and distinctly bulbous. It has, as Fries suggests, more points of resemblance to *A. arvensis* than to *A. campestris,* but its bulbous stem at once separates it from that species. The bulb is peculiar, it being small but very abrupt and depressed or flattened like a common turnip. The pileus is thin in proportion to its breadth and is quite fragile, so that the plants must be handled with care to prevent its being broken. In mature plants the margin of the pileus sometimes has a lurid or dull purplish tint, which is probably derived from the color of the spores.

The annulus is often tinged with yellow exteriorly and is sometimes radiately rimose on the lower surface like that of *A. arvensis.* In some instances fragments of it remain attached to the margin of the pileus. The plants sometimes grow in close groups or tuft-like clusters. *A. edulis,* Berk., is given as a synonym.

It is reported to be esculent, but I have not tested it. Persons unacquainted with it should guard against confounding immature specimens of it with the white forms of the phalloid agaric, *A. phalloides,* a poisonous species which grows in similar places and bears some resemblance to it. The poisonous *A. phalloides* has a much larger bulb to the stem and the lamellæ remain permanently white or whitish, showing at no age either the pinkish or blackish-brown hues which are so conspicuous in *A. silvicola.*

AGARICUS PLACOMYCES, *Pk.*

Flat-cap Agaric.

Pileus fleshy but rather thin, at first convex or campanulate, then expanded and quite plane, *squamulose,* whitish, *the disc and minute scales brown ;* lamellæ close, free, *white, then pinkish,* finally blackish-brown; stem smooth, stuffed with a small pith slightly tapering upward, *bulbous,* whitish, the bulb stained with yellow and usually giving rise to one or two mycelioid white root-like processes; annulus large, flabby; spores elliptical, .0002 to .00025 in. long, .00016 to .00018 in. broad.

Plant 3 to 5 in. high, pileus 2 to 4 in. broad, stem 2 to 4 lines thick.

Under hemlock trees. Oneida and Knowersville. July.

This rare but beautiful Agaric is easily distinguished from its allies by the bulbous stem and the perfectly flat white surface of the expanded pileus finely adorned by numerous minute brown scales. These scales are confluent on the disk where they form a brown spot, thus imitating in appearance many species of the subgenus Lepiota. Sometimes faint radiating striæ extend from the disk to the margin of the pileus. In damp weather the large thin annulus is sometimes studded with drops of moisture of a dark color. Nothing is known concerning the edible qualities of the species. The specific name is derived from two Greek words, *πλακους*, a flat cake, and *μυκης*, a fungus, and has reference to the very flat horizontally expanded pileus.

AGARICUS SILVATICUS, *Schæff.*

Wood Agaric.

Pileus thin, at first convex or campanulate, then expanded, *gibbous or subumbonate,* fibrillose or variegated with a few thin tawny brownish or reddish-brown *spot-like appressed scales,* whitish, brownish or smoky gray, the disk sometimes tinged with red or reddish-brown, the flesh white or faintly reddish ; lamellæ thin, close, free, narrowed toward each end, reddish, then blackish-brown ; stem rather long, *equal or slightly tapering upward,* hollow, whitish ; spores elliptical, .0002 to .00025 in. long, .00016 to .0002 in. broad.

Plant 3 to 5 in. high, pileus 2 to 4 in. broad, stem 4 to 6 lines thick.

Woods. Summer and autumn. Not common.

The absence of a bulbous base to the stem and the fibrillose or feebly scaly pileus which is more or less gibbous or umbonate, serve to distinguish this from the two preceding species. Concerning its edibility, Cordier says that it is at least suspicious and that Vivian pronounces it "pernicious." Its odor is strong and its flesh when cut assumes a slight yellowish tint.

AGARICUS DIMINUTIVUS, *Pk.*

Diminutive Agaric.

Pileus thin, fragile, at first convex, then plane or centrally depressed, sometimes slightly umbonate, whitish or alutaceous, faintly spotted with small thin silky appressed brownish scales, the disk brownish or reddish-brown ; lamellæ close, thin, free, ventricose, brownish-pink becoming brown, blackish-brown or black ; stem equal or slightly tapering upward, stuffed or hollow, smooth, pallid ; annulus thin, persistent, white ; spores elliptical, .0002 in. long, .00015 to .00016 in. broad.

Plant 1.5 to 2 in. high, pileus 1 to 1.5 in. broad, stem 1 to 2 lines thick.

Woods. Croghan and Sandlake. Autumn.

This is a small but symmetrical and beautiful Agaric. It is perhaps too closely related to the preceding species of which it may possibly prove to be a mere variety or dwarf form. Its pileus is quite thin and fragile. Usually the darker or reddish hue of the disk gradually loses itself in the paler color of the margin, but sometimes the whole surface is tinged with red.

In closing this brief report my most cordial thanks are tendered to those botanists who have aided me by contributing specimens and information, and their continued co-operation in the work now well advanced is most earnestly solicited.

Respectfully submitted,

CHAS. H. PECK.

ALBANY, *January* 8, 1883.

SOME ABNORMAL AND PATHOLOGIC FORMS OF FRESH-WATER SHELLS FROM THE VICINITY OF ALBANY, NEW YORK.

BY CHARLES E. BEECHER.

Monstrosities among fresh-water shells are not infrequent and are interesting as illustrative of the cause of natural or accidental deformity. A large proportion of abnormal or pathologic forms is found in exposed situations, where the shells are subject to varying conditions of water and materials brought by currents or otherwise. The annual draining and cleaning of the canals renders the contained organisms liable to many accidents. It is likewise found that in the vicinity of a ford or watering-place for cattle, many of the uniones bear the marks of injury. It is, while the animal is repairing these injuries and adapting itself to changing conditions of water and deposits, that most of the malformations in its shell are produced, and it is quite seldom that a shell is found which has been deformed by the atrophy or hypertrophy of any of the animal organs. These malformations are occasionally transmitted and their degree is often augmented by the action of the law of accelerated heredity, as applied to the mollusca by Professor Alpheus Hyatt.*

It is convenient to consider abnormalities as natural or accidental. Natural changes are usually produced by the action of gravitation, adaptation to modified habitats or by changes in the forms of the organs. The effects of gravitation are noticed mainly in those univalves which live at or near the surface of the water and, therefore, necessarily carry the weight of the shell at a disadvantage.

Accidental deformities are always the accompaniment of an attempt by the animal to repair injuries which it has received. If the form of the shell has been altered, the animal will accommodate itself to this alteration; and, on the contrary, if permanent injury or malformation has been produced in the soft parts of the animal, the accreting test will gradually adjust itself to this change in those parts.

* The Genesis of the Tertiary Species at Steinheim, by Alpheus Hyatt; page 27, Anniversary Memoirs of the Boston Society of Natural History, 1880.

One of the most noticeable and interesting examples of a departure from normal conditions is sinistrality. With some genera and species (Partula, Achatinella, Bulimus, etc.) the dextral or sinistral shells occur indifferently. Thus, from a sinistral specimen of *Campeloma,* Raf. (*Melantho,* Bodw.) were taken two sinistral fry. The remaining twenty-five were dextral. Also, some of the fry of dextral individuals are very often sinistral. In other genera only certain (*supra*) species are sinistral, and again in some entire genera (Physa, Clausilia, etc.) this is a constant feature. Many genera and species have not yet furnished a single example. Two remarkable sinistral forms are given in the present paper. Several others, among our land and fresh-water shells, are known from the State of New York, but not in the vicinity of Albany. Individuals are found among our uniones which have the cardinal and lateral teeth interchanged in the valves, thus giving to the right valve the form and number of teeth belonging to the left. This kind of sinistrality is of unusual occurrence, and has been rarely noticed.

Upon the authority of Professor R. Ellsworth Call, I am able to cite the following species in which he has observed the above reversion of teeth : *Unio complanatus,* Mohawk, N. Y.; *U. rubiginosus,* Des Moines, Iowa, and *U. cahawbensis,* Cahawba river, Alabama. He has also had the kindness to make several valuable suggestions and corrections in the subject matter of the present paper.

DESCRIPTION OF SPECIMENS.

PHYSA ANCILLARIA, *Say.*

Plate I, figs. 6–8.

Figure 6 represents a specimen with an unusually expanded aperture. The first thickening of the labrum is immediately succeeded by another thickening of the margin, which is also flexed outward and produces the enlargement.

The second specimen, figure 7, exhibits the tendency of the outer volution to become free. The suture is very deeply impressed nearly to the columella, and the aperture is much shortened.

These two specimens exhibit natural departures, while figure 8 represents an accidental deformity, in which the margin of the aperture is deeply excavate and the lower part of the labrum is sinuate.

Planorbis exacutus, *Say.*

Plate I, figs. 1–3.

The examination of a large series of specimens from the vicinity of Albany shows that this species frequently departs from its normal form. Individuals with expanded and variously modified apertures are not uncommon and one sinistral example has been detected.

Figure 1 represents an individual in which the upper side of the labrum is expanded.

Figure 2 represents an individual in which the entire aperture is inflated, especially on the lower side.

The sinistral specimen (figure 3) has lost nearly all the testaceous characters belonging to the species and is a monstrosity in every particular. It is impossible to determine from external evidence whether it is a case of true sinistrality or one of inverted growth. The volutions are of equal convexity on either side and the obliquity of the aperture is not determinative. The specimen was found in a locality abounding only in this species, and the three specimens here described were selected from among several thousand others, about two per cent of which show some departure from normality, principally in variations in the form of the aperture and elevation of the spire and in intermittent growth.

Valvata tricarinata, *Say.*

Plate I, fig. 9.

The volutions of the specimen are free except at the apex. This variation in this species has been recorded by several observers and is not extremely rare, although this is the only specimen which has been found in the vicinity of Albany.

Gillia altilis, *Lea.*

Plate I, fig. 5.

A very remarkable biflexed individual. The shell, for a considerable period of its growth, equal to the formation of the three initial volutions, is dextral and of the usual form. The spiral then changes its direction; the apex becomes partially inverted and the last volution is sinistral. This is the only example of a heterospiral growth that is known to me and cannot be satisfactorily accounted for from the appearance of the shell alone. An examination of the anatomy of the animal might have revealed the cause of this reversion of growth. The initial point of the operculum being nearer to the apex of the shell, indicates that the growth was inverted during the formation of the last volution, and suggests, as a possible explanation, the action of gravitation on an animal too weak to hold the shell on its dorsum.

SOMATOGYRUS SUBGLOBOSUS, *Say*.

Plate I, fig. 4.

The carination of the volutions and narrowing of the upper part of the aperture is often observed in individuals of this species. The specimen figured is an extreme development in these particulars, and presents a marked departure from the usual form.

UNIO PRESSUS, *Lea*.

Plate I, figs. 10–12.

Figure 10 represents the left side of a specimen which is unusually alate at the post-cardinal extremity. The outer zone of growth slopes rapidly to the pallial margin and is marked by the absence of the colored radii. In the specimen the body of the shell is of a dark-green color, while the last annulus of growth is yellow and presents a strong contrast with the remaining portion of the shell.

The next figure (figure 11) represents a specimen which received an injury during the early growth of the shell. The margin of the valve is flexed and there is a broad mesial depression in the right valve extending from the umbo to the margin. In the left valve the conditions are reversed, the depression in the right valve being represented by a corresponding plication.

Figure 12 shows a left valve with the anterior portion narrow and auriculate, the umbo oblique and the wing much reduced. The teeth of this specimen are also much modified; in the left valve there is a single continuous elevated tooth which is sinuate anteriorly to represent the cardinal teeth. In the right valve the teeth are quite rudimentary and the strong cardinal ridge of the opposite valve projects into the rostral cavity.

UNIO CARIOSUS, *Say*.

Plate I, fig. 13.

The figure represents a small gibbous female with the anterior end unusually narrowed. Individuals of a similar character are not unusual, although they are seldom as ventricose as in the present instance.

UNIO NASUTUS, *Say*.

Plate II, fig. 1.

A female showing a row of seven vertical plications on the zone of growth adjacent to the last, with obscure traces of similar plications made at an earlier period of development.

UNIO COMPLANATUS, *Solander.*

Plate II, figs. 2–6.

Figure 2 represents a specimen similar to the preceding, but with more numerous and stronger vertical plications. The shell in these species is normally smooth and we must seek for an explanation of the cause of the plications in the soft parts of the animal, as they are evidently not due to accidental causes. From the examination of a number of individuals presenting these plications in various degrees of prominence, and from the inspection of the living animal, it is evident that these abnormal features are produced by the rapid growth of the shell over the gills while they are distended with fry. *Unio osbeckii,* a species from China, is classed with the plicate forms in Lea's *Synopsis of the Unionidæ,* but the plications do not seem to be a constant characteristic of the species. The plications are not always present and, when they do occur, they are usually obscure and similar in position and expression to those specimens of *U. nasutus* and *U. complanatus* here presented and probably have a like significance.

Figure 3 represents the right valve of a specimen modified by accidental deformity. The umbo is nearly central, and the upper anterior portion of the valve is flattened and deeply sulcate.

The next specimen (figs. 4, 5) is a very elongate cylindrical form with an excessively thickened pallial margin.

The last individual to be noted (fig. 6) is an apparently normal form, as no marks of accidental or natural deformity can be detected. It was found associated with numerous specimens of *U. complanatus,* and is here referred to this species, although seemingly presenting marked specific differences. The outline is regularly elliptical, and the prominent beak is situated just anterior to the middle of the length. The cardinal teeth are elongate, and the lateral tooth is short and oblique — characters which do not belong to *U. complanatus.* Should it ultimately prove of a distinct species, it would be of a form hitherto unknown to this locality.

Specimens similar to the preceding briefly noted forms are often overlooked or considered as unimportant by many collectors ; but to a student of morphological variation and possible specific change, they are extremely interesting. After numerous accidental and natural changes have been illustrated and described, embracing many genera and species, it will be possible to generalize important biological facts relating to the classification of species and manner of growth of the organisms.

BRYOZOA

(FENESTELLIDÆ)

OF THE

HAMILTON GROUP.*

By James Hall.

FENESTELLA MULTIPLEX, *n. sp.*

See 6th Annual Rep of State Geologist Pl 11. Fig 12–16.

Bryozoan, occurring only in fragments; the shape of the frond is uncertain, but probably is infundibuliform; fragments of six centimetres in width occur, evidently only a small portion of the whole frond.

Branches moderately strong, enlarging below the bifurcations, and the width just above bifurcation is .33 mm., below bifurcation .66 mm. or slightly less. The distance between the branches is variable; there are on different portions of the frond five or six branches in the space of five millimetres; on non-poriferous side the branches are angular, and have along the middle a slight keel or carina, which connects with a similar carina on the dissepiments; when the dissepiments on opposite sides of a branch are alternating, the carina of the branch, in connecting with the carina of the dissepiment, becomes zigzag, which causes the branches to appear more irregular and less rigid than on the poriferous side; the branches are smooth.

Dissepiments about .25 mm. in diameter, four in the space of five millimetres; on non-poriferous side slightly depressed, angular and carinated; on poriferous side, depressed, rounded.

Fenestrules, on non-poriferous side, subquadrangular in outline; on poriferous side oval; length about one millimetre, width varying from one-third to two-thirds the length.

Cells in from two to four ranges, occurring as follows: In a branch which from commencement to bifurcation is six millimetres in length, for one millimetre only two ranges of cells occur, three ranges for the

---

* The species of the present paper only partially represent the genus as occurring in the Hamilton group. It is published in this incomplete form in order to show the progress of the work upon the Bryozoans, and to facilitate the final revision of the species.

space of three millimetres, and for the remaining two millimetres four ranges of cell apertures. Cells minute, circular, about .12 mm. in diameter, distant from each other equal to the diameter of an aperture, twenty in the space of one millimetre, four in the space of one fenestrule, counting those opposite the dissepiment; margins distinctly elevated, and those of the outer rows indenting the border of the fenestrule; apertures sometimes alternating and forming oblique transverse rows, at other times irregularly arranged; where two rows occur the apertures open directly upward; where three or four rows occur the central row or rows open directly upward, and the two outer rows laterally; space between rows of apertures smooth.

Formation and localities. Hamilton group; Moscow, Livingston county, and Alden, Erie county, N. Y.

FENESTELLA LATITRUNCATA, *n. sp.*

See 6th annual Rep of State Geologist Pl 13, Fig 1-9.

Bryozoan, occurring only in fragments; the form of frond is not certainly known, but probably is infundibuliform.

Branches strong, gradually enlarging to the bifurcations; width just below bifurcation one and one-third millimetres, just above, two-thirds to three-fourths of one millimetre; the distance between the branches is from one-half to four-fifths of one millimetre; three to four branches in the space of five millimetres; on non-poriferous side the branches are slightly angular.

Dissepiments about .5 mm. in diameter, slightly expanding at their junction with the branches, two in the space of five millimetres; on non-poriferous side, on a plane with the branches, slightly arching and angular; on poriferous side slightly depressed, rounded.

Fenestrules, on non-poriferous side, subquadrangular; on poriferous side oval, in outline; length one and three-fourths millimetres.

Cells arranged in from three to six ranges; cell apertures minute, circular .14 mm. in diameter, distant from each other a little more than the diameter of an aperture, sixteen in the space of five millimetres longitudinally; margins distinctly elevated, and those of the outer rows indenting the border of the fenestrules, so much so, that the margins are plainly visible from the non-poriferous side, giving a somewhat serrate appearance to the margin, alternating and forming oblique, transverse rows; the longitudinal rows are separated by a fine, slightly elevated carina; the space between the apertures, longitudinally, has sometimes a single striation.

Where fragments of this species occur, from the large branches, and the widening below the bifurcations, which, when the branches are broken off a short distance above, present a clavate appearance, they very much resemble a Thamniscus, this is especially the case where the depressed dissepiments of the poriferous side are covered with sediment, while the branches are not; without a critical examination it would be considered a Thamniscus.

This species can be distinguished from *F. multiplex* by its more robust form, and the greater number of ranges of cell apertures.

Formation and locality. Hamilton group; Ontario, Canada.

FENESTELLA FISTULATA, *n. sp.*

see 6th Annual Rep of State Geologist P12. Fig 1-16

Bryozoan, broadly infundibuliform or cup shaped.

Branches slender, gradually increasing in size to the bifurcations; bifurcations distant from five to ten millimetres; diameter of branch just below bifurcation a little less than .5 mm., above bifurcation, .33 mm.; the distance between branches is less than the width, or about .25 mm.; from nine to eleven branches in the space of five millimetres; on non-poriferous side branches slightly angular, and having along the middle a narrow, slightly elevated carina or keel, which connects with similar carinæ on the dissepiments; when the dissepiments or opposite ends of the branch alternate, the carina of the branch, in order to connect with the carina of the dissepiments, assumes a zigzag form, and also surrounds the fenestrules with a hexagonal elevation. There is no evidence of striae or of nodes.

Dissepiments comparatively strong, .25 mm. in width, expanding at the junction with the branches, depressed on both poriferous and non-poriferous side; on non-poriferous side, carinated and slightly angular; on poriferous side rounding.

Fenestrules small, oval; length from .33 to .50 mm., width about two-thirds the length, appearing the same size on each face of the frond.

Cells in two and three ranges, sometimes the third range extends only a short distance below the bifurcation, at others nearly the whole length to the next bifurcation; apertures, minute, circular, about .12 mm. in diameter, distant from each other less than the diameter of an aperture, twenty-five in the space of five millimetres, opening nearly directly upward; margins distinctly elevated, but on account of the apertures opening upward, scarcely indenting the border of the fenestrule ranges of apertures separated by a narrow, slightly elevated, flexuous ridge, which is shorter and more prominent when there are only two ranges of pores present.

This species is one of the most abundant of those occurring in the Hamilton group, and its poriferous face is generally easily recognized; from *F. multiplex* and *F. latitruncata* it is easily distinguished by its size and compactness.

Formation and localities. Hamilton group; Genesee and Erie counties, N. Y., and West Williams, Ontario.

FENESTELLA ASPECTUS, *n. sp.*

see 6th Annual Rep of State Geologist P13. Fig 10-14.

Bryozoan infundibuliform, undulating, frequently partially folded upon itself on a line with the branches.

Branches slender, gradually increasing in size to the bifurcations, which are distant from each other from three to fifteen millimetres; a transverse section of the branch is sub-cuneiform in outline, the widest part is on the poriferous side; just below the bifurcation on the poriferous side the branch is about .5 mm. in width, gradually growing smaller to the non-poriferous face, where it is less than half that width; just above bifurcation on poriferous side the branch is .33 mm.

in width; ten branches in the space of five millimetres; on non-poriferous side the branches are rounded or circular, and frequently have a very narrow, slightly elevated keel or striation running along the middle, which connects with a similar keel on the dissepiments, and opposite each dissepiment is a prominent triangular node.

Dissepiments slender, about .25 mm. in diameter, eight or nine in the space of five millimetres, much expanded at their junction with the branches; on non-poriferous side depressed, and with a thin, slightly elevated carina; on the poriferous side they are scarcely perceptible.

On account of the cuneiform shape of the branches, the fenestrules on the different faces of the frond have an entirely different appearance; on the non-poriferous side the fenestrules appear broadly oval, or nearly circular, a little less than .5 mm. in length and of about the same width; the branches rapidly thicken to the poriferous side where they are contiguous or nearly so, the fenestrule generally not showing at all, and when showing appearing only as a narrow slit.

Cells in two or three ranges, two ranges occur for only a short distance above the bifurcation, the greater part of the branch being occupied by three ranges; apertures small, circular, about .16 mm. in diameter, closely arranged, frequently nearly contiguous, twenty-eight in the space of five millimetres, the central row opening directly upward, the two outer rows nearly upward, slightly lateral; margins distinctly elevated and unusually thick; the margins of the outer rows of adjacent branches are separated only by a narrow line, sometimes contiguous; the central row of apertures is elevated above the outer rows, making the branch angular.

This species is not common, and when the poriferous face is seen is easily recognized; like *F. fistulata*, the cells are arranged in two and three rows and the branches are nearly of the same size, but it differs in having the cell apertures larger and much more closely arranged, and the central row much elevated, making the branch angular, while in that species the branch is nearly if not quite flat, the apertures being on the same plane; the contiguity of the branches, or the poriferous face, is also a distinguishing characteristic.

Formation and locality. Hamilton group; Bellona, New York.

FENESTELLA ANGUSTATA, *n. sp.*

See 6th Annual Rept. State Geologist Pl. 5. Fig 1-8.

Bryozoan infundibuliform; fronds large.

Branches of nearly the same size throughout their entire length, except immediately below the bifurcations, or increasing in size very gradually; bifurcations at very irregular distances from each other, varying from five to fifteen millimetres; width of branches from .33 to .50 mm.; distance apart less than the width of the branches; from ten to thirteen branches in the space of five millimetres; on non-poriferous side the branches are rounded, with generally a single range of nodes along the middle; sometimes there are additional scattering nodes with indistinct evidences of striations; on other parts of the frond the nodes are obsolete, either from wearing or some other cause not apparent, and there are from three to five strong striations on a branch.

Dissepiments comparatively strong, about .25 mm. in diameter, expanding at their junction with the branches, nine or ten in the space of five millimetres; on non-poriferous side rounded, nearly on a plane with the branches, granulose; on poriferous side depressed slightly below the ranges of apertures.

Fenestrules on non-poriferous side broadly oval, appearing narrower on poriferous side; length about .5 mm.; width from one-half to two-thirds the length.

Cells in two ranges, opening at an angle of forty-five degrees from the axis of the branch; apertures small, circular, about .14 mm. in diameter; distance apart less than the diameter of an aperture, twenty-eight to thirty in the space of five millimetres; apertures distinctly elevated and indenting the border of the fenestrules; space between the ranges of apertures carinated; carina sharp, slightly elevated, and having prominent nodes or short spines, four in the space of one millimetre.

To the poriferous side of *F. fistulata* this species has no resemblance; it slightly resembles the non-poriferous side, from which, however, it is readily distinguished by the absence of the keel along the middle of the branch and on the dissepiments, and by the presence of striations, nodes and granules.

Formation and locality. Hamilton group; Alden, Erie Co., N. Y.

FENESTELLA MARCIDA, *n. sp.*

See 6th Annual Rep of State Geologist. Pl. 6. Fig 10-15.

Bryozoan, consisting of large infundibuliform fronds, frequently undulating or partially folding upon itself along the line of the branches. Branches slender, very gradually enlarging to the bifurcations, which are distant from each other from seven to twenty-four millimetres; width below bifurcation .33 mm.; width just above bifurcation .25 mm.; distance from each other equal to or a little more than the width of the branches, sometimes appearing less on poriferous side than on non-poriferous; on non-poriferous side branches rounded, except just below bifurcation, where they are flattened, striated; striæ fine but distinct, finely granulose, from three to five on a branch.

Dissepiments about .20 mm. wide, eight in the space of five millimetres; on some fronds the width is .25 mm., nearly equal in width to some parts of the branches, expanding slightly at their junction with the branches; on non-poriferous side depressed, striated; striæ granulose; on poriferous side slightly depressed, rounding, carinated; carina very thin, slightly elevated.

Fenestrules broadly oval, occasionally subquadrangular; length nearly .5 mm.; width two-thirds the length; on poriferous side the fenestrules appear narrower, the width often not more than one-third the length and sometimes appearing only as a narrow slit.

Cells in two ranges, apertures small, circular; diameter about one-seventh of one millimetre; distant from each other less than the diameter of an aperture, seven to eight in the space of five millimetres; margins distinctly elevated and indenting the border of the fenestrule; space between ranges of apertures carinated; carina spinulose; nodes or spines prominent, about .16 mm. in height, three in the space of one millimetre.

This is a very abundant species; it is very similar to *F. angustata*, but is of less compact growth; the non-poriferous side is very finely granulose, while that species has a line of comparatively strong nodes along the middle of the branch.

Formation and localities. Hamilton group; Darien and Moscow, N. Y.

FENESTELLA PLANIRAMOSA, *n. sp.*

See 6th Annual Rep of State Geologist P. 1. Fig 1–13

Bryozoan fan-shaped, no perfect frond observed; largest fragment seen five centimetres long and four wide.

Branches slender, bifurcations at very irregular distances from each other, varying from four to twenty-five millimetres; the branches just below bifurcation are of the same width, so that where the bifurcations are close together the branches increase rapidly in width, where they are distant they increase very gradually; branches just above bifurcation .33 mm. in width; just below, .66 mm. in width. The space between the branches is greater than their width; from four to seven branches in the space of five millimetres; on non-poriferous side, just above the bifurcation, the branch is rounded, sometimes slightly angular, soon becoming flattened, and for the greater part of the length flat or slightly concave; striated; striæ very fine but distinct, from four to nine on a branch.

Dissepiments extremely slender, about .20 mm. in width; distance from each other variable, from two to four millimetres, generally a little over three millimetres, not expanding at their junction with the branches, frequently curving; on non-poriferous side often arching, striated, rounding.

Fenestrules quadrangular; length variable but usually slightly less than three millimetres; width varying from .50 to .66 mm.

Cell apertures in two and three ranges, two for the greater part of the length of the branch; apertures small, oval or circular, opening obliquely; about .20 mm. in length; distance apart varying from about two-thirds to a little more than the diameter of an aperture, from twelve to eighteen in the space of five millimetres; margin of the lower portion of aperture elevated more than that of the upper portion; space between the ranges of pores occupied by a carina; carina sharp, elevated one-fifth of one millimetre, and having prominent nodes or spines which are elevated above the carina equal to the height of the carina; three in the space of two millimetres.

Formation and locality. Hamilton group; Bellona, Yates Co., N. Y.

FENESTELLA CINCTUTA, *n. sp.*

See 6th Annual Rep of State Geologist P 9. Fig 16.

Bryozoan occurring only in fragments; the form of a perfect frond is not known; one fragment, the largest seen, is somewhat curved as if forming part of a frond infundibuliform in shape, but one of the edges of the fragment is entire, rounded, and non-celluliferous, which shows that the frond could not have been continuous ; the largest fragment observed is three and one-half centimetres long and two and one-half wide.

Branches comparatively strong, increasing in size but slightly, if any, below bifurcations; width of branch .66 mm.; branches flexuous, regularly bent from side to side, forming on each side of the branch convexities and concavities, which alternate with each other, the convexities of contiguous branches uniting and coalescing; on non-poriferous side the branches are slightly angular, with a carina running along the middle; the carinæ of two contiguous branches, at the anastomosed part, sometimes unite and form on that portion one carina, at other times there is a space of .25 mm. or more, which is deeply channeled.

Dissepiments or anastomosed portions of the branch vary in width from .66 mm. to 1.33 mm.; the narrower ones are in reality not anastomosing, but very short celluliferous dissepiments; there are three in the space of five millimetres.

Fenestrules oval, one millimetre in length, .66 mm. in width.

Cells in three ranges; on the dissepiments sometimes one or two ranges more; apertures minute, circular, a little more than .20 mm. in diameter, closely arranged, frequently nearly contiguous, eighteen in the space of five millimetres; the central range opens directly upward, the outer range nearly directly upward, very slightly laterally ; margins comparatively strong, very distinctly elevated.

Formation and locality. Hamilton group ; Ontario, Canada.

FENESTELLA PERUNDULATA, *n. sp.*

See 6th annual Rep of State Geologist P 2. Fig 1-14

Bryozoan probably infundibuliform in shape.

Branches moderately strong, .5 mm. in width ; space between the branches more than the width of the branches, seven branches in the space of five millimetres ; on non-poriferous side angular, carinated ; carina and upper part of the branch regularly flexuous; at the dissepiments the carina and angular portion of the branches frequently meet and coalesce, giving the appearance of anastomosing branches.

Dissepiments strong, from .50 to .66 mm. in width, expanding at their junction with the branches, about three in the space of five millimetres; on non-poriferous side, angular and on a plane with the branches; on poriferous side depressed, rounding.

Fenestrules small, oval, .75 mm. in length, .5 mm. in width.

Cells in two ranges; apertures small, circular, opening nearly directly upward, about .16 mm. in diameter, distance apart less than the diameter of an aperture, about twenty in the space of five millimetres; margins distinctly elevated ; space between ranges of apertures carinated; carina strong, with an elevation equal to the thickness of a branch, and slightly expanded and flattened at the top; width of expanded portion .25 mm. ; finely striated.

On the poriferous face the branches, carinations and ranges of apertures are straight, presenting a somewhat rigid appearance, while on the non-poriferous face the whole upper portion of the branch is regularly flexuous. Sometimes, on the dissepiments, the carinations meet, coalesce, and form a carination across the dissepiments; at others there is a space between of .25 mm.; sometimes this space is smooth and deeply channeled across the dissepiment, at others the dissepiment has a carina connecting the carinæ of the adjacent branches; the two faces present such a different appearance, that were it not for the fact that both sides of the same specimens are seen they would be very easily mistaken for different species.

Formation and locality. Hamilton group; Moscow, Livingston county, N. Y.

FENESTELLA ASSITA, *n. sp.*

See 6th annual Rep of State Geologist P 7. Fig 8-11.

Bryozoan probably infundibuliform, though occurring only in fragments in the present collections; largest fragment observed two and one-half centimetres long, two centimetres wide.

Branches moderately strong, gradually enlarging in size to the bifurcations, which are distant from each other from three to fourteen millimetres; width of branches on non-poriferous side .33 mm., on poriferous side about .50 mm.; space between branches less than the width of the branches, ten branches in the space of five millimetres; on non-poriferous side branches rounding, carinated; carina thin, elevated about .20 mm., and obscurely nodose.

Dissepiments strong, .33 mm. in width, eight in the space of five millimetres, expanding at their junction with the branches; on non-poriferous side, on a plane with the branches, carinated; on poriferous side depressed, carinated.

Fenestrules oval, about .33 mm. in length; width on non-poriferous side about two-thirds the length; on poriferous side they are very obscure, either not perceptible or appearing as very narrow slits.

Cell apertures in two and three ranges; the greater part of the length of the branch has only two ranges; in a branch which is eleven millimetres long before bifurcating, eight millimetres of that length has two ranges of cells, and three millimetres three ranges; apertures small, circular, opening directly upward, about .16 mm. in diameter; distance between apertures less than the diameter of an aperture, twenty apertures in the space of five millimetres; margins distinctly elevated; space between ranges of apertures carinated; carina strong, not much elevated, and having minute spines situated at quite regular distances from each other, about twenty in the space of five millimetres; the ranges of apertures on adjacent branches are nearly contiguous.

Formation and locality. Hamilton group; New York.

FENESTELLA INFLEXA, *n. sp.*

not. Ill -

Bryozoan infundibuliform; fronds large, largest fragments seen seven millimetres across.

Branches flexuous, forming on each side of a branch regular and alternate convexities and concavities; the convexities of the opposite side of adjacent branches frequently contiguous ; coalescing; bifurcations distant from each other from two to ten centimetres or even more; width of branch .5 mm., eight in the space of five millimetres ; on non-poriferous side the branches are angular and carinated; where two branches or the carinations of two branches unite there is very frequently a small spine or node.

Dissepiments or points of anastomosing about .66 mm. wide, four in the space of five millimetres ; sometimes the branches simply anastomose; at other times there is a short dissepiment.

Fenestrules small, oval, .66 mm. in length ; width about one-half the length. On the poriferous side the branches are angular.

Cells in two ranges, opening nearly directly upward, apertures minute, circular, about .20 mm. in diameter, closely arranged ; distance between apertures less than the diameter of an aperture; sometimes nearly contiguous, eighteen in the space of five millimetres; margins distinctly elevated; space between ranges of apertures angular, carinated ; carina sharp, sinuous, elevated about .20 mm.

The non-poriferous face presents a variety of phases ; sometimes the carinæ of adjacent branches unite and immediately separate, leaving the point of union merely a point which generally has a node or spine, and presents the appearance of a diamond-shaped elevation inclosing the fenestrule, sometimes they remain united for the space of half a millimetre or more, at other times they do not meet and the space between is sometimes channeled, and at others there is a transverse carination, connecting the two longitudinal carinations. This latter form occurs where the branches are united by dissepiments instead of anastomosing, and presents the appearance of an hexagonal elevation inclosing the fenestrule.

This species is very similar to *F. perundulata* on the non-poriferous face and without very critical comparison it would be difficult to distinguish them; but on the poriferous face the difference is more evident. In this species the carina separating the row of apertures is thin, sharp, highly elevated and very sinuous. In *F. perundulata*. it is strong, elevated equal to the thickness of the branch expanded at the top, and straight.

Formation and locality. Hamilton group; West Bloomfield, New York.

FENESTELLA PERFORATA, *n. sp.*

See 6th Annual Rep. of State Geologist P. 10. Fig 1-13.

Bryozoan consisting of large infundibuliform fronds; fragments are of six centimetres in length and five in breadth, evidently only a small portion of the frond; thickness of frond one and one-half millimetres; frond consisting of numerous cylindrical branches which frequently and irregularly bifurcate, and are connected by dissepiments ; along the middle of the branches and dissepiments on the celluliferous face there is a keel or carina, which is elevated and expands above, forming secondary branches and dissepiments very similar in appearance to the principal ones.

Branches moderately strong, about .5 mm. in width, eight branches in the space of five millimetres; branches regularly sinuous, forming on each side of the branch regularly alternating curvatures and concavities; the convexities of adjacent branches approach each other, but very seldom unite, being connected by dissepiments; on non-poriferous side the branches are rounding or slightly angular and have along the middle a carina; carina thin, slightly elevated and connected with similar carinæ on the dissepiments.

Dissepiments strong, of about the same width as the branches, five in the space of five millimetres; on non-poriferous side on the same plane as the branches; rounded or slightly angular; carinated; carina thin, slightly elevated and connected with the carinæ of the branches.

Fenestrules small, oval, slightly more than .5 mm. in length; width two-thirds to three-fourths the length.

Cells in two ranges, opening directly upward; apertures minute, nearly circular, about one-sixth or one-seventh of one millimetre in diameter, closely arranged, distance apart less than the diameter of an aperture, occupying the dissepiments as well as the branches, and forming an oval arrangement; the margins are distinctly elevated and indent the borders of the fenestrules; the space between the apertures both on the branches and dissepiments is carinated; carina thin and elevated about the thickness of the branch, when it expands and forms secondary non-celluliferous branches and dissepiments; branches .33 mm. in width, round, and having a carina; carina thin, but slightly elevated, though very distinct; branches regularly sinuous; dissepiments of the same width as the branches, round, carinated; carina similar to and connected with those of the branches.

Fenestrules oval or circular; the circular form has a diameter of about .66 mm.; the oval forms are .66 mm. (sometimes a little more) in length and about .5 mm. in width.

The two faces of the frond are very similar in appearance, the principal branches being a little wider than the secondary ones; the sinuosity of the branches and the connecting carinæ of the branches and dissepiments present the appearance of fenestrules enclosed by a hexagonal angular elevation; the dissepiments being of the same width as the branches on the same plane and similarly carinated, and the branches being quite irregular, it is sometimes very difficult to distinguish them.

Formation and locality. Hamilton group; New York.

FENESTELLA SCALARIS, *n. sp.*

See 6th Annual Rep of State Geologist Pg. Fig 1-11.

Bryozoan consisting of large infundibuliform fronds; largest fragment seen seven centimetres long and nearly four centimetres wide.

Branches slender, very gradually increasing in size to the bifurcations, which are distant from each other from five to thirty millimetres, generally from fifteen to twenty millimetres; width of branches about .33 mm.; distance between branches less than the width of the branches, from nine to eleven branches in the space of five millimetres; on non-poriferous side branches rounded, carinated; carina slightly elevated and finely nodose, about seven nodes in the space of one millimetre; on some fronds the nodes are more distant, and the rest of the branch is granulose.

Dissepiments comparatively slender, less than .25 mm. in width, six in the space of five millimetres; on non-poriferous side, on a plane with the branches, rounded, carinated; carina similar to the carina of the branch.

Fenestrules oval, length about .66 mm., width from one-half to two-thirds the length.

Cells in two ranges, opening nearly directly upward; apertures minute, circular, about .20 mm. in diameter, distance apart equal to and slightly more than the diameter of an aperture, about twenty in the space of five millimetres; margins slightly elevated, and indenting the border of the fenestrule; space between the ranges of apertures elevated, carinated; carina thin, elevated, nearly equal to the thickness of the branch, the upper half slightly expanded, and having a sharp, thin crest, the carinæ connected by their lateral projections or bars, which are very thin and extend down the side of the carinæ obliquely about .20 mm., or a little more, about eighteen bars in the space of five millimetres.

Where the poriferous face is seen this species can be easily distinguished by the very thin lateral bars connecting the carinæ, and their comparatively great distance apart. The species of the genus Fenestella are so similar in appearance, that without both poriferous and non-poriferous faces, it is sometimes very difficult to assign a specimen to the right species.

Formation and localities. Hamilton group; Bellona, N. Y., and West Williams, Ontario.

FENESTELLA EXORNATA, *n. sp.*

see 6th annual Rep of State Geologist. P4. Fig 6-13 P5. Fig 1-13.

Bryozoan probably infundibuliform, though occurring only in fragments in the present collections; largest fragment seen five centimetres long and three wide.

Branches moderately slender, appearing more slender on non-poriferous side than on poriferous, gradually increasing in size to the bifurcations, which are distant from each other generally from five to seven millimetres; branches from .33 to .50 mm. in width; space between the branches on non-poriferous side more than the width of branches, on poriferous side about equal to the width, five or six branches in the space of five millimetres; on non-poriferous side flat, with a comparatively thin, sharp elevation around the edge of the fenestrules; the space between these elevations flat or slightly concave, with frequent, short, broad, conical spines, about .20 mm. in height.

Dissepiments strong, frequently as wide as, or wider than the branches, there are four in the space of five millimetres, greatly expanding at their junction with the branches, on a plane, and having the same appearance in every respect as the branches on their non-poriferous side; on poriferous side very much depressed and flattened.

Fenestrules, on non-poriferous side, appearing broadly oval, on poriferous side elongate-oval; length from three-fourths to one millimetre; width on poriferous side .5 mm.

Cells in two ranges, opening slightly laterally; apertures small, circular; diameter about .16 mm.; distance apart equal to or a little more than the diameter of an aperture, about twenty in the space of five millimetres; margins slightly elevated; space between the rows of apertures carinated; carina thin, sharp, consisting of two plates, which coalesce near the crest; height of carina .75 mm., or nearly twice the width of the branches.

This species is very characteristic and is easily recognized from either surface, from non-poriferous by the flat branches, with elevation around the fenestrule; and from the poriferous face by the thin greatly elevated carina, in which respects it differs from any other known species of this formation.

Formation and locality. Hamilton group; Alden, Erie county, N. Y

FENESTELLA QUADRANGULA, *n. sp.*

See 6th Annual Rep. of State Geologist P3, Fig 7-12.

Bryozoan probably infundibuliform in shape though, so far as observed, occurring only in small fragments; frond rigid in appearance.

Branches slender, very gradually increasing in size to the bifurcations which are distant from each other from five to fifteen millimetres, generally from ten to twelve millimetres; width of branches from .33 to nearly .50 mm. space between the branches more than the width of the branches; nine branches in the space of five millimetres; on non-poriferous side, branches rounded and frequently having a node or spine opposite the dissepiments; striated; striæ fine; sometimes entirely concealed by fine granules.

Dissepiments slender, less than .25 mm. in width; seven in the space of five millimetres, expanding at their junction with the branches; on non-poriferous side on a plane with the branches, rounding; poriferous side depressed, angular; slightly carinated.

Fenestrules broadly oval or sub-quadrangular; length from .50 to .66 mm.; width from .33 to .50 mm. Cells are in two ranges, opening slightly laterally; apertures minute, .16 mm. in diameter, very closely arranged; distance apart about one-half the diameter of an aperture; twenty-two in the space of five millimetres; margins slightly elevated; space between ranges of apertures, angular, carinated; carina moderately strong; very slightly elevated and having a row of nodes; nodes moderately strong, about four in the space of one millimetre.

Formation and locality. Hamilton group; Darien, N. Y.

FENESTELLA EMACIATA, *n. sp.*

See 6th Annual Rep of State Geologist P8, Fig 9-13.

Bryozoan occurring only in fragments, the form of the whole frond is not certainly known, but probably infundibuliform; largest fragment observed five centimetres long and three wide.

Branches moderately slender; not increasing in size, except just below the bifurcations, which are distant from each other from four to twenty-four millimetres — generally about fifteen millimetres; width of branches from .33 to .50 mm.; space between about equal to the width of the branches; seven branches in the space of five millimetres; on non-poriferous side, rounded, striated; striæ moderately strong, from three to five on a branch ; finely granulose ; sometimes the central stria resembles a narrow carina.

Dissepiments about .25 mm. in width ; six in the space of five millimetres; slightly expanding at their junction with and oblique to the branches; angle of obliquity from ten to twenty degrees; on non-poriferous side moderately depressed, rounded, transversely striated, granulose; on poriferous side, very much depressed, slightly angular, carinated; carina slight.

Fenestrules oval or subquadrangular; length .66 mm.; width from .33 to .50 mm.

Cells in two ranges opening laterally; apertures small, .20 or .16 mm. in diameter, closely arranged, frequently nearly contiguous; from twenty to twenty-five in the space of five millimetres; margins elevated and indenting the border of the fenestrule.

Space between the ranges of apertures elevated, height equal to one-half the thickness of the top of the branch; slightly rounding; not acutely angular, having a row of nodes; nodes minute; frequently wanting.

This species differs from *F. marcida* by having stronger, more widely separated branches; dissepiments farther apart and oblique to the branches; on the poriferous side the cells open more laterally; the space between the cells is elevated, not carinated, and comparatively thick, and without the closely arranged, prominent nodes of that species.

Formation and locality. Hamilton group, shore of Seneca lake, N.Y.

FENESTELLA CURVATA, *n. sp.*

See 6th annual Rep of State Geologist Pl 6. Fig 1-9.

Bryozoan infundibuliform; largest fragments seen four millimetres in length and of about the same width.

Branches slender, scarcely increasing in size to the bifurcations, which are distant from each other from four to fifteen millimetres, generally about ten millimetres; width of branches from a little less than .25 to .33 mm., occasionally slightly more; transverse section subcuneiform in outline; space between branches greater than the width of the branches; seven branches in the space of five millimetres; when the dissepiments on opposite sides of the branches alternate, the branch is flexuous, but not when the dissepiments are opposite each other; on non-poriferous side the branches are rounder, in well-preserved specimens showing fine, granulose striæ, from five to seven on a branch; generally opposite the dissepiments there is a prominent, conical spine about .25 mm. in height.

Dissepiments comparatively strong; width nearly or quite equal to that of the branches; thirteen in the space of ten millimetres; not expanding at their junction with the branches; on non-poriferous side slightly depressed, rounding; on poriferous side scarcely perceptible.

Owing to the sub-cuneiform shape of the branches the fenestrules of the poriferous and non-poriferous face present an entirely different appearance; on non-poriferous face they are broadly oval or subquadrangular; .66 mm. in length; width from .50 to .66 mm.; on the poriferous side they frequently appear merely as narrow slits; sometimes the branches are apparently contiguous.

Cells in two ranges, opening slightly laterally; apertures minute, circular, diameter about .20 mm., closely arranged; distance apart from one-half to one diameter of an aperture, about twenty in the space of five millimetres; margin distinctly elevated and indenting the border of the fenestrule; space between ranges of apertures carinated; carina thin, slightly elevated and having prominent nodes or short spines, two in the space of one millimetre.

When both the poriferous and non-poriferous faces of this species can be seen, it will be very easily distinguished from any other species of this formation.

Formation and locality. Hamilton group; Moscow, Livingston county, N. Y.

FENESTELLA BREVILINEA, *n. sp* See F. Exornata.

See 6th Annual Rep of State Geologist - P 4 - Fig 6-13 P 5. Fig 1-13

Bryozoan probably infundibuliform, largest fragment seen seven centimetres wide and five long.

Branches moderately strong, a transverse section sub-cuneiform in outline — the widest portion on poriferous side — gradually increasing in size to the bifurcations, which are distant from each other from seven to twenty millimetres; width of branches from .33 to .66 mm.; space between branches greater than the width of the branches, five or six in the space of five millimetres; or when the dissepiments on opposite sides of the branches alternate, which is generally the case, the branches are sinuous; on non-poriferous side rounding or slighty angular, carinated; carina thin, but slightly elevated, sinuous; surface pustulose.

Dissepiments from .50 to .66 mm. in width, three in the space of five millimetres on non-poriferous side, on a plane with the branches, rounded, with a semi-circular carination; pustulose.

Fenestrules oval; owing to the sub-cuneiform shape of the branches, the fenestrules on poriferous and non-poriferous sides present a widely different appearance; on non-poriferous side 1.33 mm. in length, .50 mm. or slightly more in width; on poriferous side they appear much smaller, both in regard to length and width.

Cells in two ranges minute, circular or lunate, opening slightly laterally; diameter .20 or .16 mm.; space between the apertures longitudinally, equal to or more than the diameter of an aperture; ranges of apertures separated by a carina, which is very much elevated; height about .75 mm., or more than the thickness of the branch; at the base it is nearly .25 mm. in thickness, continuing of that thickness for about one-third the height of the carina, where it abruptly narrows and for the rest of the height the carina is extremely thin. Owing to the sudden contraction of the carina it appears to have a ridge upon the side when viewed from above; apparently the dissepiments sometimes have a similar ridge; though not invariably, as the specimens, so far as observed, never occur with the poriferous face free, and the carina being extremely thin, so that in separating from the rock it might possibly be that the carinæ of the dissepiments, if any exist, are broken. The non-poriferous face, on different portions of the frond, presents a variety of appearances; on some portions apparently the branches have a continuous carina very thin and but slightly elevated and the dissepiments with a semi-circular carina, not connecting with the carina of the branch; on other portions the fenestrules are surrounded by thin elevations, the space between being somewhat flattened and in the wider portions having slightly elevated irregular lines and in the narrower portions pustulose.

This species can be distinguished from *F. exornata* by its coarser appearance as well as by the different ornamentation of the non-poriferous face of the branches.

Formation and locality. Hamilton group; Moscow, Livingston county, N. Y.

FENESTELLA SUBTORTILIS, *n. sp.*

See 6th Annual Rep of State Geologist P 9. Fig 1-5.

Probably infundibuliform in shape, but occurring only in fragments; largest fragment observed three centimetres long and two and one-half in diameter.

Branches comparatively slender, of nearly the same width throughout their entire length; bifurcations distant; width of branches from .25 to a little more than .33 mm.; space between equal to or a little more than the width of the branches; nine branches in the space of five millimetres; where the dissepiments on opposite sides of the branches alternate, which is generally the case, the branch is regularly flexuous; on non-poriferous side the branches are moderately convex, and with a thin, slightly elevated carina running along the middle which is frequently obliterated by weathering; the carina is finely nodose, the rest of the branch is also nodose or granulose; branches wider on poriferous side, giving the appearance of being more densely arranged than on the non-poriferous side.

Dissepiments strong, as wide or wider than the branches, six in the space of five millimetres; on non-poriferous side, on a plane with or elevated slightly above the branches, rounded, carinated; carina thin, slightly elevated and connecting with the carinæ of the branches; on poriferous side depressed, narrower than on the non-poriferous side.

Owing to the branches being widest on the poriferous side, the appearance of the fenestrules on the poriferous face varies from that of the non-poriferous side; on which side they are broadly oval or circular; length about .5 mm.; width from three-fourths to equal the length; on poriferous side they appear much narrower, the branches sometimes being nearly contiguous.

Cells in two ranges, opening directly upward; apertures minute, circular, about .20 or .16 mm. in diameter; distance apart equal to or less than the diameter of an aperture, eighteen in the space of five millimetres; margins thin, elevated; space between ranges of apertures carinated; carina at first very thin, sinuous, thickening immediately to about .25 mm., and having on top a thin, very slightly elevated crest. This species, especially on poriferous side, has some resemblance to *F. perundulata*, but is a much finer frond; the non-poriferous face resembles *F. curvata*, but the branches are stronger, more compactly arranged, and without spines or prominent nodes; the poriferous side is very dissimilar.

Formation and locality. · Hamilton group; Moscow, Livingston county, N. Y.

FENESTELLA STRATA, *n. sp.*

See 6th annual Rep. of State Geologist P 8, Pl. 1-6.

Bryozoan infundibuliform; largest fragment observed five centimetres long and three wide.

Branches moderately strong; widest on the poriferous side, where they are .5 mm. in width; on non-poriferous side about .25 mm.; extremely sinuous, forming at the sides of the branch alternating and regular convexities and concavities; the convexities of adjacent branches touching and coalescing; on poriferous side the branches are angular, having a slight keel, which is conspicuously nodose, owing to that side of the branch being the narrowest and the angular tops of the branches coalescing; the sinuosity of the branches is much greater on the non-poriferous side, forming diamond-shaped elevations; the frond presenting a reticulated appearance, and it is with great difficulty that the direction of the branches can be determined.

Dissepiments; the points of coalition or anastomosing are in width equal to or a little more than that of the branches; four in the space of five millimetres.

Fenestrules on non-poriferous side oval, sometimes nearly circular, usually about one millimetre in length; width two-thirds to three-fourths the length; the size and shape, however, are somewhat variable; on non-poriferous side appearing much smaller both as regards length and breadth; the branches on poriferous side, though sinuous, present a much straighter appearance than on the non-poriferous side.

Cells in two ranges, opening directly upward or slighly laterally, minute, circular; .14 mm., or a little less, in diameter; distance apart more than the diameter of an aperture, about eighteen in the space of five millimetres; margins thin, distinctly elevated; space between the ranges of apertures carinated; carina moderately thin, elevated about .20 mm., sinuous and finely crenulate.

This species in its sinuous, anastomosing branches resembles *F. inflexa*, but the branches are more slender, and on the non-poriferous side it has two ranges of apertures, divided by a carina, while that species has three or more ranges without carina. In *F. perundulata* the frond on non-poriferous face has a much more irregular appearance, and is more decidedly anastomosing.

Formation and locality. Hamilton group; Moscow, Livingston county, N. Y.

ON THE STRUCTURE OF THE SHELL IN THE GENUS ORTHIS.

By James Hall.

It is generally pretty well known among palæontologists, at the present time, that the genus Orthis, as constituted by Dalman, contains heterogeneous material; and that the species do not form the well characterized natural group sometimes claimed for them.

Leaving out of consideration the two species first named by the author of the genus, which are marked with an ?, the remaining species exhibit a considerable variety of external form and of internal marking, which characters alone are sufficient to distinguish them generally from one another.

The general aspect of the shells constituting the genus, as described by its author and extended by subsequent writers, is a sub-circular or sub-quadrate form; valves sometimes nearly equally convex, while in other examples one valve may be flat or concave. This latter feature may affect either the ventral or the dorsal valve. Both valves are furnished with an area, though this character is often but slightly developed in the dorsal valve; the opposite valve is furnished with wider area and open triangular fissure for the passage of a pedicil. The hinge line is straight, usually shorter than the width of the shell. The surface is striated or plicated, and the general aspect of nearly all the forms is so similar that they have been grouped together, generally, and by the best authors, without hesitation.

The most conspicuous external difference is between a finely striated, and a coarsely plicate surface. These differences are often accompanied by another distinguishing feature. The coarsely plicate forms, among the American species, are usually what are termed *resupinate shells;* the dorsal valve being the more convex and the ventral valve flat or concave and sometimes sinuate in front, but still carrying its conspicuous area and foramen. On further examination we find that many striated species are resupinate, or have the dorsal valve the more convex. An examination of the interior of the shell in all these forms shows that the muscular impression in the ventral valve is strongly defined, distinctly bilobate, limited at the margins by a strong ridge or elevated lamella, usually interrupted or non-continuous in the front. (These forms are chiefly of lower or middle Silurian in their geological range.)

On comparing other forms of the genus where the valves are nearly equal, or where the shell is plano-convex, the more convex valve is the ventral. There are also resupinate forms which are closely allied to them; but, as a rule, the forms with finely striated surface, subequivalve or plano-convex, have the ventral valve the more convex; and the muscular impression is flabelliform with its margins lobed, and more or less distinctly limited by an elevation of the interior substance of the shell.

The resupinate forms which are more closely allied to those with flabelliform ventral muscular impressions, have the corresponding muscular imprint more strongly defined and less distinctly lobed at the margins than in the forms just noticed.

These are the most obvious distinctions among the prevailing forms of the genus ORTHIS as constituted by Dalman.

The *Orthis* (*Platystrophia biforata*) is, in some degree, an exception to all the forms above mentioned, having both valves very convex, the surface strongly plicated, with a mesial fold and sinus, as in SPIRIFERA. In its muscular areas it resembles the resupinate forms of ORTHIS of the lower Silurian rocks, often presenting an abnormal thickening of the shell around the muscular area of the ventral valve.

The *Orthis biloba* (*Dicœlosia biloba* of King) of the upper Silurian rock also presents a departure from the typical forms of Orthis, but preserves the similar muscular system.

Before undertaking a revision of the materials constituting the genus ORTHIS, it has seemed desirable to ascertain whether the variations in form, surface ornamentation, or character of muscular impression, is associated with any difference in the shell-structure. For this purpose, cuttings, prepared for microscopic examination, have been made from many species, and the result has proved that all the resupinate lower and middle Silurian forms, whether plicate or finely striate, are fibrous shells, with the ventral muscular impression small and strongly limited. They are essentially either free from punctæ in any form, or with a few scattered pustuliform pores. The finely striate sub-equivalve or plano-convex forms with flabelliform muscular impressions, have the shell punctate in lines, or radiating belts, corresponding to the rays of the shell, with an intermediate fibrous texture. The character of the punctæ, the strength and comparative width of the punctate bands, vary with the different species.

In the finely striated, resupinate forms of the Lower Helderberg, Hamilton and Chemung groups, with the smaller and more distinctly limited flabelliform ventral muscular areas, the punctate character is very marked, often occupying almost the entire surface, and the lines of the radii are shown only by a more crowded condition of the punctæ. The resupinate species here referred to are quite different in their outline and general form from those of the lower rocks, being for the most part rotund forms with the cardinal extremities rounded. These species are easily recognized, and readily distinguished from those of the preceding group by their external form alone.

The numerous species which have been already studied in their microscopic shell-structure are naturally separated into three distinct groups which may be of generic value.

The first group includes the coarsely plicate forms, with extended cardinal angles; the valves resupinate or normal in their relations; the test is coarsely fibrous, and usually without punctæ, although some species occasionally show a few large scattered pores or ducts near the front of the shell.

Professor King has proposed the name PLATYSTROPHIA for *Orthis biforata*, and this species in its fibrous and non-punctate texture, may be taken as characteristic of the first group, although there are some features, especially in the form of the shell and also in the muscular impressions, which do not in every respect agree with other members.

With our present knowledge, we may include in this group the following species:

Platystrophia	biforata,	Trenton and Hudson River groups.
"	tricenaria,	" " " "
"	subquadrata,	Hudson River group.
"	borealis,	" "
"	occidentalis,	" "
"	plicatella,	" "
"	flabella,*	Niagara group.

' This list will be greatly extended as soon as the shell-structure of allied species can be studied. At present only those species are included which have been studied under the microscope.

The second group embraces forms which are usually regarded as typical species of the genus ORTHIS. The shell-structure characterizing this group may be described as finely fibrous, with distinct rows of punctæ coming out along the summit of the radii; the rows of punctæ are simple, or double in some species (O. Clytie), but usually there are several rows to each ray.

The following species of this group have been microscopically studied in numerous specimens:

Orthis	testudinaria,	Trenton and Hudson River groups.
"	perveta,	" " " "
"	Clytie,	Hudson River group.
"	elegantula,	Niagara group.
"	hybrida,	" "
"	Vanuxemi,	Hamilton group.
"	Penelope,	" "

The third group, consisting of *O. multistriata* of the Lower Helderberg group, *O. Iowensis* of the Hamilton group, *O. Tulliensis* of the Tully Limestone, and *O. impressa* of the Chemung group, is highly punctate, with a fine fibrous texture of the shell-substance. In the great number of the punctæ and for the most part their uniform character, together with their arrangement, these forms of the *Orthidæ* resemble species of *Terebratula*, *Cyrtina*, etc. The name *Schizophoria*, King, may be adopted for this latter group of species.

The accompanying illustrations (plates 3 and 4) will serve to give a clear idea of the microscopic characters presented in the shell-structure of specimens in each of the three groups indicated.

The preparation of the shell sections and the photographs of these for the lithographer have been made by Mr. C. E. Beecher of the State Museum.

---

*Not Orthis flabella of Sowerly.

DESCRIPTION OF A NEW SPECIES OF STYLONURUS FROM THE CATSKILL GROUP.

BY JAMES HALL.

Sometime during the year 1882 Prof. Geo. H. Cook of Rutgers College, State Geologist of New Jersey, called my attention to the carapace of a large crustacean in a mass of sandstone from the town of Andes, Delaware county, N. Y., which had been presented to the College Museum. At the same time Prof. Cook sent to me a plaster cast of the fossil, in relief, which preserved the characters of the surface in a remarkable degree of perfection.

I subsequently saw the original specimen in the museum of Rutgers College, and at a later period, through the kindness of the authorities of that institution, I have been allowed to have the specimens in my possession, for more critical examination and study.

The locality of the fossil is in the midst of the Catskill group, and the character of the rock alone indicates its geological horizon.

The specimens of the rock, one retaining the impression and the other the relief of the carapace, are more than two feet across, each one having a thickness of several inches. Although there are in one of the slabs some cavities partially filled with ferruginous matter, and other ferruginous markings, I have been unable to detect any evidence of organic remains in any part of the mass.

The rock, in its unweathered condition, is a fine-grained, olive-gray sandstone, weathering to a more distinctly gray color and becoming somewhat friable.

The accompanying description and illustration of the species will give an idea of the character of the fossil and its relations to its congeners previously known.*

---

*The first published notice of this fossil, so far as I am aware, appeared in the Transactions of the New York Academy of Sciences (Vol. II, p. 8, Oct., 1882), by Prof. D. S. Martin, under the title of a new Eurypterid from the Catskill Group. The notice was based upon a cast of the carapace in the N. Y. State Museum of Natural History, which had been labeled with name and locality by the author. The printer's error in spelling the name Stylomurus instead of Stylonurus, would be readily corrected by any one at all familiar with this class of fossils.

GENUS STYLONURUS, PAGE 1856.

STYLONURUS EXCELSIOR, *n. sp.*

Plate V, fig. 1.

Carapace sub-elliptical, truncate behind; width at the base about two-thirds of the length; lateral margins gently curved outward from the base of the carapace to a point opposite the base of the palpebral arches, thence gradually incurving to the front of the carapace.

Eyes circular situated on a line just anterior to the center of the length; separated by a strong median ridge which, commencing nearly on a line with the posterior limits of the palpebral arches extends forward nearly one-half the distance to the anterior margin where it becomes merged in the general convexity of the surface; palpebral arches strongly elevated semi-circular, more regularly curving behind, where they are gradually depressed into the general contour; the anterior portion of the arch is narrower and terminates abruptly in a line almost through the center of the eyes; posterior angles of the carapace rounded; occipital ring moderately defined, anterior to which and separated by a transverse depression, is a central lobe with an intermediate and lateral lobe on each side with corresponding depressions.

Surface on the anterior part marked by strong elongate and confluent pustules which are arranged in concentric lines, becoming more individualized and directed backward and subimbricating on the posterior half; the markings on the occipital ring are more subdued than upon the general surface, except on the posterior margin which is ornamented by a row of strong spiniform nodes; the entire intermediate surface, as well as the surface of the nodes, is marked by fine scales; the surface included by the palpebral arches is marked by stronger scales which are not elevated into nodes; the concave spaces between the posterior lobes are marked only by the fine, scale-like ornamentation.

Abdomen and appendages unknown.

The greatest length of the carapace is two hundred and fifty-five millimetres; width at base one hundred and ninety-five millimetres; width in a line through the bases of the palpebral arches two hundred and twenty-five millimetres, and across the anterior extremities of the arches one hundred and ninety-three millimetres; the diameter of the eyes is twenty-three millimetres; distance between the extremities of the palpebral arches, sixty-five millimetres.

This species is very different from the ordinary forms of the genus in the great anterior extension of the carapace and the prominence of the palpebral arches.

A restoration on the scale of *Stylonurus Logani*, Woodward, would make the entire animal over four feet in length.

Formation and locality. In the Catskill group; Andes, Delaware county, N. Y.

LIST OF SPECIES OF FOSSILS FROM AN EXPOSURE OF THE UTICA SLATE AND ASSOCIATED ROCKS, WITHIN THE LIMITS OF THE CITY OF ALBANY.

BY C. E. BEECHER.

Climacograptus bicornis.
Dicranograptus ramosus.
Diplograptus mucronatus.
Crinoid stems.
Trematis terminalis.
Leptaena sericea.
" subtenta.
Orthis testudinaria.
Zygospira modesta.
Avicula Trentonensis.
Cleidophorus planulatus.
Ambonychia undata.
Tellinomyia dubia.
" levata.
Lyrodesma poststriatum.
Ten undetermined species of Lamellibranchiata.
Hyolithes Americanus.
" sp. ?
Bellerophon bilobatus.
" cancellatus.
Murchisonia gracilis.
Eudoceras proteiforme.
Orthoceras bilineatum ?
Cornulites flexuosus.
Plumulites sp.?
Triarthrus Becki.
Trinucleus concentricus.

Thirty-six species, several of which have not heretofore been noticed in the Utica Slate.

The well-known graptolite locality at Kenwood has been for a long time the only locality for fossils in the immediate vicinity of Albany, and has afforded but a single oboloid shell in addition to the graptolites. The discovery of strata furnishing an abundant and varied fauna is, therefore, of considerable interest.

The beds carrying these fossils are nearly vertical and situated north of the Dudley Observatory on the line of the New York Central railroad.

A CATALOGUE

OF THE

PUBLISHED WORKS OF JAMES HALL, LL.D.

1836–1882.

COMMUNICATED BY DR. DAVID MURRAY.

PART I.

BOOKS.

1. Geology of New York. Part IV, comprising the survey of the Fourth Geological District; pp. 682, maps and plates. Albany, 1843. 4to.
2. Fremont's Exploring Expedition: Appendix A. Geological formations; pp. 295–303. B. Organic Remains; pp. 304–310, 4 plates. Washington, 1845. 8vo.
3. Palæontology of New York. Vol. 1; pp. xxiii, 338; plates, 100. Albany, 1847. 4to.
4. Report on the Geology of the Lake Superior Land District. By J. W. Foster and J. D. Whitney:
    - Lower Silurian System. Chapter 9, pp. 140–151. Washington, 1851. 8vo.
    - Upper Silurian and Devonian Series. Ibid. Chapter 10, pp. 152–166.
    - Description of New and Rare Species of Fossils from the Palæozoic Series. Ibid. Chapter 13, pp. 203–231.
    - Parallelism of the Palæozoic Deposits of Europe and America. Ibid. Chapter 18, pp. 285–318.
5. Stansbury's Expedition to the Great Salt Lake. Geology and Palæontology; pp. 401–414. Philadelphia, 1852. 8vo.
6. Palæontology of New York. Vol. II; pp. viii, 362; 104 plates. Albany, 1852. 4to.
7. United States and Mexican Boundary Survey (Emory). Geology and Palæontology of the Boundary; pp. 103, 140, 20 plates. Washington, 1857. 4to. Also published in American Journal of Science, 2d Ser. See vol. 24, pp. 72–86. New Haven, 1857.
8. Geological Survey of the State of Iowa. Vol. I, part 1. Hall and Whitney. General Geology. Chapter II, pp. 35–44. Geology of Iowa. General Reconnoissance. Chapter III, pp. 45–46. Part II. Palæontology of Iowa. Chapter VIII, pp. 473–724, 29 plates. Albany, 1858. 4to.
9. Contributions to the Palæontology of Iowa, being descriptions of new species of Crinoidea and other fossils (supplement to vol. I, part II, of the Geological Report of Iowa); pp. 1–92, 3 plates. Albany, 1859.

10. Iowa Geological Survey. Supplement to vol. I, part II; pp. 1–4. 1859. 4to.
11. Palæontology of New York. Vol. III, part I, text; pp. xii, 522. Albany, 1859. 4to.
12. Supplement to Vol. 1, published in Palæontology of New York. Vol. III, pp. 495–529. Albany, 1859. 4to.
13. Palæontology of New York. Vol. III, pt. II, plates. 141 plates and explanations. Albany, 1861. 4to.
14. Report on the Geological Survey of the State of Wisconsin. Vol. I, James Hall and J. D. Whitney. Madison, 1862. 8vo.
    Chapter I, Physical Geography and General Geology, pp. 1–72.
    Chapter IX, Palæontology of Wisconsin; pp. 425–448.
15. Geological Survey of Canada, Figures and Descriptions of Canadian Organic Remains. Decade II. Graptolites of the Quebec Group; 151 pages, 23 plates. Montreal, 1865. 8vo. and 4to.
16. Palæontology of New York. Vol. IV, pt. I, pp. xi, 428, 69 plates. Albany, 1867. 4to.
17. Geological Survey of the State of Wisconsin, 1859–1863. Palæontology; part III. Organic Remains of the Niagara Group and Associated Limestones; pp. 1–94, 18 plates. Albany, 1871. 4to.
    (Same as published in 1864 in advance for 18th Report and 20th Report, New York State Museum of Natural History, 1867, under title of "Account of Some New or Little Known Species of Fossils from Rocks of the Age of the Niagara Group," also in revised edition of same in 1870.)
18. Geological Survey of Ohio. Vol. II. Geology and Palæontology; part II, Palæontology. Columbus, 1875. 8vo.
    Descriptions of Silurian Fossils, James Hall and R. P. Whitfield. Ibid., pp. 65–161.
19. Descriptions of Crinoidea from the Waverly Group, James Hall and R. P. Whitfield. Ibid., pp. 162–179.
20. Illustrations of Devonian Fossils; 7 pages, 133 plates, with interleaved descriptions. Albany, 1876. 4to.
21. United States Geological Exploration of the Fortieth Parallel. Clarence King. Vol. IV. Ornithology and Palæontology; part II. Palæontology, James Hall and R. P. Whitfield; pages 199–302, 7 plates. Washington, 1877. 4to.
22. Palæontology of New York. Vol. V, pt. II, text pp. xv, 492, plates 120. Albany, 1879. 4to.

PART II.

SCIENTIFIC PAPERS PUBLISHED IN REPORTS, TRANSACTIONS OF SOCIETIES, JOURNALS, MAGAZINES, ETC.

N. B. — The title or an abstract only was given of papers in the list marked with an asterisk (*), as full notes were not furnished for publication.

1. Catalogue of Plants, Growing without Cultivation, in the Vicinity of Troy. John Wright and James Hall, 42 pages. Troy, 1836. 8vo.
2. Descriptions of two species of Trilobites, belonging to the genus PARADOXIDES. American Journal of Science and Arts. Vol. XXXIII, pp. 139–143. New Haven, 1837. 8vo.
3. Second Annual Report of the Fourth Geological District of New York. Assembly Doc. 200, pp. 287–373. Albany, 1838. 8vo.
4. Third Annual Report of the Fourth Geological District of the State of New York. Assembly Doc. 275, pp. 287–339. Albany, 1839. 8vo.
5. Fourth Annual Report of the Survey of the Fourth Geological District. Assembly Doc. 50, pp. 389–456. Albany, 1840. 8vo.
6. Fifth Annual Report of the Fourth Geological District. Assembly Doc. 150, pp. 149–180. Albany, 1841. 8vo.
7. Notes explanatory of a section from Cleveland, Ohio, to the Mississippi river, in a south-west direction, with remarks upon the Identity of the Western Formations with those of New York. Transactions of the Association of American Geologists and Naturalists; pp. 267–293. Boston, 1842. 8vo.
8. Remarks upon Casts of Mud Furrows, Wave Lines, and other Markings upon Rocks of the New York System. Ibid., pp. 422–432.
9. Niagara Falls. Their physical changes and the Geology and Topography of the surrounding country. Boston Journal of Natural History. Vol. IV, pp. 106–134. Boston, 1842. 8vo.
10. Notes upon the Geology of the Western States. American Journal of Science and Arts. Vol. XLII, pp. 51–62. New Haven, 1842. 8vo.
11. * Geographical Distribution of Fossils of the Palæozoic Strata of the United States. Proc. Am. Assoc. Geol. and Naturalists published in American Journal of Science and Arts. Vol. 45, pp. 157–160. New Haven, 1843. 8vo.

12. * Ripple Marks and Casts of Furrows. Ibid. Vol. 45, pp. 148–149. New Haven, 1843. 8vo.
13. * Sections at Portage. Ibid. Vol. 45, pp. 329–330. New Haven, 1843. 8vo.
14. Address before the Society of Natural History of the Auburn Theological Seminary, 1843; pp. 1–20. Auburn, 1844. 8vo.
15. * Geographical Distribution of Fossils. American Journal of Science, vol. 47, pp. 117–118. New Haven, 1844. 8vo.
16. Description of Some Microscopic Shells from the Decomposing Marl Slate of Cincinnati. Ibid. Vol. 48, pp. 292–295. New Haven, 1845. 8vo.
17. Notice of the Geological Position of the Cranium of the Castoroides Ohioensis. Boston Journal of Natural History, vol. V, pp. 385–391. Boston, 1846. 8vo.
18. * On the supposed impression in Shale of the soft parts of an Orthoceras. Quar. Journal, Geological Society, London, vol. V, pp. 107–111. London, 1848. 8vo.
19. On the Parallelism of the Palæozoic Deposits of North America, with those of Europe; followed by a table of the species of fossils common to the two continents, with indication of the positions in which they occur, and terminated by a critical examination of each of these species; by Ed. de Verneuil (translated and condensed from the Bulletin of the Geological Society of France, 2d Ser., vol. IV). Am. Jour. Science and Arts. 2d Ser., vol. V, pp. 176–183, 359–370. New Haven, 1848. 8vo. Ibid. 2d Ser., vol. VII, pp. 45–51, 218–231. New Haven, 1849. 8vo.
20. Remarks on the Observations of S. S. Haldeman "on the supposed identity of Atops trilineatus with Triarthrus Beckii." Am. Jour. Sci. and Arts, 2d Ser. vol. V, pp. 322–327. New Haven, 1848. 8vo.
21. Catalogue of Specimens in the Geological Department of the Geological Survey of New York. First Ann. Report on the State Cab. of Nat. Hist., 39 pages. Albany, 1848. 8vo.
22. Catalogue of specimens in the Palæontological Department of the Geological Survey of New York. Ibid., 15 pages.
23. * Upon some of the Results of the Palæontological Investigations in the State of New York. Am. Jour. Sci., 2d. Ser., vol. V, pp. 243–249. New Haven, 1848. 8vo.
24. List of Minerals, Geological Specimens and Fossils, added to the collections, 1847, 1848. Second Ann. Report of State Cab. of Nat. Hist.; 4 pages. Albany, 1849. 8vo.
25. On the Trails and Tracks in the Sandstones of the Clinton Group of New York; their probable origin, etc.; and a comparison of some of them with Nereites and Myrianites. Proc. Am. Ass. Ad. Sci., 2d meeting (Cambridge), 1849, pp. 256–260. Boston, 1850. 8vo.
26. On the Brachiopoda of the Silurian Period; particularly the Leptænidae. Ibid., pp 347–350.
27. On Graptolites, their Duration in Geological Periods, and their Value in the Identification of Strata. Ibid., pp. 351–352.
28. Description of New Species of Fossils, and Observations upon some other Species previously not well known, from the Trenton Limestone. Third Ann. Report State Cab. Nat. Hist., pp. 167–175, 5 plates. Albany, 1850. 8vo.

29. * Remarks on the Geology of Mackinac, Drummond and St. Joseph's Islands and the Northern Shores of Lake Michigan. Proc. Am. Assoc. Ad. Sci., 4th meeting (New Haven), 1850, p. 354. Washington, 1851. 8vo.
30. * Report on the Invertebrate Fossils exhibited to the Association. Proc. Am. Assoc. Ad. Sci., 5th meeting (Cincinnati), 1851, p. 180. Washington, 1851. 8vo.
31. * Parallelism of the Palæozoic Rocks of New York, with those of the Western States, and of all those with the Palæozoic Strata of Europe. Ibid., p. 59.
32. * On the Silurian Rocks of the Lake Superior Land District. Ibid., pp. 64–66.
33. * Catalogue of specimens of the Rocks and Fossils in the Gray Sandstone, Medina Sandstone, Clinton Group, Niagara Group, Onondaga Salt Group, and a part of the Waterlime Group. 4th An. Rep. N. Y. St. Cab. Nat. Hist., pp. 119–146. Albany, 1851. 8vo.
34. On Drummond's Island. Proc. Am. Acad. Arts and Sciences, vol. II, pp. 253, 254. Boston, 1852.
35. * Comparison of the Geological Features of Tennessee with those of the State of New York. Proc. Am. Assoc. Ad. Sci., 6th meeting (Albany), 1851, pp. 256–259. Washington, 1852.
36. * Remarks upon the Fossil Corals of the Genus Favosites, and allied Fossil Genera Favistella, Astrocerium and others. Ibid., p. 306.
37. * On the Palæozoic Genera Trematopora, Cellepora, etc. Ibid., p. 306.
38. * Tracks, Trails, etc., in the Shales and Sandstones of the Clinton Group from Green Bay, with remarks on the thinning out and reappearing of this portion of the Clinton Group. Ibid., p. 306.
39. * Remarks on the Trilobite of the Potsdam Sandstone, named by Dr. Owen, *Dikellocephalus*, and its Relations to Asaphus and Ogygia. Ibid., p. 301.
40. * Remarks upon the Fossils of the Potsdam Sandstone. Ibid., p. 304.
41. Notice of a Geological Map of the United States and the British Provinces of North America, with Explanatory Text, Geological Sections and Plates of the Fossils which characterize the formations, by J. Marcou. Am. Jour. Sci., 2d Ser., vol. 17, pp. 199–206. New Haven, 1854. 8vo.
42. Rapport sur la Partie Geologique de l'Exposition de New York. C. Lyell and J. Hall. Traduit par M. A. Langel. Annales des Mines, vol. VI, pp. 1–85. Paris, 1854. 8vo.
43. Report on Coal Lands in Kentucky, for the Kentucky Mining and Manufacturing Company. B. Silliman and J. Hall, pp. 16. New York, 1855. 8vo.
44. * Observations upon the Geology of the Mauvaises Terres, Nebraska, with Notices of the Geographical and Geological Range of some of the Fossils of that Region. Proc. Am. Ass. Ad. Sci., 8th meeting, Washington, 1854, p. 290. Cambridge, 1855. 8vo.
45. * Remarks upon a Collection of Cretaceous Fossils from Nebraska, and the Absence of Species known in the Southern Extension of the Same Formation. Ibid., p. 290.

46. * Remarks upon the Results of Extensive and Continued Collections of Fossil Species from a Portion of the Silurian Rocks of New York, showing the Number of Species and Individuals of each Species Obtained from a Limited Locality during a Period of Ten Years. Ibid., p. 290.
47. * On the Reproduction of Similar Types or Representative Species in Successive Geological Formations. Illustrated by a Collection of Species of the Brachiopoda from the Niagara and Lower Helderberg Groups of the Palæozoic Rocks of the United States. Ibid., p. 290.
48. * Red Sandstone of the Connecticut River Valley, and the Proofs of its Oölitic or Liassic Age. Ibid., p. 290.
49. * Remarks upon the Geological Formation of the country along the Line of the [Mexican] Boundary Survey, based upon the Examinations of Dr. Parry, made under the Order of Major [W. H.] Emory. Ibid., p. 291.
50. * The Silurian and Devonian Systems, and the Nature of the Evidence for Drawing a Line of Separation between the two Systems in the United States. Ibid., p. 291.
51. * On the Western Limits of the Cretaceous Formation on the Northern Continent of America, as Evidenced by the Various Collections that have been made by Exploring Expeditions under the Direction of the Government of the United States. Ibid., p. 291.
52. * Contributions to our Knowledge of the Geology of Nebraska and the Mauvaises Terres. Proc. Am. Ass. Ad. Sci., 9th meeting, Providence, 1855, p. 277. Cambridge, 1856. 8vo.
53. * Notes upon the Genus Graptolithus. Ibid., p. 277.
54. * On the Development of the Septa in the Genus Baculites, from the extreme Young to the Adult State. Ibid., p. 277.
55. Descriptions of New Species of Fossils from the Cretaceous Formations of Nebraska, with Observations upon Baculites ovatus and B. compressus; and the Progressive Development of the Septa in Baculites, Ammonites and Scaphites. J. Hall and F. B. Meek. Memoirs of the American Academy of Arts and Sciences, vol. V, new series, pp. 379–411, 8 plates. Cambridge, 1856. 4to.
56. On the Genus Tellinomya, and Allied Genera. The Canad. Nat. and Geol., vol. 1, pp. 390–395. Montreal, 1856. 8vo.
57. Observations on the Genus Archimedes, or Fenestella, with Descriptions of Species, etc. Proc. Am. Ass. Ad. Sci., 10th meeting, Albany, 1856, pp. 176–180. Cambridge, 1857. 8vo.
58. On the Carboniferous Limestones of the Mississippi Valley. Ibid., pp. 51–69.
59. Opening Address before the Am. Association. Ibid., pp. 230–232.
60. * On some Points in the Geology of the Upper Mississippi Valley. Ibid., p. 226.
61. * On the Results of Collections of Fossils during a Period of Ten Years in the Limestones of the Lower Helderberg. Ibid., p. 227.
62. Observations upon the Carboniferous Limestones of the Mississippi Valley. [Abstract.] Am. Jour. Sci., 2d Ser., vol. 23, pp. 187–203. New Haven, 1857. 8vo.

63. Remarks upon the Genus Archimedes or Fenestella from the Carboniferous Limestones of the Mississippi Valley. Ibid., pp. 203, 204.
64. Observations upon the Cretaceous Strata of the United States with Reference to the Relative Position of Fossils Collected by the [Mexican] Boundary Commission. Am. Jour. Sci. and Arts, 2d Ser., vol. 24, pp. 72–86. New Haven, 1857. 8vo.
65. Descriptions of Palæozoic Fossils. 10th Ann. Rep. St. Cab. Nat. Hist., App. C., pp. 41–180. Albany, 1857. 8vo.
66. * On the Cretaceous Formations of the United States and the North American Continent. Pro. Am. Ass. Ad. Sci., 11th meeting (Montreal), 1857, p. 158. Cambridge, 1858. 8vo.
67. * On the Carboniferous Limestones and Coal Measures of the United States. (Published in the Geological Report of Iowa, 1858.) Ibid., p. 158.
68. * On the Direction of Ancient Currents of Deposition, and the Source of Materials in the Older Palæozoic Rocks, with Remarks on the Origin of the Appalachian Chain of Mountains. Ibid., p. 158.
69. Contributions to the Geological History of the American Continent. (The address of the retiring President, delivered before the First Montreal Meeting of the American Association for the Advancement of Science, August, 1857.) Published in the Proc. Am. Ass. Ad. Sci., 2d Montreal Meeting, 1882, pp. 29–71. Salem, 1883.
70. Notes upon the Genus Graptolithus, and Description of Some Remarkable New Forms from the Shales of the Hudson River Group, discovered in the Investigations of the Geological Survey of Canada, under the Direction of Sir W. E. Logan, F. R. S. Canadian Naturalist and Geol., vol. 3, pp. 139–150, and 161–177. Montreal, 1858. 8vo.
71. * Observations upon the Genus Graptolithus and allied Genera. Proc. Am. Ass. Adv. Sci., 12th meeting, Baltimore, 1858, p. 287. Cambridge, 1859. 8vo.
72. * Observations upon the Genus Meganteris and other Palæozoic Brachiopoda. Ibid., p. 287.

    Contributions to the Palæontology of New York. 12th Ann. Rept. Cab. Nat. Hist. Albany, 1859. 8vo.
73. Notice of the Genera Ambonychia, Palæarca and Megambonia. Ibid., pp. 8–14.
74. Observations on the Genera Capulus, Pileopsis, Acroculia, and Platyceras. Ibid., pp. 15–22.
75. Observations on the Genera Platyostoma and Strophoslylus. Ibid., pp. 20–22.
76. Observations on the Genus Nucleospira. Ibid., pp. 23–34.
77. Observations on the Genus Eatonia. Ibid., pp. 34–37.
78. Observations on the Genus Rensselaeria. Ibid., pp. 38–41.
79. Observations on the Genus Camarium. Ibid., pp. 42–44.
80. Notes upon the Genus Graptolithus. Ibid., pp. 45–58.
81. Trilobites of the Shales of the Hudson River Group. Ibid., pp. 59–62.

82. Catalogue of the Species of Fossils described in volumes I, II, III, of the Palæontology of New York; with the Corrections on Nomenclature, as far as determined to the present time. Ibid., pp. 63–87.
83. Corrected List of the Fossils described in the Report of the Fourth Geological District of New York. Ibid., pp. 87–92.
84. Catalogue of the Species of Fossils described in the Third Volume of the Palæontology of New York. Ibid., pp. 93–96.
85. Supplementary note on the Genus Ambonychia. Ibid., p. 110.
86. New Species of Fossils from the Niagara Group of Wisconsin. Report of Progress for 1859, pp. 1–4. Albany, 1860. 8vo.
87. Descriptions of New Species of Fossils from the Silurian Rocks of Nova Scotia. Can. Nat. and Geol., vol. V, pp. 144–159. Montreal, 1860. 8vo.
88. * Relations of the Genus Eurypterus. Proc. Am. Acad. Arts and Sci. 1859, vol. IV, p. 353. Boston, 1860. 8vo.

Contributions to Palæontology, 1858 and 1859. 13th Ann. Rep. N. Y. St. Cab. Nat. Hist., Appendix F. Albany, 1860. 8vo.

89. Notices of New Forms of the Genus Graptolithus and Allied Genera. Ibid., pp. 55–64.
    [From Supp. to vol. I, Pal. N. Y., published in vol. III.]
90. On Rhynchonella, etc. Ibid., pp. 65–69.
91. Observations on Orthis, Skenidium, Ambocœlia, etc. Ibid., pp. 69–73.
92. Observations on the Genera Athyris (= Spirigera), Merista (= Camarium), Meristella and Leiorhynchus. Ibid., pp. 73–75.
93. Descriptions of New Species of Fossils from the Hamilton Group of Western New York, with Notices of others from the same Horizon in Iowa and Indiana. Ibid., pp. 76–94.
94. Notes and Observations upon the Fossils of the Goniatite Limestone in the Marcellus Shale of the Hamilton Group, in the Eastern and Central parts of the State of New York, and those of Goniatite Beds of Rockford, Indiana; with some analogous forms from the Hamilton Group proper. Ibid., pp. 95–112.
95. Note upon the Trilobites of the Shales of the Quebec Group in the town of Georgia, Vermont. Ibid., pp. 113–119.
96. New Species of Fossils from the Hudson River Group of Ohio and other Western States. Ibid., pp. 119–121.
97. Observations upon a New Genus of Crinoidea, Cheirocrinus. Ibid., p. 121. 8vo.
98. Descriptions of New Species of Crinoidea; from Investigations of the Iowa Geological Survey. Preliminary Notice, p. 19. Albany, 1861. 8vo.
99. Report of the Superintendent of the Geological Survey, exhibiting the Progress of the Work. Geological Survey of Wisconsin; Descriptions of New Species of Fossils from the Investigations of the Survey. pp. 52. Madison, 1861. 8vo.
100. New Species of Orthoceras. Geol. of Vermont, p. 718. Claremont, N. H., 1861. 4to.

Contributions to Palæontology. Being some of the Results of Investigations made during the years 1859 and 1860. 14th Ann. Rept. St. Cab. *Appendix C.* Albany, 1861. 8vo.

101. Observations upon some New and Other Species of Fossils, from the Rocks of the Hudson River Group of Ohio and the Western States; with descriptions. Ibid., pp. 89–92.
102. Note on the Genera Bellerophon, Bucania, Carinaropsis, and Cyrtolites. Ibid., pp. 93–98.
103. Descriptions of New Species of Fossils from the Upper Helderberg, Hamilton and Chemung groups; with observations upon previously described species. Ibid., pp. 99–109.
104. Descriptions of New Species of Crinoidea from the Carboniferous Rocks of the Mississippi Valley. Jour. Bos. Soc. Nat. Hist., vol. 7, pp. 251–328. Boston, 1861. 8vo. Also pub. separate August, 1872, with 7 plates.
105. On the primordial Fauna and Point Levis Fossils. Am. Jour. Sci. and Arts, 2d ser., vol. 31, pp. 220–226. New Haven, 1861. 8vo. Also Pub. in Can. Nat. and Geol., vol. VI, pp. 113–120. Montreal, 1861.
106. On the Potsdam Sandstone and Hudson River Rocks in Vermont. Am. Jour. Sci. and Arts, vol. 33, pp. 106–107. New Haven, 1862. 8vo.
107. Rejoinder to Criticisms on Contributions to Palæontology. Ibid., pp. 127–132.
108. * On the Formation of Mountain Chains. Proc. Amer. Acad. Arts. and Sci. [1861], vol. V, pp. 240–241. Boston, 1862. 8vo.

Contributions to Palæontology. (Continuation of Appendix C.) Descriptions of New Species of Fossils from the Upper Helderberg, Hamilton and Chemung Groups, continued from page 109 of the 14th Annual Report of the Regents of the University upon the State Cabinet. 15th Ann. Rept. N. Y. St. Cab. Nat. His. Albany, 1862. 8vo.

109. Contributions to Palæontology. Ibid., pp. 1–53.
110. Preliminary Notice of the Trilobites and other Crustacea of the Upper Helderberg, Hamilton and Chemung Groups. Ibid., pp. 54–86. (Published 1861, Sept.)
111. Preliminary notice of some of the Species of Crinoidea, known in the Upper Helderberg and Hamilton Groups of New York. Ibid., pp. 87–125.
112. Observations upon a New Genus of Brachiopoda. Ibid., pp. 126–127.
113. Observations on the Genera Athyris — Spirigera, etc. (Reprinted from the 13th Report with explanation.) Ibid., pp. 148–163.
114. Note on the Genus Cypricardites. Ibid., pp. 164–165.
115. Notes and Corrections. Ibid., pp. 167–169.
116. On a New Crustacean from the Potsdam Sandstone. Can. Nat. and Geol., vol. 7, pp. 443–445. Montreal, 1863.

Contributions to Palæontology; principally from investigation made during the years 1861 and 1862. 16th Ann. Rept. N. Y. St. Cab. Nat. His. Appendix D. Albany, 1863. 8vo.

117. Descriptions of New Species of Brachiopoda, from the Upper Helderberg, Hamilton and Chemung Groups. Ibid., pp. 19.

118. Observations upon some of the Brachiopoda, with Reference to the Characters of the Genera Cryptonella, Centronella, Meristella, Trematospira, Rhynchospira, Retzia, Leptocœlia and allied forms. Ibid., pp. 38–61.
119. Observations upon the Genus Streptorhynchus, with remarks upon some species heretofore referred to the Genera Strophomena and Orthis. Ibid., pp. 61–66.
120. Note on the Geological Range of the Genus Receptaculites in American Palæozoic Strata. Ibid., pp. 67–69.
121. Note on the Occurrence of Astylospongia in the Lower Helderberg Rocks. Ibid., pp. 69–70.
122. On the Occurrence of Crustacean Remains of the Genera Ceratiocaris and Dithyrocaris, with a notice of some new species from the Hamilton Group and Genesee Slate [with a plate]. Ibid., pp. 71–75.
123. Observations upon some Spiral-growing Fucoidal Remains of the Palæozoic Rocks of New York. Ibid., pp. 76–83, 1 plate.
124. Observations upon the Genera Uphantænia and Dictyophyton; with notices of some species from the Chemung Group of New York, and the Waverly Sandstone of Ohio. Ibid., pp. 84–91, 4 plates.
125. The Flora of the Devonian Period. Ibid., pp. 92–109, 4 plates.
126. Preliminary Notice of the Fauna of the Potsdam Sandstone; with remarks upon the Previously known species of Fossils, and Descriptions of some New Ones, from the Sandstone of the Upper Mississippi Valley. Ibid., pp. 119–209, 6 plates.
127. Supplementary Note on the Potsdam Sandstone. Ibid., pp. 210–222.
128. Notes and Corrections. Ibid., pp. 223–226.
129. Observations upon some of the Brachiopoda, with reference to the Genera Cryptonella, Centronella, Meristella, and allied forms. Trans. Albany Institute, vol. IV, pp. 125–147 [1863]. Albany, 1864. 8vo. Also published in Am. Jour. Sci., 2d Ser., vol. 35, pp. 396–406; vol. 36, pp. 11–15. New Haven, 1863. 8vo.
130. Preliminary Notice of some Species of Crinoidea from the Waverly Sandstone Series, of Summit county, Ohio, supposed to be of the age of the Chemung Group of New York. Seventeenth Ann. Report N. Y. State Cab. Nat. Hist., pp. 50–60. Published in advance. Albany, 1863. 8vo.
131. Descriptions of New Species of Fossils from the Carboniferous Limestones of Indiana and Illinois. Read in 1856 and published separately. Trans. Alb. Inst., vol. IV. 1864.
132. * On the Genus Eurypterus. Ibid., p. 280. 1860. 8vo.
133. * On the Formation of Mountain Chains. Ibid., pp. 284–285.
134. * On the Geology of Wisconsin. Ibid., pp. 288, 295. 1864.
135. * Remarks on Oil Springs. Ibid., p. 303.
136. * Remarks on the Taconic System. Ibid., pp. 289, 292, 293.
137. * On the Niagara Group. Ibid., p. 301.
138. Notice of some New Species of Fossils from a locality of the Niagara Group in Indiana; with a List of Identified Species from the Same Place. Ibid., pp. 195–228 [1862]. Albany, 1864. 8vo.

139. Notes upon the Oil Region of Canada West, and its Geographical Relations; 7 pages. 1865.
140. Report upon the Property of the Empire State Iron and Coal Company of Georgia [giving some account of the geology of North-western Georgia]; 24 pages. Albany, 1866. 8vo.
141. Descriptions of some New Species of Crinoidea and other Fossils from the Lower Silurian Strata of the Age of the Hudson River Group and Trenton Limestone; 17 pages. Printed in advance from the Report of the State Cabinet for 1866. Albany, 1866. 8vo. Also published in 24th Report, 1872.
142. Observations upon some Species of Spirifera; being the concluding remarks of the chapter on the descriptions of species of that genus from the Upper Helderberg, Hamilton and Chemung Groups. From the Palæontology of New York, vol. IV, pp. 252–257; unpublished. Proc. Am. Philos. Soc., vol. X, pp. 246–254. Philadelphia, 1866. 8vo.
143. On the Occurrence of an Internal Coluvoluted Plate within the Body of Certain Species of Crinoidea. Proc. Boston Soc. Nat. Hist., 1864, vol. X, pp. 33, 34. Boston, 1866. 8vo.
144. Notes upon the Geology of some Portions of Minnesota; from St. Paul to the Western part of the State. Trans. Am. Philos. Soc., 1866, pp. 329–340 Philadelphia, 1867. 4to.
145. * On the Structure of the Mountains and Valleys in Tennessee, Northern Georgia and Alabama. Proc. Am. Ass. Adv. Sci., 15th meeting (Buffalo), 1866, p. 105. Cambridge, 1867. 8vo.
146. * Remarks on the Geological Structure of Southern Minnesota. Ibid., p. 105.
147. * Observations on the Structure and Mode of Growth of the Spines on the Cardinal Area of Chonetes, with Remarks on the Distribution of some Species of the Genus. Ibid., p. 105.
148. * On the Structure of the Spines in the Genera Athyris, Meristella, and other Genera of Spiriferidae. Ibid., p. 105.
149. * On some Characters of Spirifera, and the Geographical and Geological distribution of some of the Species. Ibid., p. 106.
150. Notice of volume IV of the Palæontology of New York. Twentieth Ann. Report N. Y. State Cab. Nat. Hist., pp. 145–167. Albany, 1867 8vo. Also printed separately.

Contributions to Palæontology. Ibid.

151. Introduction to the study of the Graptolitidæ. Ibid., pp. 169–240, 4 plates.
152. The Genus Chonetes. Ibid., pp. 242–244.
153. Remarks on the Genera Productus, Strophalosia, Aulosteges and Productella. Ibid., pp. 245–250.
154. On the Genera Spirifera, Cyrtina, and allied genera. Ibid., pp. 251–257.
155. On the Genera Athyris, Merista and Meristella. Ibid., pp. 258–266.
156. Note upon the Genus Zygospira and its Relations to Atrypa. Ibid., pp. 267–268.
157. Remarks upon the Genera Rhynchonella and Leiorhynchus. Ibid., pp. 269–273.
158. Note on the Genus Eichwaldia. Ibid., pp. 274–278.

159. On the Genus Tropidoleptus. Ibid., pp. 279–281.
160. Note on the Genus Palæaster, with descriptions of some new species and observations upon those previously described. Ibid., pp. 282–303, 1 plate.
161. Account of some new or little known Species of Fossils from Rocks of the age of the Niagara Group (originally printed in advance for the 18th Report in the New York State Cabinet, 1864). Ibid., pp. 305–401, 15 plates.
162. * Observations on the Genus Streptorhynchus. Ibid., p. 241.
163. * Observations on the Genus Strophodonta. Ibid., p. 241.
164. * On the Genera Pentamerus and Stricklandinia, and their supposed relations with Rensselæria. Ibid., p. 273.
165. * On the Genera Terebraluta, Centronella, Cryptonella, etc. Ibid., p. 279.
166. * Descriptions of some new species of Crinoidea, and other fossils from the Lower Silurian strata, principally of the age of the Hudson River Group. Ibid., p. 304.
167. * Descriptions of Bryozoa and Corals from the Lower Helderberg Group of New York. Ibid., p. 304 (published in 26th Report, 1874).
168. * Descriptions of Bryozoa, etc., from the Upper Helderberg and Hamilton Groups of New York. Ibid., p. 304 (published in Trans. Alb. Inst., 1882).
169. * Miscellaneous Notices. Ibid., p. 304.
170. * On the Geological Relations of the Mastodon and Fossil Elephant. (See 21st Report on the State Cabinet of Natural History, Albany, 1871.) Am. Assoc. Ad. Sci., 16th meeting, Burlington, 1867; p. 161. Cambridge, 1868. 8vo.
171. * On the Geographical Distribution of the Sediments and of the Fossils in the Hamilton, Portage and Chemung Groups of New York. Ibid., p. 161.
172. * On the Value of the term Hudson River Group in Geological Nomenclature. (See also for printed notes Proceedings Nashville meeting, Am. Ass. Ad. Sci. 1877.) Ibid., p. 161.
173. * On the Occurrence of Fossil Sponges in the Successive Groups of the Palæozoic Series. Ibid., p. 161.
174. Geological History of the North American Continent; a lecture delivered before the American Institute in New York; p 24. Albany, 1869. 8vo.
175. * Preliminary Notice of the Lamellibranchiata of the Upper Helderberg, Hamilton and Chemung groups. Proc. A. A. Sci., 18th meeting, Salem, 1869; p. 282. Cambridge, 1870. 8vo.
176. Preliminary Notice of the Lamellibranchiate Shells of the Upper Helderberg, Hamilton and Chemung Groups, with others from the Waverly Sandstones. (Preparatory for the Palæontology of New York.) Part II. (State Cab. Nat. Hist., December, 1869); pp. 97. Albany, 1870. 8vo.
177. * Recent Progress in Geology. Trans. Alb. Inst., 1865. Vol. VI, pp. 291–294. Albany, 1870. 8vo.
178. * Notice of the Fossil Plants of the Hamilton and Chemung Groups, with reference to the Source of the Sediments of these Formations. Proc. Am. Assoc. Ad. Sci., 19th meeting, Troy, 1870; p. 362. Cambridge, 1871. 8vo.

179. * On the Relation of the Oneonta Sandstone and Montrose Sandstone of Vanuxem to the Hamilton and Chemung Groups. Ibid., p. 362.
180. * Note upon the Rocks of the Huronian System on the Peninsula of Michigan. Ibid., p. 362.
181. * Remarks on the Occurrence of the Genus Dithyrocaris in the Hamilton and Chemung Rocks of New York. Ibid., p. 363.
182. Notes and Observations on the Cohoes Mastodon. 21st Ann. Rept. N. Y. St. Cab. Nat. Hist., 1868; pp. 99–148 and maps. Albany, 1871. 8vo.
183. * Remarks upon the Catskill Red Sandstone Group as it occurs upon the Borders of New York and Pennsylvania. Proc. Am. Ass. Adv. Sci., 20th meeting, Indianapolis, 1871; p. 418. Cambridge, 1872. 8vo.
184. Reply to a "Note on a question of Priority." Am. Jour. Sci. and Arts, 3d Ser., vol. IV, pp. 105–109. New Haven, 1872. 8vo.
185. Report on the Water Supply of the City of Albany. Trans. Alb. Inst., vol. VIII, pp. 218–227, 1872. J. Hall, G. W. Hough, T. Hun, L. C. Cooley. Albany, 1872. 8vo.
186. The New York State Museum of Natural History; Its History and Present Condition. 8vo., 4 pages.
    Printed as a pamphlet, taken from the Albany Evening Times February 5, 1873.
187. Descriptions of New Species of Fossils from the Devonian Rocks of Iowa. J. Hall and R. P. Whitfield. 23d Ann. Rept. S. Cab. Nat. Hist.; pp. 223–239. Albany, 1873 (should be 1872). 8vo.
188. Notice of Three New Species of Fossil Shells from the Devonian of Ohio. J. Hall and R. P. Whitfield. Ibid., pp. 240–241.
189. Notice of Two New Species of Fossil Shells from the Potsdam Sandstone of New York. J. Hall and R. P. Whitfield. Ibid., pp. 241–242.
190. Notes on some New or Imperfectly Known Forms among the Brachiopoda, etc. (published March, 1871 · reprinted with explanation of figures March, 1873.) Ibid., pp. 244–247.
191. Descriptions of New Species of Fossils from the Vicinity of Louisville, Kentucky, and the Falls of the Ohio. J. Hall and R. P. Whitfield. 24th Ann. Rept. N.Y. St. Mus. Nat. Hist., pp. 181–200. (6 pl. for same in 27th Rep.) Albany, 1872. 8vo.
192. Report on Fossils Trees of Schoharie County. Ibid., pp. 15–16.
193. Remarks on Some Peculiar Impressions on Sandstone of the Chemung Group, New York. J. Hall and R. P. Whitfield. Ibid., pp. 201–204.
194. Descriptions of New Species of Crinoidea and Other Fossils from Strata of the Age of the Hudson River Group and Trenton Limestone. (In part previously published 1866.) Ibid., pp. 205–224, 3 pl.
195. Descriptions of New Species of Fossils from the Hudson River Group, in the Vicinity of Cincinnati, Ohio. Ibid., pp. 225–232, 1 pl. (Published October, 1871, in advance of the State Cab. Rep.)

196. * On the occurrence of Trunks of Psaronius in an erect position, resting on their original bed, in Rocks of Devonian Age in the State of New York; with some Inferences regarding the Condition of the Sea-Bottom and Shore-line during the Deposition of the Strata. Report of the British Association for the Advancement of Science, 42d meeting (Brighton), 1872, p. 103. London, 1873.

197. * On the Relations of the Middle and Upper Silurian (Clinton, Niagara and Lower Helderbergs) Rocks of the United States. Ibid., pp. 103–104. (Published in full in the Geological Magazine, vol. IX. London, 1872. 4 pp.

198. On the Relations of the Niagara and Lower Helderberg Formations, and their Geographical Distribution in the United States and Canada. Proc. Am. Assoc. Ad. Sci., 22d meeting (Portland, 1873), pp. 321–335. Salem, 1874. 8vo. (Also published in 27th Ann. Rept. St. Mus., 1875, with map.)

199. Descriptions of Bryozoa and Corals of the Lower Helderberg Group. 26th Ann. Rept. N. Y. St. Mus. Nat. Hist., pp. 93–115. (Published in advance.) Albany, 1874. 8vo.

200. The Anderson School of Natural History and Geology of Penikese Island. Field meeting Albany Institute. 4 pp. Albany, 1874. 8vo.

201. Descriptions of New Species Goniatitidæ, with a list of previously described species. 27th Rep. N. Y. St. Mus. Nat. Hist., pp. 132–136. (Also published in advance, 1874.) Albany, 1875. 8vo.

202. On the Geology of the Southern Counties of New York and adjacent parts of Pennsylvania, especially with reference to the Age and Structure of the Catskill Mountain Range. Proc. Am. Assoc. Ad. Sci., 24th meeting (Detroit), 1875, pp. 80–84. Salem, 1876. 8vo. Also published in American Journal, 3d Series, vol. 12, pp. 300–304. New Haven, 1876. 8vo.

203. The Fauna of the Niagara Group in Central Indiana. 28th Rept. N. Y. St. Mus. Nat. Hist., documentary edition. 32 plates and explanations, 1875. Albany, 1876.

204. * Note upon the Geological position of the Serpentine Limestone of Northern New York and an Inquiry regarding the relations of this Limestone to the Eozoön Limestone of Canada. Proc. Am. Assoc. Ad. Sci., 25th meeting (Buffalo), 1876, p. 385. Salem, 1877. 8vo. Published in Am. Jour., 3d Ser., vol. 12, pp. 298–300, 1876.

205. Note upon the History and value of the Term Hudson River Group in American Geological Nomenclature. Proc. Am. Assoc. Ad. Sci., 26th meeting (Nashville), 1877, pp. 259–265. Salem, 1878. 8vo.

206. The Hydraulic Beds and Associated Limestones at the falls of the Ohio. Trans. Alb. Inst., vol. IX, pp. 167–180, 1877. Albany, 1879. 8vo. Also published in Pal. N. Y., vol. V, pt. ii, pp. 139–148. Albany, 1879. 4to.

207. Note on the Genus Plumalina. 30th Rept. N.Y. St. Mus. Nat. Hist., pp. 255–256, 1 pl. Albany, 1878. Mus. Ed., 1879. 8vo.

208. The Fauna of the Niagara Group in Central Indiana. 28th Rep., State Museum Edition, pp. 99, 203, 32 pl. Albany, 1879. 8vo.
209. Notice of Some Remarkable Crinoidal Forms from the Lower Helderberg Group. Ibid., pp. 205–210, 3 pl. Also published in 4to. Albany, 1880.
210. De la Nomenclature des Terrains Palæozoiques aux Etats-Unis. Extrait du Cong. Internat. de Geologie, 1878, pp. 1–8. Paris, 1880.
211. * The Fauna of the Lower Helderberg Group, in relation to the Corals, Bryozoa and Echinodermata. Proc. Am. Assoc. Ad. Sci., 28th meeting (Saratoga), 1879, p. 488. Salem, 1880. 8vo.
212. * Notes upon the Genera Fenestella, Hemitrypa, etc. Ibid., p. 488.
213. * On the present condition of the work upon the Palæontology of New York. Ibid., p. 488.
214. Corals and Bryozoans of the Lower Helderberg Group. 32d Rept. N. Y. St. Museum of Nat. Hist., pp. 141–176. Albany, 1879. Also published separately and distributed 38 pp., 1880. Albany, 1880.
215. Notes upon the relations of the Oneonta and Montrose Sandstones of Vanuxem, and their Relation to the Sandstones of the Catskill Mountains. [Read before the National Academy of Science, New York meeting, November, 1882.] Science, vol. I, p. 280. New York, 1880. 4to.
216. Descriptions of New Species of Fossils from the Niagara Formation at Waldron, Indiana. Trans. Alb. Inst., vol. X, pp. 57–76. (Read 1879, and published separately in 1881.) Albany, 1882. 8vo.
217. Bryozoans of the Upper Helderberg Group. Trans. Alb. Inst. vol. X. (Read March, 1881, and published separately in 1881, 36 pp., 8vo.) Albany, 1882. 8vo.
218. Bryozoans of the Upper Helderberg and Hamilton Groups. Trans. Alb. Inst., vol. X, pp. 145–197. Albany, 1882. (Same as 217, with the addition of the Hamilton Bryozoa, published as a separate pamphlet 1882.)
219. Fossil Corals of the Niagara and Upper Helderberg Groups. Published in advance of the Annual Report of the State Museum of Nat. Hist. 8vo., pamph., pp. 59. August, 1882.
220. Descriptions of the Species of Fossils found in the Niagara Group at Waldron, Indiana. Indiana Department of Geology and Natural History. 11th Annual Report for 1881. 8vo., pp. 217–345. Indianapolis, 1882. (Also bound separate.)
221. * Note upon the Genus Plumalina [Plumalites in error]. Proc. Am. Assoc. Ad. Sci., 31st meeting (Montreal), 1882, p. 419. Salem, 1883.
222. On the relations of Dictyophyton, Phragmodictyum and similar forms with Uphantænia. Ibid., p. 419.

PLATE I.

PLANORBIS EXACUTUS.

Page 53.

Figs. 1, 2. Side views of two specimens, showing the position and form of the aperture, × 9.

Fig. 3. A sinistral example, retaining but few of the characters pertaining to the species, × 9. *Swamp, Greenbush, N. Y.*

SOMATOGYRUS SUBGLOBOSUS.

Page 54

Fig. 4. A shell presenting a carination around the upper portion of the volutions, and a narrow and angular aperture, × 3.

Mohawk river.

GILLIA ALTILIS.

Page 53.

Fig. 5. View of a biflexed specimen in which the three apical volutions are dextral and the fourth or outer volution is sinistral, × 9.

Hudson river, Albany, N. Y.

PHYSA ANCILLARIA.

Page 52.

Fig. 6. A specimen with an expanded aperture.

Fig. 7. An example in which the outer volution shows a tendency to uncoil. and the aperture to become circular.

Fig. 8. A deformed shell presenting a very deep sinus in the lower part of the aperture. All natural size. *Hudson river. Albany, N. Y.*

VALVATA TRICARINATA.

Page 53.

Fig. 9. A specimen with the volutions unrolled except at the apex, × 9.

Island creek, Albany, N. Y.

UNIO PRESSUS.

Page 55

Fig. 10. A left valve, showing an unusually alated cardinal extremity, and absence of radiating bands on the outer great zone of growth.

Fig. 11. A small right valve of a specimen, showing two broad radiating undulations. The shell is also higher than normal forms.

Fig. 12. Left valve with the anterior portion narrow and auriculate, umbo oblique, and the wing much reduced. Natural size.

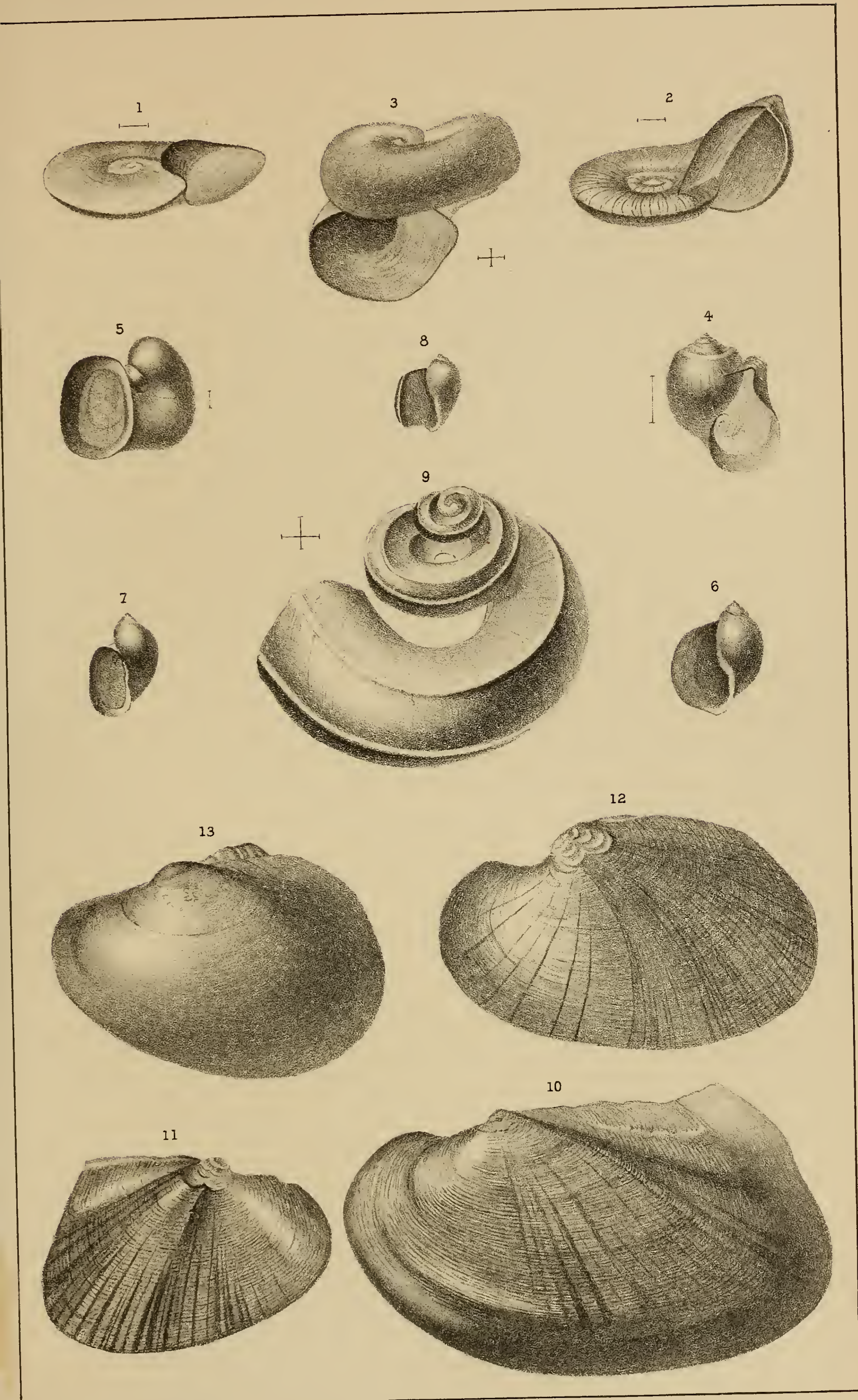
Normanskill.

UNIO CARIOSUS.

Page 54.

Fig. 13. A very gibbous left valve, narrowed in front and flattened on the ventral margins. Female; natural size.

Hudson river, Albany, N. Y.



C. E. Beecher, del.

Weed, Parsons & Co Albany, N.Y.

PLATE II.

Unio nasutus.

Page 54.

Fig. 1. Left valve of a female, showing plications of the shell produced by growth over the gills while distended with fry. Natural size.
Canal, West Troy, N. Y.

Unio complanatus.

Page 55.

Fig. 2. A specimen presenting characters similar to the preceding, but showing two or more successive periods of impregnation. The general form of the shell is normal and may serve for comparison with the three following illustrations of unusual examples. *Canal, West Troy, N. Y.*

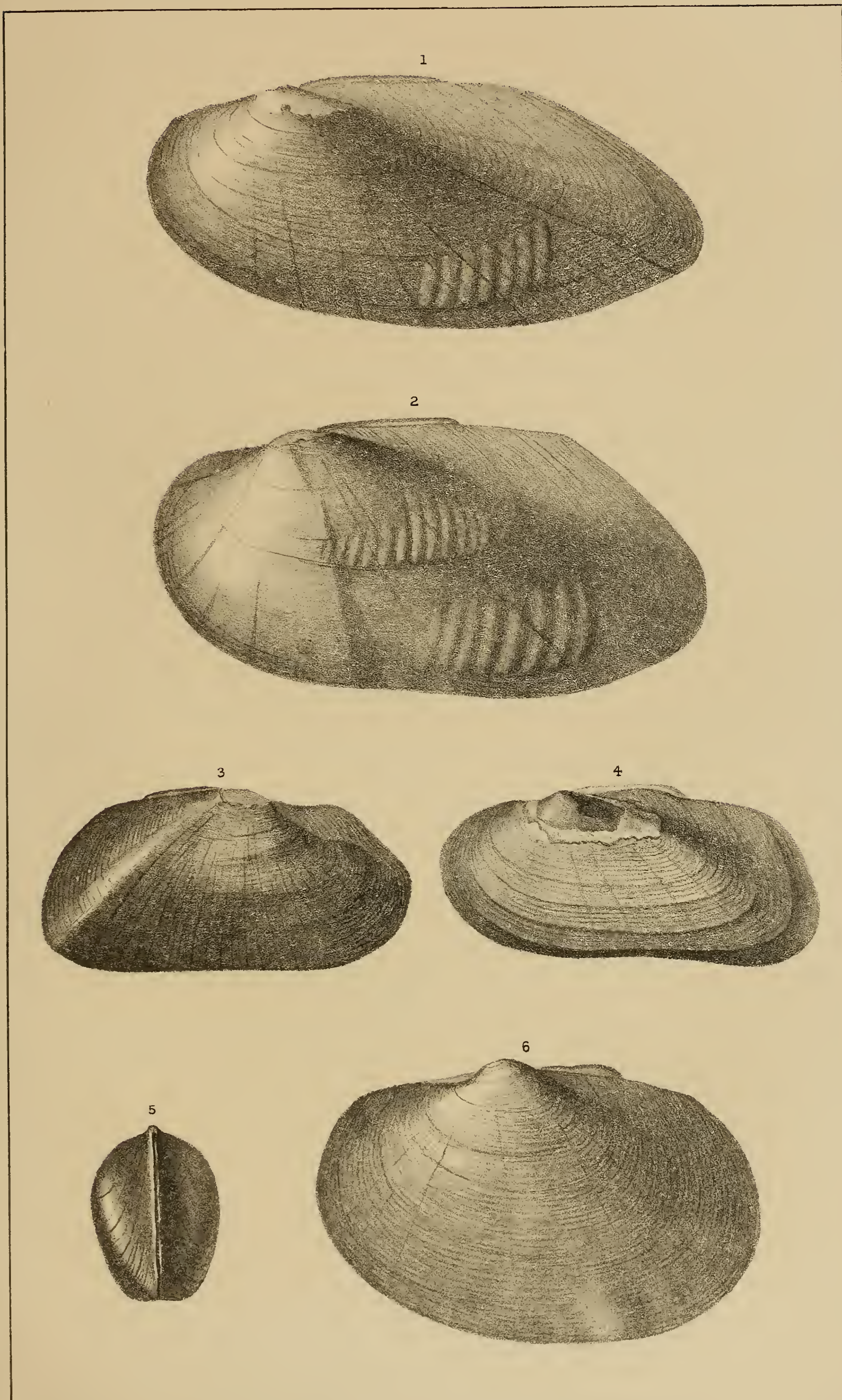
Fig. 3. A right valve having the umbo nearly central and with a strong sulcus on the anterior portion of the valve.
Canal, West Troy, N. Y.

Fig. 4. A very elongate cylindrical form.

Fig. 5. *Id.* Posterior view, showing the convexity of the valves.
Hudson river, Albany, N. Y.

Fig. 6. A wide, regularly elliptical specimen with large, prominent, rounded umbo which is situated just anterior to the middle of the cardinal line. Natural size. *Canal, West Troy, N. Y.*

FRESH WATER SHELLS.



C.E. Beecher, del.

Weed, Parsons & Co Albany, N.Y.

PLATE III.

Platystrophia tricenaria.

Page 75.

Fig. 1. Horizontal section of a portion, including two of the radii, and showing the fibrous non-punctate character of the shell.

Platystrophia biforata.

Page 75.

Fig. 2. Showing the fibrous structure of the shell.

Platystrophia occidentalis.

Page 75.

Fig. 3. Similar to the preceding.

Platystrophia subquadrata.

Page 75.

Fig. 4. Section showing the fibrous structure of the shell, and the large scattered punctæ.

Platystrophia flabella.

Page 75.

Fig. 5. A section including two of the interradial areas. The lower right hand portion has been cut through to the surface of the shell and shows the concentric striæ.

Orthis perveta.

Page 75.

Fig. 6. Section showing the rows of minute punctæ.

Orthis Clytie.

Page 75.

Fig. 7. Showing the single and double rows of punctæ between the fibrous interspaces.

Orthis elegantula.

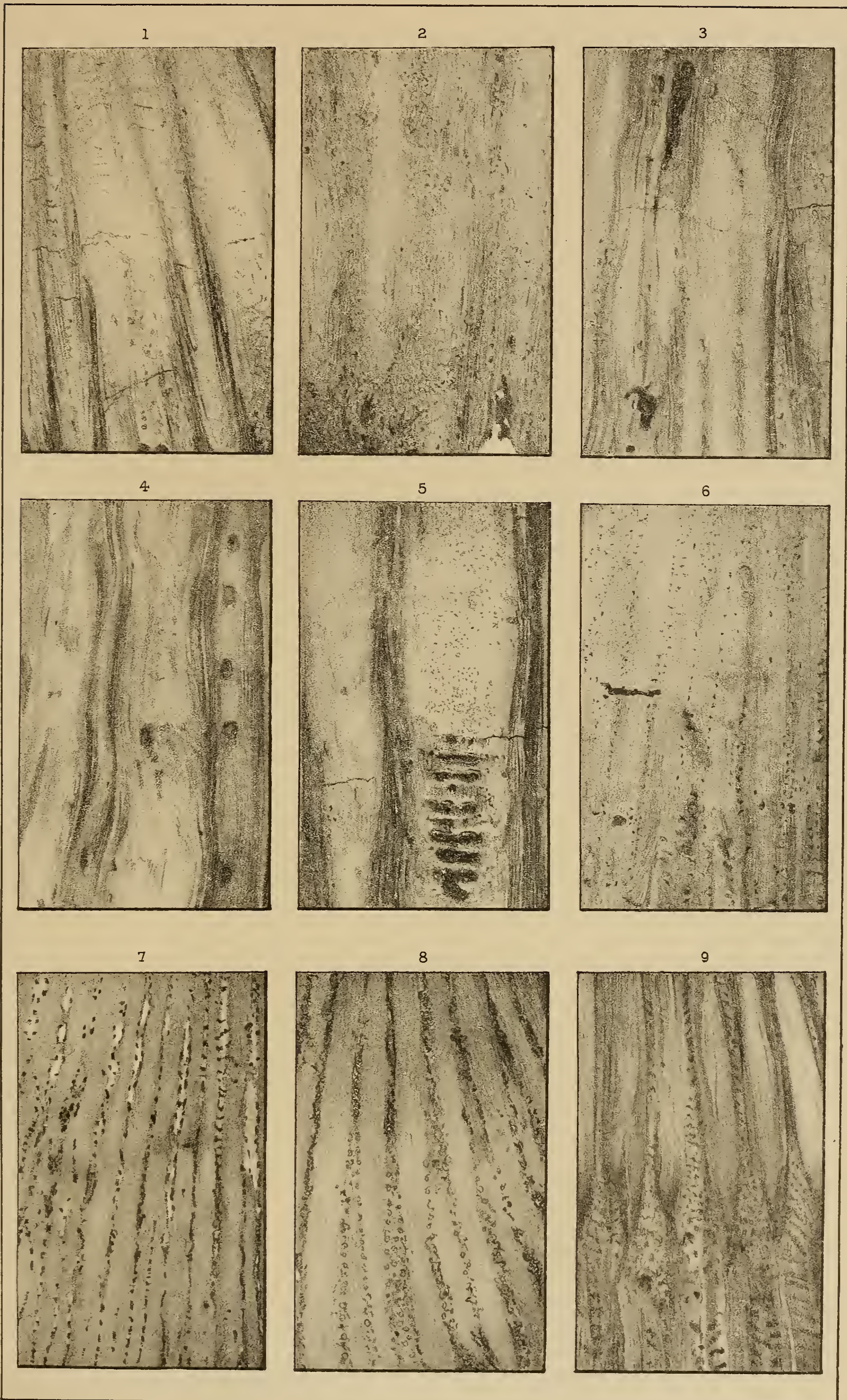
Page 75.

Fig. 8. Showing somewhat obscurely the broad rows of punctæ.

Fig. 9. Horizontal section of the shell through a varix of growth; the punctæ are partially obliterated by the action of the crystallization of iron pyrite.

FOSSIL BRACHIOPODA.

MICROSCOPIC STRUCTURE



C. E. Beecher, photo. Weed, Parsons & Co Albany, N.Y.

PLATE IV.

ORTHIS VANUXEMI.

Page 75.

Fig. 1. Vertical longitudinal section through a portion of the test, showing the laminæ of the shell and tubuli. Some of the tubuli bifurcate before reaching the surface.

Fig. 2. Vertical longitudinal section through the front of two valves, showing very distinctly the oblique laminæ and the size of the vertical tubuli.

Fig. 3. Horizontal section from near the surface, showing large and small punctæ.

Fig. 4. Section from near the center of a valve, showing the fibrous and punctate structure.

Fig. 5. Section at some depth below the surface, showing the regular rows of punctæ and flexuous direction of the fibres which run independently of the rows of punctæ.

ORTHIS PENELOPE.

Page 75.

Fig. 6. Horizontal section showing the very strongly marked rows of punctæ and intermediate fibrous structure.

SCHIZOPHORIA MULTISTRIATA.

Page 75.

Fig. 7. Showing the numerous minute punctæ and fibrous structure of the shell of this species.

SCHIZOPHORIA IOWENSIS.

Page 75.

Fig. 8. A section from near the surface, showing the numerous punctæ. In sections cut at a greater depth the appearance is similar in general features to fig. 9.

SCHIZOPHORIA TULLIENSIS.

Page 75.

Fig. 9. Showing the numerous close punctæ with no definite arrangement.

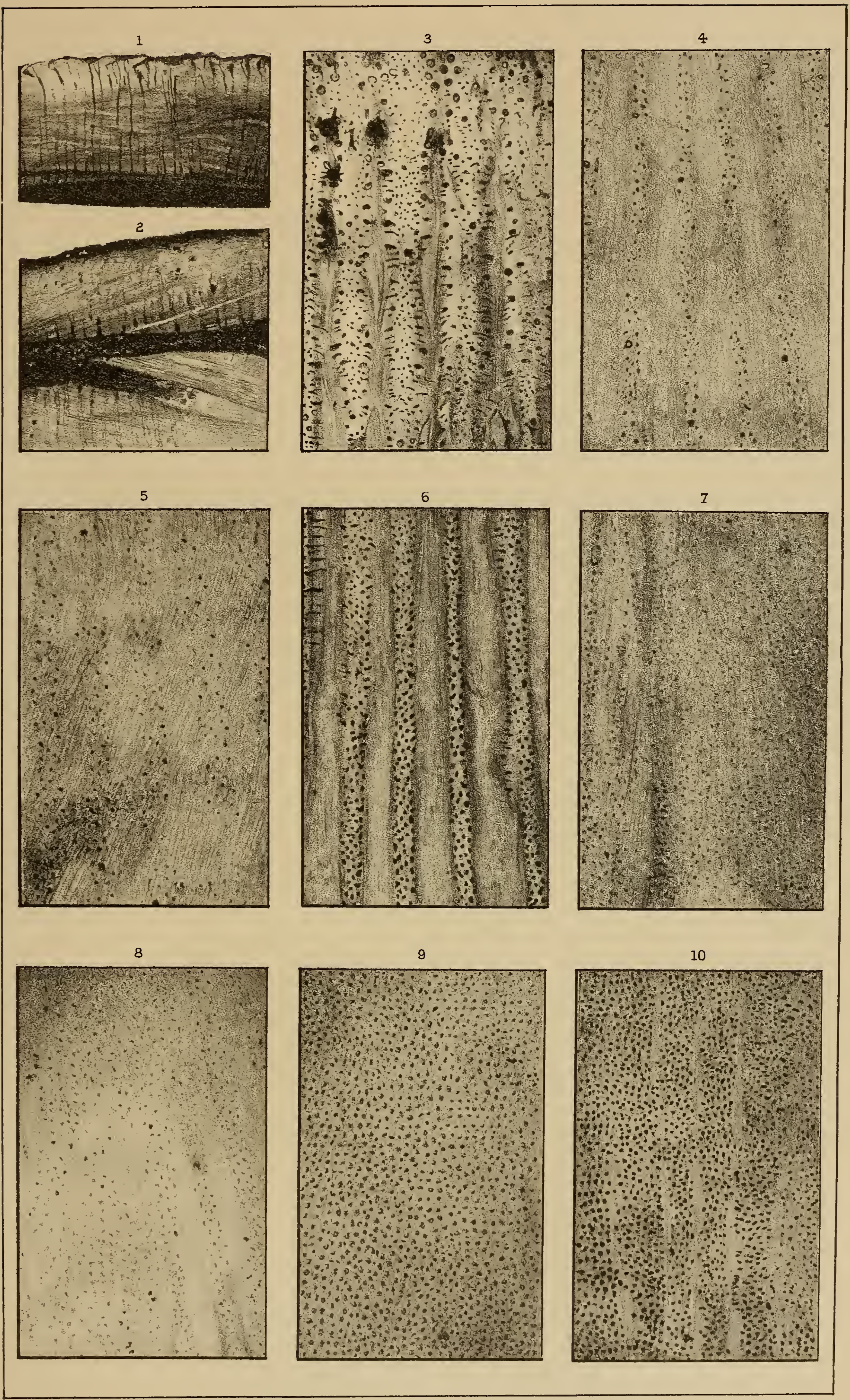
SCHIZOPHORIA IMPRESSA.

Page 75.

Fig. 10. Section from nearer the surface than the preceding, showing the broad bands of punctæ which gradually coalesce and produce an evenly punctate structure.

FOSSIL BRACHIOPODA.

MICROSCOPIC STRUCTURE



C. E. Beecher, photo.

Weed, Parsons & Co Albany, N.Y.

PLATE V.

STYLONURUS EXCELSIOR.

Page 77.

View of the carapace described. The figure was drawn from a plaster cast taken from the matrix, as this portion preserved the markings of the test in a greater degree of perfection than the reverse or relief.

THIRTY-SEVENTH ANNUAL REPORT

ON THE

NEW YORK STATE MUSEUM OF NATURAL HISTORY,

BY THE

REGENTS OF THE UNIVERSITY

OF THE

STATE OF NEW YORK

TRANSMITTED TO THE LEGISLATURE JANUARY 10, 1884.

ALBANY:
WEED, PARSONS & COMPANY.
1884.

STATE OF NEW YORK.

No. 60.

IN SENATE.

JANUARY 10, 1884.

THIRTY-SEVENTH ANNUAL REPORT

OF THE STATE MUSEUM OF NATURAL HISTORY.

UNIVERSITY OF THE STATE OF NEW YORK,
OFFICE OF THE REGENTS,
TRUSTEES OF THE STATE MUSEUM.

To the Legislature:

I have the honor to transmit herewith the Thirty-seventh Annual Report of the Trustees of the State Museum of Natural History, as required by law.

G. W. CLINTON.
Vice-Chancellor.

January 10, 1884.

CONTENTS.

REPORT.

To the Legislature:

The Regents of the University, as trustees of the State Museum of Natural History, respectfully submit their Thirty-seventh Annual Report, as required by law.

The act of the Legislature constituting chapter 355 of the Laws of 1883, imposed new and important duties on the trustees of the museum. They submit the following statement of their proceedings under this law.

The first section of this act directs the trustees to occupy the several rooms of the State Hall for the purposes of the museum as they may be vacated by the present occupants, and to fit up and prepare the rooms in a suitable manner, and to remove thither all the State collections. An appropriation of $20,000 was made for this purpose. Under this authority the trustees have occupied the basement for the storage of valuable plates belonging to the Palæontology, and for duplicate specimens. They have also used for temporary purposes the rooms in the second and third stories which have become vacant. But until a larger number of rooms in the building is vacated it has been found impossible to commence the work of fitting up the building. The trustees have requested Commissioner Perry to aid and advise them in the preparation of plans for the complete adaptation of the building for the museum. He has accordingly carefully studied the building and has had plans for the work prepared. The work of actual preparation will be begun as soon as any considerable portion of the building is vacated.

The second section of the act provides for a reorganization of the staff and work of the museum. In accordance with this section vesting all the appointments of the staff in the trustees, they reappointed all the members as follows:

Professor James Hall to be State Geologist and Director of the museum.

James W. Hall, general assistant in charge of the zöological department.

John Gebhard, special assistant and guide to the museum.

Charles E. Beecher, assistant in geology and palæontology.

Also they appointed for special departments in the museum the following, viz.:

J. A. Lintner, State Entomologist.

Charles H. Peck, State Botanist.

The trustees in further pursuance of this section have planned and arranged to carry out its purposes by instituting extensive exchanges and distributions of their duplicate specimens among the institutions of learning under the Board of Regents. This, however, can only be fully carried out when the duplicates of the collections are brought together in the new museum building. Under the resolution of the Legislature of 1881, collections of named and labeled specimens have been sent on application to the following academies:

1. Perry Union School, Perry, Wyoming county.
2. Baldwinsville Academy, Baldwinsville, Onondaga county.
3. Seymour Smith Academy, Pine Plains, Dutchess county.
4. Waterville Union School, Waterville, Oneida county.
5. Dreanan Literary Institute, Franklin, Delaware county.
6. Phelps Union and Classical School, Phelps, Ontario county.
7. Little Falls Union School, Little Falls, Herkimer county.
8. Port Byron Free School and Academy, Port Byron, Cayuga county.
9. Glens Falls Academy, Glens Falls, Warren county.
10. Weedsport Union School, Weedsport, Cayuga county.
11. Dryden Union School, Dryden, Tompkins county.
12. Olean Free School and Academy, Olean, Cattaraugus county.
13. Rutgers College, New Brunswick, New Jersey.
14. Warsaw Union School, Warsaw, Wyoming county.

The law provides that the trustees of the museum shall hereafter be authorized to print, under their own direction, the scientific papers prepared by the staff of the museum. As the increased appropriation called for by these enlarged duties has not yet become available, the trustees have been unable to enter upon the work of printing scientific papers. This they expect to undertake during the coming year, and they look forward with satisfaction to the prospect of issuing from the museum, from time to time, the important and valuable results of their investigations.

By the third section of the law the trustees are charged with the work of supervising the completion of the Palæontology. It is provided that one volume of the work shall be issued each year during five years, and that the completed work shall consist of those five volumes. The trustees, in preparing to execute this part of the law, found existing contracts for the printing and engraving required for this work. They sought the opinion of the Attorney-General as to the binding force of these contracts, and were advised that the contracts held by Charles Van Benthuysen & Sons were valid, and gave to them the right to execute the printing and engraving for the remaining volumes of the Natural History of the State. They obtained, however, extensive and advantageous modifications of the terms of these contracts, and executed a new and supplementary contract for the due execution of the work under the conditions imposed by the law.

They also made a contract with Professor James Hall for the execution of the drawings necessary for the plates to be engraved, and for the preparation of the text and explanations of the plates, and for the supervision of the work.

These contracts with Charles H. Van Benthuysen and with James Hall are herewith transmitted for the information of the Legislature.

Under these contracts the work of preparing a new volume of the Palæontology was resumed, and has been pushed forward with all possible speed. It is expected that this volume will be ready for delivery in February of the present year, and a second volume will be ready by January, 1885.

The volumes of the Palæontology owned by the State, and not yet sold or distributed, have been handed over to the custody of the trustees of the museum, and the proceeds of the sale of volumes are placed to the credit of the museum library.

The trustees in closing this report desire to make grateful mention of the several members of the museum staff, for the faithful and efficient manner in which they have performed their arduous duties.

We respectfully refer for a fuller account of the operations of the several departments of the museum, to the reports of the Director, and of the State Entomologist and State Botanist, which are herewith transmitted.

The value of the services of these officers will be particularly evident from the recital there given of their work. The State Entomologist has during the past summer been called upon to aid in the threatened invasion of the northern counties of the State by the chinch-bug, one of the most destructive pests of agriculture. The value of Professor Peck's contributions to botany is indicated by the constant demand received for copies of his contributions to the past annual reports of the museum.

Respectfully submitted,

G. W. CLINTON,
Vice-Chancellor.
DAVID MURRAY,
Secretary.

CONTRACTS.

An Act to regulate the State Museum of Natural History and the publication of the Palæontology of the State.

The People of the State of New York, represented in Senate and Assembly, do enact as follows ;

SECTION 1. For the purpose of providing sufficient and fire-proof accommodations for the collections of natural history belonging to the State, the Regents of the University, as trustees of the State Museum of Natural History, are hereby directed, in pursuance of the concurrent resolution of the Legislature, passed on the twenty-fourth day of March, eighteen hundred and eighty-one, to occupy, for the purposes of said museum, the several rooms of the State Hall as they may be vacated by their present occupants; and said trustees are hereby directed to fit up and prepare said rooms in a suitable manner, and to remove thither and arrange in order for exhibition, as soon as may be, the collections of said museum ; said trustees shall also make provision for and remove to said State Hall, to be a part of said museum, all the fossils, minerals and other property of the State now in the charge of the State Geologist, in pursuance of the provisions of chapter two hundred and seventy of the laws of eighteen hundred and eighty-two; and the sum of twenty thousand dollars, or so much thereof as may be necessary, is hereby appropriated for the expenses of fitting up and removal, as provided in this section, to be paid on vouchers approved by said trustees.

§ 2. The scientific staff of the museum, to be appointed by said trustees, shall consist of a Director, who may also be State Geologist, and whose compensation shall be the same as now fixed by law, and of three assistants, together with such special assistants as may be necessary, whose compensation shall be fixed from time to time by said trustees, together with the State Geologist, State Entomologist and Botanist as these officers are now defined and provided for by law ; and all the collections made by the members of said staff during their terms of service shall belong to and form a part of the collections of the museum ; and the trustees of said museum shall be authorized to publish each year the scientific contributions of said staff and such other original scientific contributions as they may deem expedient, which publication shall be in lieu of the reports now required by law from the State Geologist and State Entomologist, and the scientific papers communicated each year to the Legislature along with the annual report of said trustees ; and it shall be the duty of said trustees to distribute from the duplicate specimens of the museum to institutions of learning such collections as may be available and suitable for that purpose, as directed by a concurrent resolution of the Legislature passed on the fourteenth day of March, eighteen hundred and eighty-one, and to provide facilities in the museum for the study of its collections, and by means of printed hand-books describing said collections, and in such other ways as may be practicable, to make said museum a means of instruction to the citizens of the State. In order to provide for the expense of printing the aforesaid scientific publications and in order to increase the usefulness and efficiency of said museum as aforesaid, the annual appropriation to be made for its maintenance shall be fifteen thousand dollars, to be paid on vouchers approved by said trustees.

§ 3. The trustees of the State Museum of Natural History are hereby appointed to supervise the completion of the publication of the Palæontology of the State, to contract for the preparation and printing thereof, and to audit and certify to the expenditures therefor; and it is hereby provided that one volume of said Palæontology shall be published within one year from the execution of the contract for its preparation, that a second volume shall be published within two years, and that the entire work shall not extend beyond five bound volumes in addition to those already issued, all of which shall be published within five years from the passage of this act, and shall comprise the following subjects, that is to say, the *Lamellibranchiata* to be bound in two volumes, the *Bryozoans* to be bound in one volume, the *Brachiopoda* to be bound in one volume, and the *Crustacea, et cetera,* to be bound in one volume; and the sum of fifteen thousand dollars shall be appropriated annually for five years for the purposes of this section, payable on vouchers certified by said trustees; which sum of fifteen thousand dollars, or so much thereof as may be necessary, is hereby appropriated out of any money in the treasury not otherwise appropriated for the purpose of said publication for the current year.

§ 4. The volumes of the Natural History hereafter to be published, and the copies still remaining of the volumes already published, shall be in the charge of the trustees of said museum, who shall distribute and sell the same in accordance with the provisions of law now in force for such distribution and sale, and the proceeds of such sale said trustees shall use for the purpose of forming a suitable library for said museum, and they shall have authority to make exchanges with such portion of the volumes of said work as are not required for distribution or sale, and to receive donations and deposits of books and specimens on such terms as they shall deem advantageous for said museum.

Contract between the State of New York by the Trustees of the State Museum of Natural History and Charles H. Van Benthuysen.

Memorandum of agreement made this twenty-eighth day of July, 1883, between the State of New York, by the Regents of the University acting as trustees of the State Museum of Natural History, pursuant to chapter 355 of the Laws of 1883, and Charles H. Van Benthuysen, printer, of the city of Albany, witnesseth:

Whereas, The State of New York, by William C. Bouck, Governor, entered into a contract on the fourth day of April, 1843, with Thomas

B. Carroll and Alanson Cook, for printing and binding the Natural History of the State of New York, and on the twenty-seventh day of July, 1847, by John Young, Governor, entered into a contract with Richard H. Pease for the lithographic engravings of the drawings requisite for completing the Natural History of the State of New York; and

Whereas, On the fifth day of October, 1871, the State of New York, by Homer A. Nelson, Secretary of State, and Samuel B. Woolworth, Secretary of the Board of Regents acting pursuant to chapter 717 of the Laws of 1868, entered into a further contract with Charles Van Benthuysen, printer, of the city of Albany, assignee of the two aforesaid contracts for the continuation of the work to be performed in publishing the aforesaid Natural History ; and

Whereas, The execution of the said contracts was transferred to the firm of Charles Van Benthuysen & Sons, composed of Charles Van Benthuysen, Charles H. Van Benthuysen and Arthur L. Van Benthuysen; and

Whereas, By the death of the said Charles and Arthur L. Van Benthuysen, the said Charles H. Van Benthuysen, as the survivor, has succeeded to the rights and obligations of said firm under said contract; and

Whereas, Elizabeth Root Van Benthuysen, widow and executrix of the will of late Charles Van Benthuysen, has by a writing hereon indorsed in behalf of herself and the estate consented to certain modifications of said contract hereinafter described,

Now, therefore, it is hereby agreed by the aforesaid trustees and Charles H. Van Benthuysen, his heirs and assigns, that the said Van Benthuysen shall execute, as hereinafter described, the work required under the aforesaid contracts for the publication of the remaining volumes of the Palæontology of the State, as defined in section three of chapter 355 of the Laws of 1883, and the publication of said volumes of Palæontology as therein defined, shall constitute the completion of the publication of the Natural History of the State of New York, as provided for by the aforesaid contracts ; that is to say, the said Van Benthuysen shall print in letter-press the text of said Palæontology from good and clear type on paper of thirty-five pounds to the ream, and the explanations of the plates on paper of sixteen pounds to the ream, substantially as per samples herewith, and he shall execute in good style for said text to be printed therewith the wood cuts required for illustrations, not to exceed one hundred in all the volumes ; he shall print in lithography the residue of the plates for said work, as hereinafter described, on Tileston's best plate paper, weighing eighty-five pounds to the ream, as per sample herewith, and he shall bind the said work in full cloth with title on back, and sides stamped in gold and black, and the printing, lithography and binding in style and execution shall be in all respects equal and conformable to those of the volume last published, entitled volume five, part two of Palæontology, except that no engraved title-page with vignette shall be required in any of the volumes hereafter to be printed ; said work shall be printed in five volumes, three thousand copies of each, to contain in all not more than one thousand three hundred and seventy-five pages of text, together with the plates and explanations belonging thereto, said explanations to be printed, when the matter so requires, in double column or on both sides of the sheet; the volumes of said work shall consist as fixed by law of the following, that is to say:

There shall be two volumes on Lamellibranchiata, to contain together about four hundred and fifty pages of text and ninety-six plates, of which seventy-eight plates are already printed and are in the possession of said trustees, and eighteen plates, to contain three hundred and twenty-five figures, are to be lithographed and printed by said Van Benthuysen, for which there shall be printed also ninety-six leaves of explanations to face said plates; there shall be one volume on Bryozoa, to contain about three hundred pages of text, and sixty-eight plates, of which thirty-three plates have been printed and are now in the possession of the said trustees, and six plates, containing one hundred and twenty-seven figures, have been drawn on stone and are to be proved and printed, and twenty-seven plates, to contain five hundred and sixty-three figures, are to be lithographed and printed, and sixty-six leaves of explanations to face said plates are to be printed; there shall be one volume on Crustacea (including also matter Pteropoda and Cephalopoda), to contain about three hundred and twenty-five pages of text, and sixty-six plates, of which twenty-two plates have been printed and are now in the possession of said trustees, four plates, containing sixty-eight figures drawn on stone and proved, are to be printed, and forty plates, to contain five hundred and forty figures, are to be lithographed and printed, and sixty-six leaves of explanations to face said plates are to be printed; there shall be one volume on Brachiopoda, to contain about three hundred pages of text and fifty-seven plates, of which twenty-seven plates have been printed and are now in the possession of said trustees, and thirty plates, to contain nine hundred and five figures, are to be lithographed and printed, and fifty-seven leaves of explanations are to be printed; it is further agreed that said trustees shall furnish to said Van Benthuysen the drawings for the plates of the several volumes in such order and quantity as may be required for the due completion thereof, as hereinafter described, and the last of said drawings for each volume shall be furnished at least two months before the specified time of its delivery, all proofs of such plates to be approved by the said trustees or their authorized agent, and the printed sheets of said plates to be delivered to and receipted for by said trustees or agent; the said trustees shall also furnish, in a fair and legible condition, the manuscript copy in such quantity and at such times as will enable the said Van Benthuysen to comply with the terms of this agreement, the last installment of copy for each volume to be furnished at least two months before the time herein specified for the delivery of such volume; the said Van Benthuysen shall furnish one proof, three copies, and one revise, three copies, to be returned within four working days from receipt thereof. It is further agreed that said trustees shall furnish to said Van Benthuysen the copies of the printed plates for the several volumes in their possession as they may be required for binding, and said Van Benthuysen shall deliver to said trustees at the times herein specified three thousand copies of each of said volumes, containing the text, plates and explanations as hereinbefore described, provided that as one hundred copies of each of the plates of the Lamellibranchiata up to and including number eighty, except numbers thirty-five and forty-two, have been appropriated to use by said trustees, it shall constitute a full delivery on the part of the said Van Benthuysen, when he shall have delivered two thousand nine hundred complete copies of each of the two volumes of Lamellibranchiata and one hundred copies of a bound volume containing the text and the remaining plates; the times for the delivery of the several volumes herein specified shall be as follows, that is to say, the first volume on Lamellibranchiata not later than February 15, 1884; the second volume on Lamellibranchiata not later than January 1, 1885; the volume on Bryozoa not later than May 1, 1886; the volume on Crustacea, etc., not later than May 1, 1887, and the volume on Brachiopoda not later than August 1, 1888; it is further agreed that the said Van Benthuysen shall be paid from the treasury of the State for the work herein described as follows, that is to say, for the first volume on Lamellibranchiata, six thousand seven hundred and forty-four and thirty-six one-hundredths dollars; for the second volume on Lamellibranchiata, ten thousand four hundred and two and eighty-seven one-hundredths dollars; for the volume on Bryozoa, fifteen thousand and sixteen and twenty one-hundredths dollars; for the volume on Crustacea, etc., sixteen thousand nine hundred and thirty-two and eighty-eight one-hundredths dollars; and for the volume on Brachiopoda, fifteen thousand nine hundred and three and sixty-nine one-hundredths dollars; making a total of sixty-five thousand dollars, to be paid in the manner following, that is to say, for the work of lithography, as herein described, on the presentation from time to time of detailed bills in which the work executed for each separate volume shall be separately stated, he shall be paid for such work at the rate of eighty-eight per cent of the prices fixed in the contract made in 1871 between the State of New York and Charles Van Benthuysen; and on the completion of the printing and binding and the delivery of each of the several volumes, he shall be paid such further sum as when taken together with the sums paid for the lithography of such volume shall amount in the case of each volume to the aggregate sum hereinbefore specified for such volume; and said sums shall be in full payment for all the work done in pursuance of this agreement; it is further agreed in case the Legislature shall fail to make the appropriations for the continuance of the work herein described, or in case of the death or disability of the author or authors employed for its preparation, that the work shall be suspended and that all the parts of any volume or volumes which shall have been printed, together with the plates and explanations therefor, shall be delivered to the said trustees, and so far as appropriations may be available, payment shall be made for the same in accordance with the terms herein described, and the balance not so paid shall constitute a just claim against the treasury of the State.

In witness whereof and in pursuance of the authority conferred by the third section of chapter three hundred and fifty-five of the Laws of 1883, the Regents of the University, acting as trustees of the State Museum of Natural History, have

[L. S.] caused their common seal to be hereon impressed, and the Chancellor and Secretary have hereto subscribed their names, and the said Charles H. Van Benthuysen has also hereto subscribed his name and affixed his seal this twenty-eighth day of July, 1883.

(Signed) H. R. PIERSON,
Chancellor.
DAVID MURRAY,
Secretary.

CHARLES H. VAN BENTHUYSEN. [L. S.]

In consideration of the sum of one dollar in hand paid by the parties to the within contract, the receipt of which is hereby acknowledged, I hereby consent to the contract.

(Signed) E. R. VAN BENTHUYSEN. [L. S.]

CONTRACT BETWEEN THE STATE OF NEW YORK, BY THE TRUSTEES OF THE STATE MUSEUM OF NATURAL HISTORY, AND JAMES HALL, STATE GEOLOGIST.

Memorandum of agreement made and entered into this first day of September, A. D., 1883, by and between the people of the State of New York, by the Regents of the University of the State of New York, acting as Trustees of the State Museum of Natural History, pursuant to section three of chapter three hundred and fifty-five of the Laws of 1883, and James Hall, State Geologist, of the city of Albany.

Witnesseth, that whereas it is provided by said act that the trustees of the State Museum of Natural History shall supervise the completion of the publication of the Palæontology of the State; contract for the preparation and printing thereof, and audit and certify to the expenditures thereof, and that one volume of said Palæontology shall be published within one year from the execution of the contract for its preparation; that a second volume shall be published within two years, and that the entire work shall not extend beyond five bound volumes in addition to those already issued, all of which shall be published within five years from the passage of this act, and shall comprise the following subjects, that is to say, the *Lamellibranchiata*, to be bound in two volumes; the *Bryozoa*, to be bound in one volume; the *Brachiopoda*, to be bound in one volume, and the *Crustacea, et cetera*, to be bound in one volume; now, therefore, it is hereby agreed by and between the parties aforesaid that the said Hall shall prepare and furnish all the text and description of plates required by each and all of the aforesaid volumes on Palæontology, and shall deliver the manuscript thereof in suitable installments and in a fair and legible condition to the printer, and shall correct and return within four working days the proof of the same as it may be delivered to him by the printer; that the said Hall shall also make or procure to be made by competent draughtsmen and furnish to the lithographer all the drawings of fossils which may be required for said volumes, and shall supervise the work of lithographing said drawings; shall inspect and approve the proofs of plates and the paper to be used in printing said plates, and shall receive from and receipt to said lithographer for the printed plates as they may be delivered to him; it is further agreed that the said Hall shall furnish to the printer the manuscript of the text and the drawings for the plates and the manuscript of the descriptions of the plates for the several volumes, in such order and within such reasonable time as may be required for the due printing and delivery of the same at the dates hereinafter fixed, the last installment of said manuscript of text and descriptions of plates and of said drawings for each of said volumes to be furnished to said printer not later than two months before the date so fixed; and that the dates of the delivery of the several volumes to the said trustees shall be as follows, that is to say, the first volume on *Lamellibranchiata* by the fifteenth day of February, 1884; the second volume on *Lamellibranchiata* by the first day of January, 1885; the volume on *Bryozoa* by the first day of May, 1886; the volume on *Crustacea, et cetera,* by the first day of May, 1887, and the volume on *Brachiopoda* by the first day of August, 1888; and it is further agreed that for the services as aforesaid the said Hall shall be paid as follows, that is to say, as compensation for authorship and including the correction of proof and the supervision of the drawing and lithography as herein described, the sum of twelve hundred dollars per annum for five years; as compensation for an assistant to be employed by the said Hall for the purpose of aiding in the preparation of said work a sum not to exceed one thousand dollars in any one year, to be paid on vouchers certified by said Hall; and as compensation for the execution of the drawings required for said volumes to be executed under his supervision and subject to his approval by persons to be employed by him, there shall be paid from time to time upon vouchers certified by him such sums as may be required, not to exceed in the aggregate for all the remaining drawings, three thousand dollars, and at a rate not to exceed on an average the sum of three and one-half dollars for each figure so drawn; and whereas, under chapter two hundred and seventy of the Laws of 1882, and under chapter two hundred and forty-three of the Laws of 1883, appropriations are made for James Hall as State Geologist for compensation for authorship and superintendence of drawings and engravings and for persons employed in making drawings, it is further covenanted and agreed that whatever sums are received from the State by the said Hall after the date hereof, on account of services for authorship and superintendence of drawings and engravings or for expenditures for persons employed in making drawings under the aforesaid acts, or under any future acts of appropriation available during the time of this contract, other than those in pursuance of said chapter three hundred and fifty-five of the Laws of 1883, first above referred to, shall be credited to the payments herein stipulated to be paid to said Hall for such services and expenditures, and shall be in place of payments made from the appropriations provided in and in pursuance of the aforesaid chapter three hundred and fifty-five of the Laws of 1883; and it is further agreed, in case the work herein described shall be suspended in consequence of the failure of the Legislature to make appropriations for its continuance, or for any other cause, that the said Hall shall deliver to the said trustees all the parts of the manuscripts of the text and descriptions of plates and of the drawings for said plates so far as the same have been prepared, and so far as appropriations may be available payment shall be made for the same in accordance with the terms herein described, and the balance not so paid shall constitute a just claim against the treasury of the State.

In witness whereof, and in pursuance of the authority conferred by the third section of chapter three hundred and fifty-five of the Laws of 1883, the Regents of the University, acting as trustees of the State Museum of Natural History, [L. S.] have caused their common seal to be hereon impressed, and the Chancellor and Secretary have hereto subscribed their names and the said James Hall has also hereto subscribed his name and affixed his seal this first day of September, 1883.

(Signed)

H. R. PIERSON,
Chancellor.

DAVID MURRAY,
Secretary.

JAMES HALL,
State Geologist. [L. S.]

REPORT OF THE DIRECTOR.

ALBANY, *January*, 1884.

To the Honorable the Board of Regents of the University of the State of New York :

GENTLEMEN — I have the honor to communicate herewith the annual report upon the State Museum of Natural History for the year 1883, being the thirty-seventh in consecutive order, together with a statement of the condition of the collections in the several departments, with the additions made thereto, and a general account of the work done in the institution during the past year.

Since the communication of the thirty-sixth report considerable progress has been made in the publication of the reports subsequent to the thirty-first. The thirty-second report had already been issued as a legislative document, but no copies have been published for the use of the Regents or of the museum. The thirty-third and thirty-fourth reports have been printed and delivered at the museum and State library for general distribution. The thirty-fifth report is nearly printed ; already more than four hundred pages are in type and it will speedily be issued. This report will contain several scientific papers, which were communicated with the thirty-third and thirty-fourth reports, and will also include the several catalogues of shells which had been communicated with preceding reports and not heretofore printed. The thirty-sixth report will follow without delay, and we have reason to believe that within the present year the reports will be printed up to date. This work once accomplished will relieve the museum of much unpublished matter which has accumulated from year to year, and has left the actual work and condition of the museum unrepresented in the printed reports.

The collections of the museum have been preserved in their usual good order and condition, and all available space and facilities have been given to their exhibition. The anticipated early removal of the collections to the State Hall has rendered it undesirable to make any unusual plans for placing material on exhibition, which at best could only be of temporary service.

The skeleton of the whale mentioned in my two preceding reports has been received in good order and is now stored in one of the basement rooms of the State Hall. The specimen is ready for mounting and placing on exhibition as soon as a suitable place can be provided.

The collections of birds and mammals, formerly in charge of the Taxidermist, Mr. James A. Hurst, have, since the death of the latter, been placed in charge of Dr. J. W. Hall, assistant in the museum, who, for the past two years, has had entire charge of these collections. During the past month these collections have been removed from their cases, carefully cleaned and examined, and replaced in the cases in good order, and are all reported as entirely free from injurious insects. The skeletons of birds, fish and mammals have likewise received the proper treatment for their preservation and have been replaced in their proper cases. The alcoholic collections have also been critically examined, the jars refilled, and the whole restored to the cases in proper order.

Since the date of my last report the mineralogical collection has been removed from the shelves, the specimens and cases cleaned, and the minerals returned to their places. The geological collection in the wall cases has been likewise removed and properly cleaned and returned to their places. The catalogue of the mineralogical collection has been completed and will accompany this report.

The cleaning and rearrangement of this part of the museum collection has more clearly revealed the fact, which we knew before, that the collection of minerals, in its representation of New York localities, is far behind the discoveries of later years, and imperatively requires attention. I would recommend that some attention be given to improving this department of the collection. This can be most readily and economically done by the purchase of collections at the localities, or the employment of some person living on the ground where these minerals have been discovered and who will obtain them for a much less cost than can be done by sending collectors into the field.

The additions to the museum collections made during the year 1883 will be found recorded in detail in the lists appended.

In the botanical department specimens have been received from seven contributors.

In the collections of zoölogy and ethnology additions are recorded from eight contributors, and there are three contributors to miscellaneous collections.

To the collections of geology, mineralogy and palæontology specimens have been received from eleven contributors.

The library has received from all sources one hundred volumes and pamphlets ; of these, six have been purchased.

COLLECTIONS IN THE FIELD.

During the spring of 1883, the excavations made in cutting the West Shore railroad through the Utica and Hudson river slates at a point about three miles below Albany enabled the museum to secure a large collection of graptolites from these beds. The collection embraces several thousand specimens, and many of these are large slabs covered with these organisms. The black slates of this locality have conserved the organic remains in an unusual condition of perfection, compared with most of the localities of the slates in the Hudson valley. From this abundant and well-preserved material there may be obtained valuable data for an instructive paper of the graptolites, especially as to the development of the base or initial point of the organism.

The collection is so extensive in number of specimens that the museum may well supply to other similar institutions a share of its duplicates.

The Curator has considered it desirable to make some farther investigation in regard to the relations of the Oneonta sandstone and the underlying rocks, a problem of much importance in the geological record of the State, and one which requires still farther inquiry before a satisfactory determination can be made. Geological sections and collections were made in the counties of Delaware, Otsego, Chenango and Madison. These collections illustrate the order of succession among the strata in several localities, and will be of use in the final comparisons and determination of this question.

During the past summer it became necessary to verify some former observations upon the relations of the Niagara and Lower Helderberg groups, with the Hudson River group in the neighborhood of Catskill, which had heretofore been published in the New York reports, and which more recently had been controverted. The observations especially made sustain the views formerly published regarding the unconformability of the higher groups with the Hudson River group below, still leaving, however, a wide field for further investigation and the determination of many interesting questions regarding the geological dynamics of the periods named.

CURRENT WORK OF THE MUSEUM.

In addition to the current work pertaining to the care and preservation of the several collections of the museum, the catalogue, etc., as already mentioned, other work has been going on for the advancement of the museum collections.

The work of cutting translucent sections of fossils for mounting on glass, and of cutting and polishing other fossils for illustrating their structure, as well as cutting and shaping specimens for illustration and for placing in the cases, has been carried on as usual.

The total number of translucent sections of rocks and fossils cut and mounted on glass during the year is about 213. Specimens of fossils cut and shaped, ground for resting on shelf or block, and polished, number 360.

Taking advantage of our facilities for cutting and polishing specimens, the authorities of the normal school at Cortland sent to the museum a considerable number of specimens of fossils from their collections proposing that these be cut and polished, and the museum retain a part of the material thus acquired, as payment for the labor bestowed. The proposition was accepted and the work done; a part of the collection has been returned to the normal school at Cortland, and the museum retained forty-five specimens, which are enumerated in the list of additions to the museum collections. Both institutions have profited by this intercourse, and the Curator would be glad to extend to any of our educational institutions similar facilities.

An arrangement similar to the above has been made with E. B. Knapp, Esq., of the Skaneateles Library and Scientific Association, who has sent a considerable collection of cyathophylloid fossils for cutting, conditioned on receiving a portion of them in return, for the use of the Library Association. Since this arrangement will accrue to the advantage of students of natural science, the Curator has had no hesitation in making the agreement.

The entire collection of translucent sections of rocks and fossils, on glass slides, has been numbered and labeled ; each section has the catalogue number and name written on the glass with a preparation of asphalt. A catalogue of these specimens, numbering more than two thousand, will accompany the present report as an appendix.

LAMELLIBRANCHIATA.

In the fossil Lamellibranchiata the duplicate specimens of the families PECTINIDÆ, PTERINIDÆ, AVICULIDÆ and MYTILIDÆ have been arranged and labeled preparatory for selection and distribution, and now await the publication of volume V, part 1 of the Palæontology of New York. The remainder of the collection of Lamellibranchiata will be arranged and labeled during the present year.

BRACHIOPODA.

The application of photo-micrography has been made to the illustration of the microscopical sections of the fossil Brachiopoda, prepared by Mr. C. E. Beecher, and has been carried on by him far enough to demonstrate its entire applicability to the objects sought to be accomplished. From what has already been done in this direction it is evident that the results are very important to the study and classification of the Brachiopoda, and that photography can be very successfully applied in the representation of the minute structure of fossil organisms.

Already something more than three hundred of these microscopic slides have been prepared, from which more than seventy photomicrographic illustrations have been made. The negatives are the property of the State Museum. A print from each one will be mounted in a suitable book for study and reference, and, with the microscope slides will form the typical series for future reference in all studies of the Brachiopoda.

The success attending this experiment is already much greater than I could have expected, and I confidently anticipate that the coming year will show a greatly increased amount of material prepared, as well as improved results from the application of the photo-micrographic process.

DISTRIBUTION OF DUPLICATE COLLECTIONS.

Collections averaging one hundred species each have been sent to the following institutions:

Port Byron Free School and Academy.
Glens Falls Academy.

Weedsport Union School.
Dryden Union School.
Olean Free School and Academy.
Rutgers College, New Brunswick, New Jersey. In exchange.

I would be glad to recommend that some steps be taken to arrange, according to generic and specific order, the duplicate fossils of the museum collections. Many of these are now packed in boxes and are only accessible with difficulty whenever a small collection is desired for distribution to school or academy. In such difficulty it is natural to seek those most accessible, and in this manner we may often send away specimens in the smaller series which it would be desirable to reserve for more important collections.

The completion of volume V, part 1, on the Lamellibranchiata will enable us to give authentic names to a large number of these fossils. The collections from New York are much greater than from any other State in the Union, and the volume now in press will give a greater amount and variety of palæozoic forms than have yet been published in any country of America or Europe from the same formation.

I would beg leave to suggest that certain sets of these duplicates be set aside for exchange or presentation to some of the foremost museums in Europe. In either case, were these collections in the museums of Europe, it would lead to a clearer and higher appreciation of the work which we have done, and make the work still more emphatically one of authority in geological science.

Such a course would serve to open an intercourse between the State Museum and the more important museums of Europe, a feature which I feel will be an important one for ourselves and will serve to facilitate the future working of the institution.

I would also beg leave to call your attention to the fact that there are several very valuable collections in the State Museum which in case of loss could not be replaced. In view of the conceded unsafe condition of the present museum building, I would recommend that the following collections be at once removed to the State Hall and placed in some room of which the officers of the museum have entire control.

It is not necessary that these collections be displayed in cases, but they may be placed in closed cases or drawers until the new rooms shall be finished for their reception :

(*a.*) The typical series of specimens of the Cephalopoda, used in the preparation of volume V, part 2, of the Palæontology of New York. The collection numbers between eight and nine hundred specimens, and is partially arranged under glass and partially in drawers.

(*b.*) The collection of Gould's types of Mollusca.

(*c.*) The Emmons collection of crystallized minerals.

(*d.*) The Waldron series of Niagara fossils, of which many are types.

(*e.*) The collection of translucent sections of rocks and fossils, numbering more than three thousand specimens.

(*f.*) The typical collection of Gasteropoda and Pteropoda of volume V, part 2, Palæontology of New York, are in the custody of the Curator, as no available space has yet been assigned for their reception.

(*g*.) At the completion of volume V, part 1 (now in press), the extensive collections of Lamellibranchiate shells which have been used in the preparation of this work will be available for incorporation with State Museum collections.

GENERAL SUMMARY FOR 1883.

Current work of the Museum.

Transparent sections of rocks and fossils mounted on glass, about	225
Specimens of fossils shaped, cut, ground and polished, about...	360
	585

Arranging and cataloguing the above sections.

Whale skeleton.— Completed, parts fitted and ready for mounting, at present stored under cover and in safety.

Geological surveys, sections and collections made in the counties of Delaware, Otsego, Chemung and Madison.

Arrangement and care of zoölogical collections, birds and mammals. The rearrangement, cleaning and numbering specimens in accordance with their present labels.

Records of library and of additions to the general collections.

Rearrangement, cleaning, etc., of collections of skeletons, and fish, both dry and alcoholic specimens.

Cleaning, ticketing and recording the general collection of minerals on second floor.

Arranging and cleaning the collection of New York minerals, already recorded.

Cleaning and arranging all geological collections and cases on first floor.

The *examination, analysis* or *partial analysis* of several hundred specimens, which are sent to the museum for the determination of the presence of gold or silver.

ADDITIONS TO THE STATE MUSEUM DURING THE YEAR 1883.

BY DONATION AND PURCHASE.

I. BOTANICAL.

1. *By donation.*

Specimens of the garden wache, *Atriplex hortensis*, L. From Mrs. S. M. Rust, Syracuse, N. Y.

Specimens of *Stellaria pubera*, Mx. and *Rhodora Canadensis*, L. From Mrs. I. B. Sampson, Albany, N. Y.

Specimens of three fungi, *Agaricus trullisatus*, Ellis; *Lenzites betulina*, Fr. and *Geaster hygro netricus*, Pers. From Mrs. C. M. Ferry, Oneida, N. Y.

Specimens of Herb Robert, *Geranium Robertianum*, L., with white flowers. From F. W. Battershall, Clyde, N. Y.

Specimens of ten species of fungi. From Professor W. G. Farlow, Cambridge, Mass.

Specimens of sixteen species of fungi. From A. B. Seymour, Cambridge, Mass.

Specimens of *Oidium irregulare*, Pk. From Wm. Treleose, Madison, Wis.

Double branch of tree, one growing through the other. From Delavan Manning, Glenn, Montgomery county, N. Y.

II. ZOÖLOGICAL.

1. *By donation.*

One hundred specimens of sea shells from Point de Galle, island of Ceylon. From W. Stephen de Silva.

Piece of a pine board from the roof of the Emmanuel Baptist Church, mined by an insect — Xylocapa Virginica — the Virginia carpenter bee. From Wm. S. Wheeler, Albany, N. Y.

Australian bird. From Henry W. Koon, Poestenkill, Rensselaer county, N. Y.

Seven specimens of hawk eggs. From E. G. Nott, Buffalo, N. Y.

Specimen of Florida gallinule, shot about ten miles south of Schenectady. From Allen Dewitt Weaver, Albany, N. Y.

A live specimen of green heron, from August Rode, Bethlehem, Albany county, N. Y.

2. *By purchase.*

Skeleton of *Rorqualis borealis* or Fin-back whale.

III. GEOLOGICAL AND MINERALOGICAL.

1. *By donation.*

Nautilus, *n. sp.*	Tully limestone,	Penn Yan,	N. Y.
" "	"	"	"
Orthoceras, *n. sp.*	"	"	"
Cyrtoceras, *sp.?*	" ?	"	"

From Wm. Coon, Esq., and Wm. W. Buxton, Esq., Milo Centre, N. Y. Communicated through Mr. Berlin H. Wright, Penn Yan, N. Y.

Petrified wood from Dakota. From Miss Bessie Young, Troy, N. Y.

Eighteen specimens, mostly Stromatopora, Lower Helderberg group.

One specimen — Eridophyllum, Upper Helderberg group.

One specimen Chaetetes — Upper Coal Measures. From C. E. Beecher.

Four specimens of Pleurotomaria sulcomarginata.

Two specimens of Lamellibranchiata — specimens of Oneida conglomerate and tufa. From Mrs. E. M. Ferry, Oneida, N. Y.

Box of iron ore from Essex county, by collection by Prof. James Hall.

Crystal of Gypsum from Frank M. Greenwood, Newark, Wayne county, N. Y.

Compact talc from Gouverneur, N. Y. Used to adulterate paper. From Willard R. Fox, Albany, N. Y.

Specimen of oil-bearing rock. From C. V. Barse, Olean, N. Y.

Rose quartz and feldspar. From W. R. Derbey, Essex county, N. Y.

Two small specimens of Mexican onyx from New Capitol.

Two boulders of peculiar shape, one resembling a human foot, the other a vertebra. From Geo. House, Montgomery county, N. Y.

2. *By exchange.*

Three polished specimens, *Ammonites,* Inferior Oölite, France.

One polished specimen. *Nautilus,* Cretaceous, Alabama.

Twenty polished specimens, *Zaphrentis Halli,* Hamilton group, Skaneateles lake, N. Y.

Two polished specimens, *Heliophyllum Halli,* Hamilton group, Skaneateles lake, N. Y.

Three polished specimens, *Cystiphyllum Americanum,* Hamilton group, Skaneateles lake, N. Y.

Two polished specimens, *Amplexus, ?* Hamilton group, Skaneateles lake, N. Y.

Fourteen polished specimens, *Zaphrentis Canadensis,* Hudson River group, Cincinnati, Ohio.

Four sections on glass, *Calceola Sandalina,* Devonian, Eifel, Europe.

From the State Normal School at Cortland, N. Y., in exchange for the labor of cutting a series of specimens for the normal school.

3. *By purchase.*

Portion of tooth of fossil elephant, found near Chemung Narrows, N. Y.

IV. ARCHÆOLOGICAL AND ETHNOLOGICAL.

By donation.

Indian pestle (stone), Hannecroix creek, Coeymans, N. Y.

Brick imported from Holland between 1646 and 1670, used in the gable of a building at Coeymans, known as the "Castle."

Continental paper money, "fifteen shillings." From Alfred A. Sherman, Coeymans, N. Y.

Anchor taken from the reefs at the bottom of Lake Champlain, near Plattsburg, in the summer of 1882. From J. B. Groot, Albany.

V. TO THE LIBRARY.

1. *By donation and exchange.*

The Geological and Natural History Survey of Minnesota, Tenth Annual Report, N. H. Winchell, State Geologist.

Official Gazette, U. S. Patent Office, full series.

Department of Agriculture Special Report, Nos. 53 to 65, inclusive.

Department of Agriculture, Revision of Statutes, new series, Rept. No. 1, Oct. 1883.

Journal of the Cincinnati Society of Natural History, Vol. v, No. 4, December, 1882; Vol. VI, No. 1, April, 1883; Vol. VI No. 2, No. 3, October, 1883.

Report of Commissioners of Agriculture for 1882.

Frontiersmen of New York, two volumes, by J. R. Simms, Albany, 1882.

Bulletin of the American Geographical Society, Nos. 2 and 4, 1882; No. 1, 1883; Nos. 2 and 5, 1883.

Second Geological Survey of Pennsylvania, T. 2, Bedford and Fulton counties.

Second Geological Survey of Pennsylvania, C. 6, Philadelphia Belt.

Second Geological Survey of Pennsylvania, G. 6, Pike and Monroe counties.

Is Fingall's Cave Artificial, by F. Cope Whitehouse, M. A., December, 1882, pamphlet, 8vo.

United States Geographical Survey, Monograph ii; Tertiary History of the Grand Cañon Dist., with folio atlas of same.

Bulletin of United States Fish Commission, Vol. 1, 1881.

Journal of the American Geographical Society, Vol. 12, 1880.

Indiana Geology and Natural History, 1881; Eleventh Report of the State Geologist.

Department of the Interior, Bureau of Education, Circular of Information, Nos. 4, 5 and 6, 1882; Nos. 1 and 2, 1883; and High Schools for Girls in Sweden.

Decas plantacum novarum. Petropoli, 1882; from E. L. Regel.

Bulletin de la Société Impériale des Naturalistes de Moscow, Nos. 3 and 4, 1881, and No. 1, and No. 2, 1882, première livraison; No. 2, 1882. seconde livraison; 1881, No. 2.

Congrès Geologique International, Compte rendu 2d session, Bologne, 1881, pp. 158.

Table Générale et Systematique Matières contenues dans les premières, 56 volumes, 1829–1881.

Théses présenteés à la Faculté des Sciences de Lille, Université de France pour obtenir le grade de Docteur et sciences naturelles par Persifor Frazer, A. M., de Philadelphia, 1882.

The Pine Moth of Nantucket, by Samuel H. Scudder. Publications of the Massachusetts Society for the Promotion of Agriculture, Boston, 1883.

Sitzungsberichte und Abhandlungen der Naturwissenschaftlichen Gesellschaft. Isis in Dresden, Jahrgang, 1882, Juli bis December; Isis in Dresden, Jahrgang, 1883, Januar bis Juni.

Anales del Museo Nacional de Mexico. Tomo iii, Entrega 2, Mexico, 1883; Tomo iii, Entrega 3–a, Mexico, 1883.

Phrenological Journal, January, 1883, new series, Vol. 27, No. 1.

Answers to Inquiries about United States Bureau of Education, by Chas. Warren, M. D., 1883.

Proceedings of the Davenport Academy of Natural Sciences, Vol. III, part 3, 1879–1881.

Bulletin of American Museum of Natural History, Vol. 1, No. 4, May 1, 1883.

Annual Report (14th) American Museum of Natural History, May 1, 1883.

Smithsonian Miscellaneous Collections, 469. List of Foreign Correspondents to January, 1882; List of Foreign Correspondents, 490, volumes 22 to 27, inclusive. Additions and Corrections to List of Foreign Correspondents, to January, 1883.

Proceedings of the Canadian Institute, Toronto, Vol. 1, Fasciculus, No. 4 and 5, 1883.

Transactions of the Edinburgh Geological Society, Vol. 4, part II, October, 1882.

Catalogue of the Fossils of the Cincinnati group, by Joseph F. James, 1883.

Revision of the genus Clematis of the United States, by Joseph F. James, 1883.

Accessions to the Indian Museum, Appendix A, for quarter ending March 31, 1883. Calcutta.

Quarterly Journal, Boston Zoölogical Society; Vol. 2, No. 3, July, 1883.

Memoirs of the Boston Society of Natural History; Vol. 3, No. 7, June, 1883.

The Leading Business Men of Dakota cities, 1883.

Vögel von Borneo ün Südosten der Insel gesammelt von Hern, F. J. Grabowsky, Wien, 1883.

Dr. Platen's ornithologische sammlungen aus Amborna, Wien, 1882.

Journal of the Royal Geological Society of Ireland; Vol. XVI, pt. 2; Vol. VI, pt. 2 (new series), 1881, 1882.

Johns-Hopkins University, Baltimore, Studies from the Biological Laboratory; Vol. 2, No. 4, July, 1883.

XXIX and XXX Bericht des Vereines für Naturkunde zu Cassel, Kassel, 1883.

Annual Report of City Auditor of Boston for financial years 1882, 1883; No. 71 of series May 1, 1882, to April 30, 1883.

Report of the Commissioners of Education for 1881.

The Fossil White Ants of Colorado, by S. H. Scudder, October 10, 1883.

Transactions of Vassar Brothers Institute and its scientific section, Poughkeepsie, N. Y., 1881, 1883, Vol. 1.

Librairie ancienne de U. Hoepli Milan, Catalogue No. 17; Entomologie, etc., 1884.

Through the Smithsonian Institution :

Anales del Museo Nacional de Mexico Tomo III. Entrega 4a. (Number of Smithsonian, 16881.)

U. S. Geological and Geographical Survey of the Territories of Wyoming and Idaho, 1878, parts I and II ; Hayden. (22154 and 22146.)

U. S. Geological Survey, J. W. Powell, Director.

Mineral Resources of the United States, Albert Williams, Jr., 1883. (22235).

Annual Report of the Secretary of the Interior on the Operations of the Department for the year ended June 30, 1881 ; Vol. III. (22171.)

No number or notice :

Second Annual Report of the United States Geological Survey to the Secretary of the Interior, 1880 and 1881. By J. W. Powell, Director.

Bulletin of the U. S. Geological Survey No. 1, Department of Interior.

United States Commission of Fish and Fisheries, Commissioners' Report, 1880.

Maps and Panoramas. Twelfth Annual Report of the U. S. Geological and Geographical Survey of the Territories, 1878.

2. *By purchase.*

Science, Vol. 1, Nos. 1 to 21, inclusive.

Science, Vol. 2, Nos. 22 to 45, inclusive, wanting No. 36.

American Journal of Science (wanting November number).

American Naturalist, full series.

Encyclopedia Britannica, Vols. 15–16.

APPENDIX A.

CATALOGUE OF TRANSLUCENT SECTIONS OF ROCKS AND FOSSILS.

List of Translucent Sections of Rocks and Fossils Prepared and Mounted on Glass, in the Laboratory of the State Museum of Natural History.

No.	Name.	Formation.	Locality.
1, 2	Cryptozoön		Saratoga Co., N. Y.
3, 4	Cnemidium ramulosum		Wurtemberg.
5	Stromatopora,	Coralline limestone	Schoharie, N. Y.
6	Serpentine and iron		Westchester Co., N. Y.
7, 8	Tentaculites,	Tentaculite limestone	Schoharie, N. Y.
9	Stromatopora,	Coralline limestone	Schoharie, N. Y.
10, 11	Stromatopora,	Hamilton group	Iowa City, Ia.
12	Astylospongia,	Niagara group	Tennessee.
13	Spirifera		
14	Astylospongia,	Niagara group	
15, 16	Stromatopora,	Coralline limestone	Schoharie, N. Y.
17, 18	Astylospongia		Tennessee.
19	Chætetes,	Trenton limestone	
20	Favosites with crinoid stem,	Lower Helderberg	
21	Cnemidium ramulosum		Wurtemberg.
22	Stromatopora,	Hamilton group	Iowa City.
23	Astylospongia		
24	Fusulina,	Upper Carboniferous	Missouri river.
25	Cnemidium		Wurtemberg.
26	Astræospongia,	Niagara group	Tennessee.
27	Astræospongia,	Niagara group	Tennessee.
28	Favosites Niagarensis,	Niagara group	Lockport, N. Y.
29	Favosites Forbesi,	Niagara group	Lockport, N. Y.
30, 31	Chætetes,	Shaly limestone	Schoharie Co., N. Y.
32	Stromatopora,	Gray limestone	Clarksville, N. Y.
33, 34	Sponge,	Trenton limestone	Wisconsin.
35	Favosites Forbesi,	Niagara group	Lockport, N. Y.
36	Sponge with crinoid stem,	Lower Helderberg group.	
37	Stromatopora,	Guelph limestone	Guelph, Canada.
38	Sponge	Lower Helderberg	
39, 40	Sponge	Trenton limestone	
41	Sponge	Lower Helderberg	
42	Stromatopora,	Hamilton group	Iowa.
43	Diphyphyllum,	Hamilton group	
44	Cnemidium ramulosum		Wurtemberg.
45	Sponge,	Lower Helderberg	
46, 47	Sponge,	Upper Helderberg	
48	Stromatopora,	Hamilton group	Iowa.
49	Diphyphyllum,	Hamilton group	

No.	Name. Formation.	Locality.
50, 51, 52	Streptelasma, Trenton limestone	
53, 54, 55	Streptelasma corniculum ? (Hall)	Cincinnati, O.
56	Chætetes, Trenton limestone	
57	Astræospongia, Niagara group	Tennessee.
58, 59	Streptelasma corniculum	Cincinnati, O.
60, 61, 62	Zaphrentis, Onondaga limestone	Schoharie, N. Y.
63	Chætetes, Trenton limestone (Geb. Coll.)	654
64, 65, 66	Columnaria, Black River limestone	
67, 68	Favosites, Hamilton group	Iowa City, Iowa.
69	Corniferous limestone	Schoharie, N. Y.
70, 71, 72	Michelinia, Hamilton group	York, Livingston Co., N. Y.
73, 74	Heliophyllum	Old No. 376 red ?
75, 76	Stromatocerium rugosum	Old No. 701
77, 78	Heliophyllum, Hamilton group	York, Livingston Co., N. Y.
79, 80, 81, 82	Stromatopora	Hackberry, Iowa.
83, 84	Stromatocerium	Old No. 701
85, 86	Heliophyllum	Western N. Y.
87, 88	Zaphrentis	Old No. 377
89	Zaphrentis	Schoharie, N. Y.
90, 91, 92, 93	Heliophyllum	Schoharie, N. Y.
94	Chætetes, Trenton limestone	
95, 96, 97	Zaphrentis	Iowa City.
98	Heliophyllum, Onondaga limestone	Schoharie, N. Y.
99	Heliophyllum ?	Old No. 379
100, '1, '2	No sections	
103	Phytopsis, Birdseye limestone	Watertown, N. Y.
104, 105	Phytopsis, Birdseye limestone	Fort Plain, N. Y.
106	Favosites, Coralline limestone	Schoharie, N. Y.
107	Favosites, Coralline limestone	Schoharie, N. Y.
108	Columnaria inequalis, Coralline limestone	Schoharie, N. Y.
109, 110	Phytopsis, Birdseye limestone	Fort Plain, N. Y.
111	Serpentine and calcite, Laurentian	Lewisburg, N. Y.
112	Eozoön Canadense, Laurentian	Canada.
113, 114	Spirifera mucronata (shell), Hamilton group	
115, 116	Orthis Vanuxemi (shell), Hamilton group	
117, 118	Athyris spiriferoides (shell), Hamilton group	
119, 120	Strophodonta perplana	
121	Sponge? Hudson River group	Barrytown, N. Y.
122	Phytopsis, Birdseye limestone	Fort Plain, N. Y.
123	Phytopsis, Birdseye limestone	Watertown, N. Y.
124	Phytopsis, Birdseye limestone	Fort Plain, N. Y
125	Tentaculites, Tentaculite limestone	Cherry Valley, N. Y.
126	Lignalite, Niagara group	Lockport, N. Y.
127, '8, '9	Trematopora ponderosa, Am. Mus., 202	Clarksville, N. Y.
130, 131	Callopora ponderosa, Am. Mus., 171	Clarksville, N. Y.
132, 133	Trematopora ponderosa, Am. Mus., 184	Clarksville, N. Y.
134	Favosites, Coralline limestone	
135	Serpentine, calcite, dolomite, Laurentian	Bolton, N. Y.
136	Sponge? Hudson River group	Barrytown, N. Y.
137	Tentaculites	Cherry Valley, N. Y.
138, 139	Trematopora ponderosa, Am. Mus., 205	Catskill creek, N. Y.
140, 141	Beatricia, Hudson River group	
142	Chætetes (branching), Lower Helderberg	
143	Trematopora ponderosa, Am. Mus., 221	Clarksville, N. Y.
144	Oölite, Calciferous	Saratoga.
145	Beatricia, Hudson River group	
146	Oölite, Calciferous	Saratoga.

No.	Name.	Formation.	Locality.
147	Cornulites (Tentaculites) Richmondensis		
148	Tentaculites elongatus	Lower Helderberg	Port Jervis, N.Y.
149	Tentaculites	Black shale	Bristol Hollow.
150, '1, '2	Beatricia	Hudson River group	
153	Tentaculites		Cherry Valley, N. Y.
154, '5, '6	Beatricia	Hudson River group	
157	Bituminous calcite vein	Trent. lime	Flat creek, Spraker's Basin.
158	Caudi galli grit		Clarksville.
159	Tentaculites	Tentaculite limestone	Schoharie, N. Y.
160	Sponge?	Hudson River group	Barrytown, N. Y.
161		Hudson River group	Cincinnati, O.
162	Tentaculites	Upper Helderberg	Delaware, O.
163	Tentaculites		Ohio.
164	Tentaculites		
165, '6, '7, '8	No sections		
169		Hudson River group	
170	Tentaculites		
171	Cornulites (Tentaculites) Richmondensis		
172, '3, '4	Chætetes lycoperdon	Trenton limestone	Newport, N. Y.
175	Tentaculites spiculus		
176	No section		
177, 178	Foraminifera	Upper Helderberg	
179	Cone in cone	Portage group	Twenty-mile creek.
180	Stromatopora, with dolomite and quartz		
181	No section		
182, '3, '4, '5	Tentaculites ? styliola		
186, 187	No sections		
188–190 incl.	Favosites venustus	Niagara group	
191	Oölitic iron ore and Beyrichia	Clinton group	Wolcott, Wayne Co., N. Y.
192	Oölitic iron ore, Beyrichia and Bryozoans	Clinton group	Wolcott, Wayne Co., N. Y.
	No sections.		
200, '1, '2	Cyathophyllum	Hamilton group	Alden, N. Y.
203, 204			Livingston Co., N. Y.
205, 206	Heliophyllum		Darien, N. Y.
207	Favistella stellata	Hudson River group	Cincinnati, O.
208	Stromatopora (broken and destroyed)		Hackberry, Iowa.
209, '10, '11	Stromatopora		Hackberry, Iowa.
212	Stromatopora		Schoharie.
213	Stromatopora		
214	Stromatopora	Lockport ? (Pickett Coll.)	
215	Heliophyllum		Darien, N. Y.
216	Stromatopora		Hackberry, Iowa.
217	Stromatopora		Hackberry, Iowa.
218, '19, '20, '21	Stromatopora		Hackberry, Iowa.
222, 223	Stromatopora	Lower Pentamerus	New Scotland, N. Y.
224–31 incl.	Cryptozoön		3 m. W. Saratoga, N. Y.
232–35 incl.	Zaphrentis	Coralline limestone	Clarksville, N. Y.
236, 237	Zaphrentis	Corniferous	Schoharie, N. Y.
238, 239	Cystiphyllum		Western New York.
240, 241	Zaphrentis		Schoharie, N. Y.
242, '3, '4, '5	Eridophyllum	Upper Helderberg group	
246	Favistella	Hudson River group	
247–50 incl.	Chætetes	Hudson River group	Cincinnati, O.
251–4 incl.	Eridophyllum		Schoharie.

No.	Name.	Formation.	Locality.
255	Stromatopora		Lockport or Rochester.
256–61 incl.	Stromatopora		Hackberry, Iowa.
262–66 incl.	Chætetes		Canada.
267	Zaphrentis		Schoharie, N. Y.
268–71 incl.	Acervularia rugosa		Albany Co., N. Y.
272, 273	Favosites Emmonsi		Albany Co., N. Y.
274, '5, '6	Stromatopora		Iowa.
277, 278	Stromatopora		Iowa.
279–84 incl.	Chætetes,	Trenton limestone	
285, '6, '7	Oölite		Schoharie, N. Y.
288, 289	Heliophyllum,	Corniferous limestone	Clarksville, N. Y.
290–93 incl.	Stromatopora,	Upper Helderberg (Pickett Coll.)	
294, 295	Chætetes,	Trenton limestone	Middleville, N. Y.
297–300 incl.	Stromatopora,	Niagara group	Skanandoa.
301, '2, '3	Heliophyllum Halli		York, Livingston Co., N. Y.
304, '5, '6	Stromatopora		Schoharie.
307, 308	Zaphrentis		Skaneateles lake, N. Y.
308, '9, '10, '11	Stromatopora		Schoharie.
312, 313	Cystiphyllum		Western New York.
314, '15, '16	Chætetes		Cincinnati.
317, '18, '19	Favosites Helderbergiæ		Schoharie, N. Y.
320, '1, '2, '3	Stromatopora		Schoharie, N. Y.
324, '5, '6	Favosites Emmonsi		Cherry Valley, N. Y.
327, 328	Zaphrentis		Skaneateles lake, N. Y.
330, '1, '2, '3	Favosites		Schoharie, N. Y.
334, '5, '6	Favosites Emmonsi		Schoharie, N. Y.
337 '8, '9	Diphyphyllum,	Niagara group	Lockport, N. Y.
340, '1, '2, '3	Favosites		Cherry Valley.
344, '5, '6, '7	Zaphrentis		Cherry Valley.
348, '9, '50	Favosites		Clarke Co., Ind.
351, '2, '3	Favosites		Schoharie, N. Y.
354, '5, '6, '7	Monticulopora fibrosa,	Hudson River group	Cincinnati, O.
358, '9, '60	Monticulopora dalii,	Hudson River group	Cincinnati, O.
361, 362	Monticulopora mammulata,	Hudson River group	Cincinnati, O.
363, 364	Stellipora antheloidea,	Hudson River group	Cincinnati, O.
365, '6, '7, '8	Monticulopora sp. ?	Hudson River group	Cincinnati, O.
369, 370	Acervularia		Iowa.
371–75 incl.	Acervularia		Port Jervis, N. Y.
376, 377	Favosites		Port Jervis, N. Y.
378–82 incl.	Zaphrentis		Horn Rock, Skaneateles lake.
383–87 incl.	Zaphrentis		Delphi, N. Y.
388, 389	Cystiphyllum		Skaneateles lake.
390, 391	Zaphrentis		Skaneateles lake.
392, 393	Heliophyllum		Skaneateles lake.
394, '5, '6	Favosites		Cobleskill, N. Y.
397–401 incl.	Heliophyllum,	Hamilton group	West Williams, Canada.
402–11 incl.	Cystiphyllum,	Hamilton group	West Williams, Canada.
412, 413	Monticulopora ponderosa,	Hudson River group	Cincinnati, O.
414, '15, '16	Dekayia attrita,	Hudson River group	Cincinnati, O.
417, 418	Favosites		Port Jervis, N. Y.
419–22 incl.	Stromatopora		Port Jervis, N. Y.
423	Astylospongia inornata,	Lower Helderberg	Schoharie, N. Y.
424, 425	Favosites minimus,	Lower Helderberg	Schoharie, N. Y.
426–37	Tentaculites		Cherry Valley.
438, '9, '40	Zaphrentis Halli		Skaneateles lake.
441, '2, '3	Stromatopora		Schoharie, N. Y.
444, '5, '6	Halysites catenulata		Port Jervis, N. Y.

No.	Name. Formation.	Locality.
447, '8, '9	Stromatopora granulifera, Corn. limestone	Kelly's island.
450, '1, '2, '3	Stromatopora granulifera, Corn. limestone	Falls of the Ohio.
454–58 incl.	Astylospongia inornata	Schoharie, N. Y.
459, 460	Diphyphyllum and Chætetes	Port Jervis, N. Y.
461–66 incl.	Favosites Niagarensis	Port Jervis, N. Y.
467, '8, '9	Zaphrentis Halli, Hamilton group	York, Liv. Co., N. Y.
470, 471	Favosites venustus, Niagara group	Lockport, N. Y.
472, 473	Chætetes, Lower Helderberg	
474, 475	Cœnostroma incrustans	Rockford, Iowa.
476, 477	Stromatopora expansa	Rockford, Iowa.
478, 479	Favosites incrusted with Stromatopora	Schoharie, N. Y.
480, '1, '2	Favosites Helderbergiæ	Schoharie, N. Y.
483, 484	Favosites	Schoharie, N. Y.
485, 486	Caunopora planulata	Rockford.
487, 488	Houghtonia Huronica, Hudson River group	Drummond's Isl.
489, '90, '91	Eozoön Canadense	Canada.
492	Chætetes fibrosa, Trenton limestone	Trenton Falls, N. Y.
493	Streptelasma corniculum, Hudson River group	Cincinnati, O.
494, 495	Favosites Emmonsi	Western New York.
496, '7, '8	Acervularia Davidsoni	Iowa City.
499, 500	Stromatopora	Schoharie.
501, '2, '3, '4	Favosites	Iowa City.
505, 506	Chætetes, Corniferous lime	Lexington, Ind.
507, 508	Favosites, Coralline limestone	Schoharie, N. Y.
509-514 incl.	Niagara limestone	Lockport, N. Y.
515-518 incl.	Heliophyllum	Darien, N. Y.
519, 520	Michelinia stylopor	Darien, N. Y.
521-526 incl.	Chætetes, Lower Helderberg	Schoharie.
527–530 incl.	Heliophyllum	Canada.
531–534 incl.	Sponge, Hudson River group	Turner Station, Ky.
535, '6, '7	Stromatopora	Town of Malden, Canada.
538–547 incl.	Astylospongia meniscus	Tennessee.
548–564 incl.	Cryptozoön	Greenfield, Saratoga Co.
565, '6, '7	Michelinia	Clarksville.
568,' 9, '70	Michelinia	Cherry Valley.
571, 572	Stromatopora	Sharon Hill.
573, 574	Michelinia	Cherry Valley.
575, 576	Heliophyllum, Hamilton group	Darien, N. Y.
577-587 incl.	Favosites	Waldron, Ind.
588–600 incl.	Zaphrentis	Waynesville, O.
601–606 incl.	Heliophyllum	Little Traverse bay, L. Michigan.
607–610 incl.	Favosites	Waldron, Ind.
611–615 incl.	Chonophyllum magnificum	Falls of Ohio.
616	No section	
617	Favosites, Hamilton group	Near Castleton, Ontario Co., N. Y.
618	Cystiphyllum	West Williams, Canada.
619	Heliophyllum, Hamilton group	York, Liv. Co., N. Y.
620, '1, '2		Alden, Erie Co., N. Y.
623–642 incl.	Zaphrentis, Hudson River group	Waynesville, O.
640–650 incl.	Stromatopora	Kelly's island.
651, '2, '3	Stromatopora	Kelly's island.
654, '5, '6, '7	Stromatopora, Lower Helderberg	Delphi, N. Y.
658, '59, '60	Stromatopora minuta, Niagara group	Pt. Detour, L. Michig'n.
661, '2, '3, '4, '5	Stromatopora (Syringostroma) sp.? Hamilton group	W. N. Y.
666, '67, '68	Stromatopora var. foliculatum, Lr. Heldbg.	Clarksville, N. Y.
669–673 incl.	Stromatopora	White's quarries, Malden, Canada.
674–681 incl.	Stromatopora	Loc.?

No.	Name.	Formation.	Locality.
682–689 incl.	Stromatopora		Iowa City, Iowa.
690–698 incl.	Stromatopora		Loc.?
699–701 incl.	Zaphrentis and Stromatopora		Loc.?
702–708 incl.	Stromatopora		Herkimer Co.
709–714 incl.	Stromatopora,	Upper Pentamerus	Cumberland, Md.
715, 716	Same overgrowing Favosites		Cumberland, Md.
717–720 incl.	Stromatopora		Loc.?
721	Stromatopora,	Coralline lime	Schoharie, N. Y.
722–725 incl.	Stromatopora		Loc.?
726–729 incl.	Stromatopora minuta,	Niagara group	Louisville, Ky.
730–733 incl.	Crypoztoön		Saratoga Co., N. Y.
734–738 incl.	Stromotopora		Clarksville, N. Y.
739–742 incl.	Stromatopora		Kelly's island.
743–754 incl.	Stromatopora,	Lower Pentamerus	Clarksville, N. Y.
755–761 incl.	Stromatopora		Little Traverse bay, L. Michigan.
762–766 incl.	Stromatopora		Sharon Hill, N. Y.
767–775 incl.	Stromatopora		Kelly's island.
776–779 incl.	Astylospongia bursa		Waldron, Ind.
780–788 incl.	Phytopsis,	Birdseye limestone	Canajoharie, N. Y.
789–793 incl.	Cyathophyllum rugosum		Loc.?
794–798 incl.	Favosites		Cumberland, Md.
799–809 incl.	Columnaria		Schoharie, N. Y.
810–814 incl.	Niagara limestone		Lockport, N. Y.
815–825 incl.	Columnaria		Schoharie, N. Y.
826–831 incl.	Favosites,	Coralline limestone	Schoharie, N. Y.
832–842 incl.	Columnaria		Schoharie, N. Y.
843	Columnaria		Loc.?
844–849 incl.	Columnaria,	Coralline limestone	Schoharie, N. Y.
850–862 incl.	Stromatopora,	Coralline limestone	Schoharie, N. Y.
863–876 incl.	Heliophyllum sp.?		r. r. t., 299, Canada West.
878, '79, '80	Favosites, Chætetes and Alveolites,	Lower Pentamerus	
881–893 incl.	Styliola, etc.,	Genesee slate—Limestone band, Iron bridge near Alden	
894–897 incl.	Stromatopora,	Coralline limestone	Port Jervis.
898–902 incl.	Stromatopora		Crawfordsville, Ind.
903, '4, '5	Favosites		Thompson's lake.
906–914 incl.	Columnaria alveolata,	Black River	
915, '16, '17	Favosites Forbesi,	Niagara group	Waldron, Ind.
918–921 incl.	Alveolites,	Hamilton group	Canada West.
922–929 incl.	Stromatopora constellata,	Coralline lime	Schoharie, N. Y.
930, '31	Cyathophyllum rugosum,	Corniferous	Falkirk, N. Y.
932, '3, '4, '5	Cyathophyllum rugosum,	Corniferous	Clarksville, N. Y.
936, '7, '8	Favosites Forbesi,	Niagara group	Waldron, Ind.
939–943 incl.	Fossil Wood,	Tertiary	Virginia.
944–951 incl.	Favosites Forbesi		Waldron, Ind.
952–959 incl.	Favosites venustus		Iowa.
960–966 incl.	Trenton limestone		Saratoga.
967–973 incl.	Diphyphyllum,	Niagara group	
974–978 incl.	Oölite		Iowa.
979–986 incl.	Astylospongia,	Niagara group	Waldron, Ind.
987–992 incl.	Stromatocerium rugosum,	Black River	
993, '4, '5	Zaphrentis		Clarksville.
996–1000 incl.	Lower Helderberg		Port Jervis.
1001, '2, '3	Stromatopora,	Upper Helderberg	Williamsville, N. Y.
1004, 1005	Favosites,	Upper Helderberg	Canada.
1006, 1007	Zaphrentis		Waynesville, O.
1008–1012 incl.	Zaphrentis,	Hudson River group	Waynesville, O.

No.	Name.	Formation.	Locality.
1013, '14, '15	Syringostoma, Corniferous limestone		Leroy, N. Y.
1016–1062 incl.	Heliophyllum Halli, Hamilton group		Leroy, N. Y.
1063–1072 incl.	Zaphrentis Canadensis, Hudson River group		Waynesville, O.
1073–1078 incl.	Chætetes lycoperdon		Middleville, N. Y.
1079–1095 incl.	Heliophyllum Halli, Hamilton group		Leroy, N. Y.
1096–1099 incl.	Heliophyllum sp. ? Hamilton group		Leroy, N. Y.
1100–1114 incl.	Heliophyllum sp. ? Hamilton group		Leroy, N. Y.
1115, 1116	Heliophyllum Halli, Hamilton group		Leroy, N. Y.
1117	Heliophyllum sp. ? Hamilton group		Leroy, N. Y.
1118	Heliophyllum Halli, Hamilton group		Leroy, N. Y.
1119	Trenton limestone		Saratoga.
1120–1125 incl.	Zaphrentis Canadensis, Hudson River group		Waynesville, O.
1126–1137 incl.	Beatricia huronica		Jefferson, Ky.
1138–1146 incl.	Tetradium		
1147, 1148, '49	Heliophyllum, Upper Helderberg		Clarksville.
1150–1154 incl.	Heliophyllum, Upper Helderberg		Cherry Valley.
1155	Zaphrentis		Clarksville.
1156, 1157	Cystiphyllum, Hamilton group		York, N. Y.
1158–1163 incl.	Zaphrentis Canadensis, Hudson River group		Waynesville, O.
1164, '5, '6	Heliophyllum and Favosites, Ham. group		E. Bethany, N. Y.
1167	Heliophyllum Halli, Hamilton group		E. Bethany, N. Y.
1168–1175 incl.	Zaphrentis Canadensis, Hudson River group		Waynesville, O.
1176	Heliophyllum Halli		Canada West.
1177–1180 incl.	Heliophyllum sp. ?		Near Avon, N. Y.
1181	Cystiphyllum, Hamilton group		Canada.
1182	Cystiphyllum, Hamilton group		Canada.
1183, 1184	Heliophyllum Halli		E. Bethany, N. Y.
1185, 1186	Cystiphyllum, Hamilton group		West Williams, Canada.
1187, 1188	Cystiphyllum, Hamilton group		Skaneateles lake.
1189, 1190	Heliophyllum		Skaneateles lake.
1191, 1192	Zaphrentis		Skaneateles lake.
1193–1197 incl.	Heliophyllum		E. Bethany, N. Y.
1198–1200 incl.	Zaphrentis, Upper Helderberg		Cherry Valley.
1201, 1202	Cystiphyllum Americanum, Hamilton group		Moscow, N. Y.
1203–1207 incl.	Heliophyllum sp. ?		Darien, N. Y.
1208–1212 incl.	Zaphrentis Canadensis, Hudson River group		Richmond, Ind.
1213, 1214	Heliophyllum, Hamilton group		West Williams, Canada.
1215–1230 incl.	Zaphrentis Canadensis		Waynesville, O.
1231–1237 incl.	Heliophyllum sp. ? Hamilton group		Bosanquet, Canada.
1238, '39, '40	Heliophyllum, Hamilton group		Little Traverse bay, L. Mich.
1241, '42, '43	Heliophyllum sp.? Hamilton group		Little Traverse bay, L. Mich.
1244–1252 incl.	Zaphrentis Canadensis		Richmond, Ind.
1253, '4, '5, '6	Heliophyllum, Hamilton group		York, N. Y.
1257–1261 incl.	Clisiophyllum		Clarksville, N. Y.
1262–1275 incl.	Heliophyllum, Hamilton group		Darien, N. Y.
1276–1280 incl.	Heliophyllum, Hamilton group		Near Leroy, N. Y.
1281–1289 incl.	Heliophyllum Halli, Hamilton group		Near Leroy, N. Y.
1290	Zaphrentis, Upper Helderberg		
1291, '2, '3	Marble		Hampton point. ?
1294–98 incl.	Fragments of shells, Clinton group		
1299	Campophyllum, Hamilton group		Iowa City.
1300	Cystiphyllum Americanum, Hamilton group		W. New York.
1301	Stromatopora? Upper Helderberg		Kelly's island.
1302–8 incl.	Foraminifera, Upper Helderberg		Kelly's island.
1309–37 incl.	Acervularia, Upper Helderberg		Kelly's island.
1338–42 incl.	Diphyphyllum, Upper Helderberg		Kelly's island.
1343–48 incl.	Acervularia, Hamilton group		Little Traverse bay, L. Mich.

No.	Name. Formation.	Locality.
1349, '50	Favosites, Corniferous limestone	Falkirk, N. Y.
1351–56 incl.	Niagara limestone	Lockport, N. Y.
1357, '8, '9	Eridophyllum, Corniferous limestone	Clarksville, N. Y.
1360–64 incl.	Favosites Emmonsi, Corniferous limestone	Clarksville, N. Y.
1365, '6, '7	Favosites hemispherica	Clarksville, N. Y.
1368, '69, '70	Chætetes, Upper Helderberg	Kelly's island, O.
1371, '2, '3, '4	Astylospongia inornata, Lower Helderberg	Clarksville, N. Y.
1375–79 incl.	Syringopora, Upper Helderberg	Kelly's island, O.
1380, '81	Astylospongia præmorsa	Waldron, Ind.
1382–87 incl.	Syringopora, Upper Helderberg	Cherry Valley, N. Y.
1388, '89, '90	Stromatopora, Coralline limestone	Schoharie, N. Y.
1391, '92	Stromatopora constellata, Coralline limestone	Schoharie, N. Y.
1393-1411 incl.	Columnaria alveolata, Black River lime	Lake Champlain.
1412–17 incl.	Acervularia, Corniferous lime	Clark Co., Ind,
1418, '19	Tentaculite limestone	Schoharie, N. Y.
1420–28 incl.	Stromatocerium rugosum, Black River lime	Lake Champlain.
1429–33 incl.	Stromatocerium with Columnaria alveolata	Lake Champlain.
1434, '35, '36 to '40	Favosites Niagarensis	Schoharie.
1441	Favosites venustus	Schoharie.
1442–51 incl.	Columnaria inequalis, Coralline limestone	Schoharie.
1452, '3, '4	Halysites catenulatus, Coralline limestone	Schoharie.
1455–60 incl.	Halysites catenulatus, Coralline limestone	Schoharie.
1461, '2, '3, '4	Heliophyllum, Upper Helderberg	Clarksville.
1465, '66	Tetradium, Hudson River group	Shore Lake Ontario.
1467–74 incl.	Tetradium, Trenton group	Albany, Ga.
1475–79 incl.	Favosites Emmonsi, Upper Helderberg	Clarksville, N. Y.
1480–84 incl.	Favosites hemisphericus, Upper Helderberg	Clarksville, N. Y.
1485–88 incl.	Calcite	Mammoth cave, Ky.
1489, '90, '91	Niagara limestone	Lockport, N. Y.
1492, '93	Encrinal limestone	
1494-1501 incl.	Chætetes lycoperdon, Trenton limestone	New York.
1502, '3, '4, '5, '6	Chætetes lycoperdon, Trenton limestone	Trenton Falls.
1507, '8	Chætetes lycoperdon (loose specimen)	Helderberg mts.
1509–13 incl.	Chætetes, Hudson River group (Pickett Coll.).	
1514	Heliophyllum, Upper Helderberg	Falkirk, N. Y.
1515–20 incl.	Recent coral	
1521, '2, '3, '4	Chætetes lycoperdon, Trenton lime	Middleville, N. Y.
1525, '6, '7 to '30	Cryptozoōn, Calciferous (loose)	Schoharie, N. Y.
1531, '2, '3	Chætetes, Corniferous lime	Kelly's island.
1534–41 incl.	Niagara limestone	Lockport, N. Y.
1542–46 incl.	Zaphrentis Canadensis, Hudson River group	Drummond's Isl.
1547–55 incl.	Cyathophyllum rugosum, Upper Helderberg	Thompson's lake.
1556–72 incl.	Favosites venustus, Niagara group	
1573–77 incl.	Monticulipora, Hudson River group	Waynesville, Ohio.
1578–82 incl.	Astylospongia inornata, Lower Helderberg	Schoharie, N. Y.
1583–87 incl.	Tetradium, Birdseye limestone	Little Falls, N. Y.
1588–99 incl.	Upper Helderberg limestone	Clarksville, N. Y.
1600–5 incl.	Tentaculite limestone	Indian Ladder, N. Y.
1606–11 incl.	Acervularia, Hamilton group	West Williams, Canada.
1612–15 incl.	Astylospongia inornata, Lower Helderberg	Clarksville, N. Y.
1616, '17, '18	Michelinia	
1619, '20, '21	Corniferous limestone	Leroy, N. Y.
1622–32 incl.	Acervularia, Corniferous lime	Kelly's island.
1633, '34	Chætetes	Kelly's island.
1635–53 incl.	Tetradium, Trenton limestone	
1654–68 incl.	Corniferous limestone	Clarksville, N. Y.
1669–73 incl.	Cyathophyllum rugosum, Upper Helderberg	Clarksville, N. Y.

No.	Name. Formation.	Locality.
1674–78 incl.	Acervularia, Upper Helderberg	Kelly's island, O.
1679, 80	Favosites Emmonsi and Stromatopora, Cornif. lime.	Charleston, Ind.
1681–89 incl.	Upper Helderberg	Charleston, Ind.
1690–94 incl.	Monticulopora, Hudson River group	Waynesville, Ohio.
1695-1707 incl.	Niagara limestone	Lockport, N.Y.
1708, '9, '10, '11	Michelinia, Upper Helderberg	Leroy, N.Y.
1712	Cyathophyllum rugosum, Upper Helderberg	Clarksville.
1713–29 incl.	Stromatopora, Upper Helderberg	Kelly's island, O.
1730, '31	Favosites hemispherica, Upper Helderberg	Cedarville, N.Y.
1732–38 incl.	Stromatopora, Lower Pentamerus	Cedarville, N.Y.
1739	Favosites Helderbergiæ, Stromatopora and Alveolites,	Cedarville, Herkimer Co., N. Y.
1740–72 incl.	Stromatopora, Lower Pentamerus.	Cedarville, Herkimer Co., N. Y.
1773	Callopora, Hamilton group	Eighteen-mile creek, N. Y.
1774	Eridophyllum, Corniferous limestone	Cedarville, N. Y.
1775–78 incl.	Pachyphyllum Woodmani, Chemung group	Hackberry, Iowa.
1779, '80	Hamilton group	Independence, Iowa.
1781	Eozoön Canadense	Thurman, N. Y.
1782, '3, '4	Ophiolyte	Lowell, Mass.
1785–89 incl.	Cyathophyllum rugosum, Upper Held	Clarksville, N. Y.
1790–96 incl.	Stromatopora, Upper Helderberg	Kelly's island, Ohio.
1797-1803 incl.	Stromatopora, Upper Helderberg	Kelly's island, Ohio.
1804–13 incl.	Stromatopora, Hamilton group	Skaneateles lake, N. Y.
1814–17 incl.	Stromatocerium rugosum, Black River group	Lake Champlain.
1818, '19, '20	Stromatopora	
1821–30 incl.	Concretion ? Hudson River group	Stuyvesant, N. Y.
1831, '2, '3	Favosites, Upper Helderberg	Clarksville, N. Y.
1837–40 incl.	Cryptozoön, Calciferous group	Little Falls, N. Y.
1841, '2, '3	Favosites, Hamilton group	New York.
1834, '5, '6	Alveolites, Hamilton group	Little Traverse bay, L. Mich.
1844, '5, '6, '7	Cryptozoön Calciferous group	Little Falls, N. Y.
1848	Astræospongia meniscus, Niagara group	Tennessee.
1849–52 incl.	Stromatopora, Coralline limestone	Schoharie, N. Y.
1853	Favosites, Hamilton group	Alden, N. Y.
1854, 1855	Stalagmite (cave)	Thompson's lake, N. Y.
1856–60 incl.	Tennessee marble	(New Capitol).
1861	"Mexican onyx"	(New Capitol).
1862–66 incl.	Niagara limestone	Lockport, N.Y.
1867	Tetradium, Hudson River group	
1868	Sponge, Hudson River group	Kentucky.
1869, 1870	Belemnite	
1871, '2, '3, '4	Stalactite	Ball's cave, N. Y.
1875, '6, '7	Cyathophyllum rugosum, Upper Held	Clarksville, N. Y.
1878	Zaphrentis, Hamilton group	Skaneateles lake.
1879	Heliophyllum, Hamilton group	Darien, N. Y.
1880	Astylospongia inornata, Lower Helderberg	Clarksville, N. Y.
1871, 1882	Chætetes lycoperdon	Middleville, N. Y.
1883–88 incl.	Niagara limestone	Lockport, N. Y.
1889	Favosites Niagarensis, Coralline limestone	Schoharie, N. Y.
1890	Favosites Forbesi, Niagara group	Waldron, Ind.
1891	Astylospongia præmorsa, Niagara group	Waldron, Ind.
1892	Columnaria inequalis, Coralline lime	Schoharie, N. Y.
1893, 1894	Hornstone, Upper Helderberg	
1895, 1896	Eridophyllum, Upper Helderberg	
1897, 1898	Shell limestone, Hudson River group	
1899	Stromatopora	Louisville, Ky.

No.	Name. Formation.	Locality.
1900	Stromatopora	Sharon, N. Y.
1901, '2, '3, '4	Fossil wood	
1905	Oölite	
1906	Favosites	
1907	Diphyphyllum, Corniferous limestone	
1908	...	
1909, 1910	Stromatopora	Kelly's island.
1911, 1912	Stromatopora expansa, Chemung	Rockford, Iowa.
1913, '14, '15	Stromatopora, Coralline limestone	Schoharie, N. Y.
1916	Callopora ponderosa, Lower Helderberg	Schoharie, N. Y.
1917	Astylospongia inornata, Lower Helderberg	Clarksville, N. Y.
1918	Cænostroma incrustans, Chemung	Rockford, Iowa.
1919, '20, '21	Favosites and Heliophyllum, Hamilton group,	West Williams, Ca.
1922, '23	Favosites, Hamilton group	West Williams, Ca.
1924–28 incl.	Strombodes pentagona, Niagara group	Louisville, Ky.
1929–32 incl.	Chætetes, Upper Coal Measures	Jackson Co., Mo.
1933–37 incl.	Stromatocerium, Hudson River group (drift)	Michigan.
1938–41 incl.	Fusulina, Carboniferous	Upper Missouri.
1941–45 incl.	Michelinia, Corniferous	Cherry Valley.
1946–47 incl.	Michelinia, Upper Helderberg	Clarksville, N. Y.
1948–52 incl.	Michelinia Stylopora, Hamilton group	
1953, 1954	Tetradium, Hudson River	
1955–58 incl.	Stromatopora	Bohemia.
1959	Sponge, Hudson River group	Kentucky.
1960–64 incl.	Astræospongia meniscus, Niagara group	Tennessee.
1965, 1966	Niagara limestone	Lockport.
1967–73 incl.	Favosites Niagarensis, Coralline lime	Schoharie, N. Y.
1974	Favosites Niagarensis, Chætetes and Stromatopora, Coralline limestone	Schoharie, N. Y.
1975, 1976	Halysites catenulatus, Niagara group	Port Jervis, N. Y.
1977, 1978	Stromatopora	Sharon Hill, N. Y.
1979	Favosites	
1980	Oölite, Calciferous	Saratoga Co., N. Y.
1981	Favosites Forbesi, Niagara	Waldron, Ind.
1982	Astylospongia inornata, Lower Helderberg	New York.
1983	Clinton iron ore	
1984–88 incl.	Monticulipora, Hudson River group	Cincinnati. O.
1989–91 incl.	Monticulipora fibrosa, Hudson River group	Cincinnati, O.
1992, '93	Monticulipora dalii, Hudson River group	Cincinnati, O.
1994	Monticulipora mammulata, Hudson River group,	Cincinnati, O.
1995, '96	Stellipora antheloidia, Hudson River group	Cincinnati, O.
1997	Chætetes	
1998	Stromatopora ?	Port Jervis.
1999, 2000	Eozoön Canadense, Laurentian	Thurman, Warren Co., N. Y.
2001–5 incl.	Ophiolite	Massachusetts.
2006, '7	Oölite, Calciferous group	Saratoga, N. Y.
2008–11 incl.	Alveolites, Chemung group	Rockford, Ia.
2012	Cænostroma incrustans and Alveolites	Rockford, Ia.
2013, '14	Favosites Emmonsi, Upper Helderberg group	Clarke Co., Ind.
2015, '16	Favosites	Iowa.
2017–19 incl.	Acervularia Davidsoni, Hamilton group	Iowa City.
2020, 21	Favosites Niagarensis, Coralline limestone	Schoharie.
2022	Trenton limestone	Flat creek, Montgomery Co., N. Y.
2023	Waterline group (limestone)	
2024	Onondaga salt group (limestone)	
2025	Medina sandstone	
2026	Astræospongia meniscus, Niagara group	Tennessee.
2027, '28	Diphyphyllum	

No.	Name. Formation.	Locality.
2029, '30, '31	Zaphrentis, Upper Helderberg group...	Clarksville, N. Y.
2032–42 incl.	Favosites Forbesi, Niagara group	Waldron, Ind.
2043, '4, '5	Crinoid stem	
2046-51 incl.	Stromatopora, Lower Pentamerus	Clarksville, N. Y.
2052, '3, '4	Favosites Niagarensis, Coralline limestone	Schoharie, N. Y.
2055	Diphyphyllum and Stromatopora, Corall. lime.	Port Jervis, N. Y.
2056 '7	Stromatopora, Coralline limestone	Schoharie, N. Y.
2058–64 incl.	Upper Helderberg limestone.	Clarksville, N. Y.
2065–70 incl.	Favosites, Upper Helderberg limestone	Cherry Valley, N. Y.
2071	Monticulipora, Hudson River group	Cincinnati, O.
2072	Chætetes lycoperdon, Trenton limestone	New York.
2073, '74	Chætetes, Corniferous limestone	Lexington, Ind.
2075	Lower Helderberg limestone	Hudson, N. Y.
2076, '77	Alveolites, Hamilton group	W. Williams, Canada.
2078, '79	Diphphyllum, Upper Helderberg group	
2080	Cystiphyllum, Hamilton group	W. New York.
2081–87 incl.	Stromatopora, Upper Helderberg group	Kelly's island, O.
2088	Favosites venustus, Niagara group	Lockport, N. Y.
2089	Chætetes, Stromatopora, Favosites Niagarensis, Coralline limestone	Schoharie, N. Y.
2090, '91	Columnaria, Hudson River group (Western)	
2092	Cryptozoön, Calciferous group	Saratoga Co., N. Y.
2093	Medina sandstone	
2094	Beyrichia, Clinton group	
2095, '6, '7	Stromatopora expansa, Chemung group	Rockford, Iowa.
2098-2100 incl.	Stromatopora	Iowa.
2101, 2102	Favosites, Hamilton group	Iowa City, Iowa.
2103-2107 incl.	Favosites, Hamilton group.	Iowa City, Iowa.
2109, '10, '11	Chætetes, Upper Coal Measure	Newburgh, Ind.
2112–15 incl.	Halysites, Niagara group	Iowa.
2116, '17, '18	Beatricia, Hudson River group	Waynesville, O.
2119, '20, '21	Stromatopora, Hamilton group	York, N. Y.
2122–27 incl.	Stromatopora and Heliophyllum	York, N. Y.
2128	Chætetes, Trenton limestone (Geb. Coll.).	

[To this list there are to be added several hundred specimens not yet recorded.]

REPORT

OF THE

STATE ENTOMOLOGIST

TO THE

REGENTS OF THE UNIVERSITY OF THE STATE OF NEW YORK.

For the Year 1883.

REPORT.

To the Honorable Board of Regents of the University of the State of New York :

GENTLEMEN — Under the provisions of Chapter 377 of the Laws of 1881, providing for the office of State Entomologist, it was required that "the Entomologist shall render an annual report of his labors and investigations to the Legislature."

Under Chapter 355 of the Laws of 1883, regulating the State Museum of Natural History, it is provided that the State Entomologist shall become, by appointment of the trustees of said Museum, a member of its scientific staff; and that his scientific contributions be hereafter published by the Museum, in lieu of the report to the Legislature formerly required by law.

In reply to a communication from your Secretary in May last, inquiring if the appointment above provided for was desired by me, I returned answer as follows:

DAVID MURRAY, LL. D., *Secretary of Board of Regents:*

DEAR SIR — To your kind favor of the 23d inst., I beg leave to reply:

My appointment by the Board of Regents of the University as a member of the scientific staff of the State Museum of Natural History, under the provisions of Chapter 355 of the Laws of 1883, would be entirely agreeable to me, and is desired.

It will give me pleasure to coöperate in earnest effort to extend the usefulness of the State Museum with which I have been so long and pleasantly connected; and also, to prosecute my studies and labors in future, under the guidance and direction of your honorable board, in accordance with my original desire, at the establishment of my present office.

Very truly yours,
J. A. LINTNER.

ALBANY, *May* 26, 1883.

Under date of June 1, 1883, your Secretary honored me with official notification of my appointment by your board as State Entomologist.

Since that time I have continued to pursue my studies and investigations in the office that had been provided for me in the Capitol.

I beg leave to present the following as a brief synopsis of my subsequent operations:

A long delay in the publication of my first report to the Legislature,* and the length of time that it remained in my hands before its final issue in November last, delayed any advance work. This, with the other duties of my office, have prevented me from having in readiness the annual report embodying my scientific investigations of the past year, which I would have been happy to present to your honorable board at this time. You will, therefore, I trust, excuse its delay which has seemed inevitable, and accept at the present a brief statement of my official labors since the date of my appointment.

CORRESPONDENCE AND EXAMINATIONS.

The correspondence of the office has been large, and, unaided as I am, somewhat burdensome. With the increasing interest felt throughout our country in the causes and means of control of insect injuries, calls for information upon these and kindred points are increasing in frequency. While so few of our States have their entomologists, additional labor devolves upon the few individuals who have been specially set apart for entomological work. The determination of specimens, or the investigation of some obscure form of insect attack requested of me, may require the labor of days before suitable answer can be returned. Such calls, when coming from other and remote States of the Union, would more appropriately be sent to the Entomological Department at Washington, where, through its efficient corps of six assistants to the Entomologist, large provision is made for an amount of work of this character. Still, as scarcely a single study of the kind, coming to me from whatever source it may, can fail of contributing to the efficiency of this department, I have felt myself authorized in giving to them all the attention that their importance has appeared to demand.

The results of these examinations have been, from time to time, communicated by me to leading agricultural and scientific journals, that the information conveyed might not be limited to the individual replied to. Since the first of June, twenty-eight such publications have been made by me. Several of these will be available, after emendation and addition, for presentation in my annual report, or other publication by the State Museum.

COLLECTIONS.

Under the act last above cited, the collections made by the Entomologist are to belong to, and form a part of, the collections of the State Museum. For reasons above stated, my collections during the past season have been quite limited. No excursions for the special purpose of collecting, were made by me. There was not the available time to devote to the immediate preparation for the cabinet which so large a

*First Annual Report | on the | Injurious and other Insects | of the | State of New York | made to the State Legislature, pursuant to chapter 377 of | the Laws of 1881, | by J. A. Lintner, | State Entomologist. | —— | Issued, October, 1883. | —— | Albany: | Weed, Parsons and Company, printers, | 1882. | —— | 8vo., pp. xxii–381, figs. 84.

proportion of insects require, of a large amount of material, nor provision for its safe-keeping — much less for its display.

The total number of specimens collected and mounted is twelve hundred and twenty. They are contained in the several orders as follows:

Hymenoptera	50	Hemiptera	322
Lepidoptera	237	Orthoptera	17
Diptera	152	Neuroptera	25
Coleoptera	372	Biological	45

The number of species cannot at present be named, as much of the material has not yet been studied. A large portion of it will be available for distribution to the educational institutions of the State or for exchange.

In addition to the above, the following collections have been made:

Larvæ of Lepidoptera, etc., in alcohol, approximately	250
Unmounted Coleoptera, Hymenoptera, etc., approximately	350
Unmounted Biological specimens, approximately	500
Pupæ from larvæ collected, hybernating	130

The aggregate number of specimens collected, as appears from the above, is two thousand four hundred and fifty.

The collections have mainly been made in Middleburgh, Schoharie Co., at Elk lake, in Essex Co., in the town of Hammond, St. Lawrence Co., and in Albany.

INSECTS OF SPECIAL INTEREST.

Among those at Middleburgh were a number of *Trypetidæ*, of the group in which the wings are exquisitely marked with clouds and spots in the beautiful patterns which have been so admirably delineated in the four plates of Baron Osten Sacken, and the late Dr. Loew of Prussia, in their valuable monographs of this interesting family. These flies had seldom fallen under my observation before, and then in only single examples; but at this time (middle of July) and place they were not at all uncommon, traveling, with the strange movements peculiar to them, over the leaves of the milkweed (*Asclepias*) and wild parsnip (*Pastinaca sativa*), upon which the species may perhaps breed.

The time of my visit to Elk lake — Aug. 15–30 — was favorable for the collection of two species of butterflies which are rarely met with in this State, except in localities having high elevations, approximating that of Elk lake, which is 2,000 feet above tide. *Grapta Faunus* (Edw.) and *Grapta j-album* (Boisd.-Lec.) were comparatively abundant in the roadway leading to the lake, resting for a while upon the damp soil to imbibe its moisture and then flitting away to the adjoining shrubbery. Both species had evidently but just emerged from their pupal stage. Of another species of butterfly — *Feniseca Tarquinius* (Fabr.), which appears to be quite local in its distribution and to occur more frequently within this State, in the Adirondack region than elsewhere, several examples were captured, but all in indifferent condition, showing that they had already been abroad for a number of days. Its larval food-plant is said by Mr. Glover to be hawthorn (*Cratægus*), but in this and in both previous instances in which the butterfly has been observed by me, it has been associated with alders (*Alnus* species), and where the hawthorn was not seen to occur.

An interesting illustration of the abundance at times and in certain localities of a particular species of insect, conjoined with the absence of other allied and perhaps more common forms, was given me at this locality. With a single exception, in a solitary example of *Catocala unijuga* (Walker), the only noctuid moth observed by me during my fortnight's sojourn here, was *Agrotis clandestina* (Harris). To add to the interest, all the examples had one common hiding-place, viz.: behind and about the sliding window-sashes of the exceedingly simple log structure that bore the euphonious name of the Elk Lake Hotel. The only conceivable attraction of such multitude of moths to their covert was a single kerosene hand-lamp, and later at night for a brief space of time, a candle in each of the four bed-rooms. Their assemblage in such numbers, under such circumstances, was a mystery to me. A sash could not be moved without disturbing a dozen of them. Hundreds could have been captured, but as many were in poor condition and the species is a common one, twenty-five examples only were brought away.

The black-fly, *Simulium molestum*, was abundant, but not very troublesome, for in the month of August it ceases to show the insatiable disposition to gorge itself with blood that it manifests in the preceding months. A number of specimens were captured and bottled for the museum collections as objects of interest to the many who have never recognized this minute yet most annoying pest of our northern wilderness.

Upon some cut poplars (*Populus tremuloides*) piled by the way-side, a large number of a wood-boring beetle, *Agrilus torpidus* (Lec.), which I had never met with before, were observed alighting from their flight in the bright sunshine, and running in jerking motions actively over the bark. Its larva is doubtless a borer in the poplar. Sixty-two examples of it were taken.

A NEW FORM OF INSECT ATTACK.

It would not be proper that at this time I should refer to more than a few of the many interesting insects, their habits and their attacks which have been brought to my notice during the past summer: I may, however, be permitted to mention two of these attacks.

We have long been familiar in Albany, with the ravages of the white-marked tussock-moth, *Orgyia leucostigma* (Sm.-Abb.), which annually, during the months of June and July, has made such formidable depredations upon the horse-chestnuts, elms, and maples bordering our streets, as to cause their foliage to present a most unsightly appearance. In years when the caterpillar which is the author of these injuries, has been unusually abundant, many of the trees, especially of the horse-chestnuts, have been entirely defoliated. It is this insect from which protection is sought by placing bands of cotton-batting loosely about the tree-trunks when the attack is first noticed — an effective preventive only in the event of the tree at the time being wholly free from the pest, but of no utility whatever if the insect be already upon it, either as young larvæ or as egg-clusters attached to the branches. It is this insect also, which deposits its eggs upon its cocoon, to the number of two or three hundred, and covers them with a mass of viscid, white, frothy matter, which, hardening by exposure, subsequently remains for months or until discolored by age, as conspicuous objects when placed, as they often are, upon the trunks of elms and larger trees, readily arresting the eye of the passer-by.

This past summer, contemporaneously with the first appearance of the attack of the caterpillar upon the foliage, the sidewalks, streets and parks where the elm was growing, were seen to be strewed with its green leaves — in many places so thickly as completely to cover the walks or ground. Upon taking them up for examination, they were found to be the tips of the branches, comprising most of the new growth of the season. The portions thus thrown down were about three inches in length and contained from four to ten fresh, uninjured leaves. It was evident that they had not been broken off by an unusually high wind, for each day continued to add to the number and to increase the abundance of the fall. Making critical observation for the discovery, if possible, of so unusual a phenomenon, it was noticed that from above the point at which the twig had been broken, the bark was entirely removed for an extent averaging one-tenth of an inch. The manner of its removal showed it to have been eaten by an insect. From its character, together with the abundant presence of the caterpillar upon the trees at the time, I believed that it was the work of the *Orgyia*. If so, it was of especial interest, as this form of depredation, had never, to my knowledge, been previously observed. To verify the belief, I ascended to a house-top where the branches of a large elm projecting over the roof gave an excellent opportunity for examination. The larvæ were abundant upon the tree; the flat roof was strewn and heaped in corners with the broken-off tips; large numbers of the girdled twigs still held their place on the tree; and by careful search, larvæ were discovered in the act of eating the bark. From what was subsequently learned, the girdling had at this time nearly ceased.

From the above observations, the following explanation of the cause of the girdled and broken-off twigs of the elm may, I think, safely be given. Upon the eating away of the bark by the *Orgyia* caterpillar, the wood on exposure rapidly dried and soon became so brittle that from a moderate swaying of the branches the weight of a half dozen or more of large and succulent leaves would occasion the breaking of the slender twig — often not exceeding in its dried state the diameter of an ordinary pin.

For the occurrence at this time of this novel form of the *Orgyia* attack, I can offer but the following as a plausible explanation. The spring had been remarkably cold, and, as a consequence, the foliage of the trees had been delayed in development quite beyond the ordinary time. The sudden advent of warm weather caused a corresponding sudden start in vegetation followed by a vigorous growth, and the young twigs of the elm would, as the result, be unusually tender. The particular feeding-ground of many of the lepidopterous larvæ is known to be decided upon only after repeated tastings and rejections of such portions of their food-plant as they traverse, and a final acceptance of that most agreeable to them. By a process like this the *Orgyia* larva may have made the discovery, that just at the commencement of the new growth, as the result of the seasonal conditions above mentioned, there was concentrated in the tender bark nutriment far more acceptable to it than that offered in the leaves, upon which alone it had hitherto been accustomed to feed. As the bark hardened with the advancing season it would cease to be acceptable for food.

The interesting query here arises, suggested by the frequency with which new habits in insects are brought to the notice of the entomologist: will the taste for bark newly acquired by the Orgyias of the last year, be conveyed, through heredity, to their descendants, to be continued through future years and displayed to an extent measured by the degree of tenderness of the bark at the period of their appearance?

The falling of the twigs, in the condition as above given, was first observed about the middle of June. Upon my return to Albany, after a fortnight's absence, on the 27th of July, twigs were still falling, but among them was a large proportion in which a new feature was presented. The breaking, instead of being at the base of the girdling, just above the commencement of the new growth, was, in these, at the preceding node, covering the growth of the former year. As a rule, the twigs showed a greater diameter at their decorticated portion, compared with those of the earlier fall. The greater strength thus given them permitted them to remain upon the tree until the death of the preceding internode, which soon followed the arrest of the circulation — its starvation ensuing, it being unprovided with leaves through which a circulation could still be maintained. When dead a slight motion of the branch, or even the weight of the terminal leaves would be sufficient to disconnect it at its lower and weaker node.

About the 1st of August the twigs ceased to fall. I have not made examination to see whether any of those upon which the above attack was made still remain upon the trees.

Nothing of the kind was observed as occurring upon the other principal food-plants of the *Orgyia*, viz.: the horse-chestnut and the maple, nor would it be expected in association with growth and structure so entirely different from that of the elm.

The same phase of attack was noticed by me in Troy, N. Y. I have seen no publication of its presence elsewhere, although the caterpillar was quite abundant in New York and other of our larger cities.

THE ENGLISH SPARROW PROMOTING INSECT INJURY.

In connection with the incidental mention above of the almost annual defoliation of so many of our more valuable shade-trees by the Orgyia caterpillars, it may be of interest to state that there is every reason to believe that we owe the commencement and regular returns of this annoying form of insect depredation to the introduction into our city, about the year 1868, of the English sparrow, *Passer domesticus*, and its subsequent rapid increase and diffusion. The sparrow does not feed upon the insect, but drives away the four species of birds which are specially fitted by structure of bill for removing the skin from our hairy caterpillars previous to swallowing the nicely prepared tid-bit.

The Chinch-Bug in Northern New York.

Another insect attack, which has claimed my attention during the past season, presents so many interesting features, and threatens to be of so great importance to the agricultural interests of our State, that I beg leave to present to your board a report of my personal observations upon it. That it might be given the immediate publicity which, in view of the approach of winter, seemed so desirable, it was communicated to the Albany *Argus*, and was published in the issue of October 10. It is as follows:

During the last week in September a package of insects was sent to the State Agricultural Society, with the following statement in regard to them, from Mr. M. H. Smith, of Redwood, Jefferson county: "I herewith transmit specimens of (to us) a new and formidable grass-destroying insect, together with portions of grass destroyed by them, and also some of the soil, for the purpose of examination. If the insect is known to you and there is any known way to exterminate it, please inform us at once. The evidence of its destructive work was first discovered in June of 1882 by Mr. H. C. King, of Hammond, St. Lawrence county. At haying-time, about the middle of July, he noticed about three acres of his timothy grass to be apparently prematurely ripened. In the fall he observed that there was no aftergrowth, and that the stubble was as dead as if it had been boiled. Search was made among the dead roots without any discovery. The following spring the field was entirely barren of timothy, but some clover, weeds and thistles occupied the ground where at least one and one-half tons of timothy to the acre, under favorable circumstances, would have been cut. In June of 1883 Mr. King discovered other fields to be affected in the same manner, and instituted a search which has recently resulted in the discovery of myriads of the insect, not in the dead grass, but at the edge of the live grass, where they may be scraped up by handfuls. They have destroyed about fifteen acres for Mr. King and several acres for each of several other farmers of his vicinity. They are causing extreme alarm, and if you can give any relief from this calamity it will be gratefully appreciated. This is an important grazing locality. In addition to the timothy, June grass and wire grass are also destroyed."

The insect identified.—The insects being submitted to me by Secretary Harison, of the State Agricultural Society, I was compelled—although almost distrusting the evidence of my eyes—to recognize them as the notorious chinch-bug of the Southern and Western States. I had never before seen a New York specimen, nor had I knowledge of its occurrence within our limits, other than the record of Dr. Fitch, of his meeting with three individuals during the winter time upon willows. Dr. Harris, the eminent Entomologist of New England, had seen one specimen in Massachusetts. In each instance the occurrence was deemed of such interest that the date of observation was given.

Throughout the Southern or Western States, or more properly those lying within the "wheat-belt region," the chinch-bug is a well-known enemy, from the almost incredible amount of injury which it inflicts, in certain years, upon the grain and corn crops. Probably the aggregate of pecuniary losses which have resulted to the United States from its ravages have considerably exceeded those inflicted by any other of our thousand insect pests. In 1864, its injuries in the State of Illinois to wheat and corn alone were computed at seventy-three millions of dollars. This was a year of unusual excess, but it is not of rare occurrence that a State suffers a loss of from twelve to fifteen millions of dollars in a single year. When the insect abounds, it is so numerous as to cover the ground; it blackens the stalks of the plants upon which it feeds; it fills the air when, at seasons of its mating, it takes wing for flight; it marches to new feeding grounds in solid bodies, upon and over one another; its invading armies sweep over and utterly destroy a wheat or corn field in two or three days; and the nauseous bed-bug odor which they exhale, sickens those who are compelled to breathe it.

Appearance of the insect.— It belongs to the order of Hemiptera, which comprises all of the bugs proper. It is, therefore, without biting jaws, but takes its food by suction through a four-jointed proboscis, which, at rest, is bent beneath the body. Its size seems quite disproportioned to its destructive powers, being but about the one-tenth of an inch long, and one-third of its length broad. Its body is black and slightly hairy under a magnifier. The wing-covers, resting flat upon its back, are white, with a subtriangular black spot in the middle of the outer margin of each, and a few black veins upon their middle. The feet and swollen ends of the four-jointed antennæ are black, while elsewhere the latter and the legs are dull yellow.

Observations upon the attack.— In addition to the information contained in the communication of Mr. Smith above given, I am able to add the following from my personal observations made during the past week (on October 5th and 6th). The cold weather of the past few days (ice was formed upon three nights) has doubtless driven most of the bugs to their winter quarters for hibernation, in crevices, beneath boards, rails, etc., in rubbish heaps, and to many other secure retreats where such insects are accustomed to hide. Yet, upon parting the roots of the timothy, upon the borders of the killed portion, they were found in alarming numbers — in some spots sufficient to cover the ground with their bodies over an area of two or three inches in diameter, having apparently congregated in such places. In one spot, upon the warm sloping side of a dead furrow, they could be seen, in numbers, running like ants, over the ground. Elsewhere, they were concealed among the roots, near to and about the bulbs, upon which they appeared mainly to feed. Their presence in any spot could always be detected by bringing the nose near the ground by the peculiar bed-bug odor above mentioned. This method of detection proved more convenient and infallible than looking for them.

The invasion is more extended than was at first supposed. Nearly all of the farms in the neighborhood of Mr. King have been attacked, either last year or this, and discoveries of attack not before suspected are, upon examination, being made daily. A present range of about eight miles is indicated. It is believed to occur throughout most of the town of Hammond, and to extend into Alexandria.

Just cause for alarm.— Without any desire to play the role of an alarmist, I feel it my duty to say that, as the result of my observations, this chinch-bug invasion of northern New York threatens to be the most serious insect attack to which our State has ever been subjected. The following are my reasons for this belief:

It has planted itself, maintained a footing, and has shown a rapid increase under unfavoring, unpropitious and unnatural conditions, such as these:

First. It is regarded as a southern insect (extending farther northward, as do most animal forms, in the Mississippi valley), yet it has appeared in the most northern county of the State, and upon (if the report be reliable) the St. Lawrence river.

Second. Its attack has been made upon timothy. This seems to be its most unusual food-plant, and, therefore, we infer, the least suited to it. All previous accounts concur in giving it a preference for spring wheat above all things else; next in order, oats or corn, and last the grasses. Timothy is only mentioned as occasionally attacked by it.

Third. In all previous accounts, great prominence has been given to its being a hot and dry weather insect, dependent upon these conditions, not only for its multiplication, but for its existence. Heavy rains have been claimed to be invariably fatal to it. It could not abound, it is stated, in a wet season. Dr. Fitch had even made recommendation of sprinkling it with water (an artificial shower), as the best means for its extermination. In the present instance, the bug obstinately persists in multiplying, contrary to all rule. The past year and the present have both been years of excessive rainfall in St. Lawrence county. Spring, summer and autumn have been exceptionally wet. In the spring, I am told that heavy and continued rains flooded meadows now showing the chinch-bug attack. At haying time, when the bugs were young, and, according to all the statements hitherto made, readily killed by wet, the rains were so frequent and severe, that the grass cut could only be secured with difficulty. Upon Mr. King's farm much of it was drawn in, upon favorable days, by improving the opportunity of extending the labor into hours after nightfall. At the present time grass is lying in fields in stacks, which could not be gathered, owing to continued rain, and fields of oats are still unharvested.

Persistence of the attack.— It is shown, by the above statements, that the insect has rapidly increased and largely extended its area during the present year, under conditions which should have been fatal to it. Why it has been otherwise may perhaps find its explanation in the fact that it is a new introduction into this part of the United States, and that it is following the law well known to prevail in the introduction from abroad (Europe, principally) of nearly all of our injurious insects. With scarcely an exception, with their importation they become far more destructive, causing greater ravages and often attacking new food-plants.

As the past history of the insect has shown that parasites and other enemies have entirely failed to arrest its multiplication, we are compelled to believe, from present indications, that it has come to stay, and that it will do so, unless effectual means are taken to prevent it. Its capability of increase is wonderful. Under the most conservative circumstances, a single chinch-bug, depositing its eggs about the first of June, would be, in the following August, the progenitor of a quarter of a million.

Importance of arresting the attack. — It should not be necessary to urge the importance of doing whatever can be done to arrest this attack, which threatens to be more serious to New York than was that of the wheat-midge, the loss from which, in some years, was computed at $15,000,000. If it should continue to increase it will doubtless extend to wheat and corn and other of the grains. In its southern extension in this State it would naturally become more serious. At the present it is known in but two counties — Jefferson and St. Lawrence. It seems practicable by prompt, earnest and combined effort, to prevent its extension and to check it where it now exists. There is scarcely a doubt that had its presence in the two limited areas in the town of Hammond, last year, been known at the time, it might have been exterminated at a very moderate cost and with little labor. Had an area of about one acre of timothy been thoroughly showered with kerosene (diluted) by means of a street sprinkler or a more simple contrivance, upon the same plan, the attack should have been arrested.

Remedial measures recommended. — Unfortunately, at the present time a large proportion of the attacking insects seem to have left their feeding grounds and to have flown to winter quarters, where they may not be reached. Where they are still to be found among the roots of timothy, about the borders of the destroyed areas, I have recommended an immediate plowing under, by turning over a flat — not overlapping — broad furrow, of the greatest depth practicable, not less than eight inches. The insects could not survive this burial. When the condition of the dead grass will admit of burning, this should be done. A thin covering of straw first applied would aid materially in the burning. As early in the spring as practicable, the meadows should be heavily rolled in order to prevent the easy access of the hibernating bugs to the roots of the grasses for the deposit of their eggs.

Wheat fields should also be rolled for the same purpose, for an attack upon them may be expected the ensuing year. A wheat field of Mr. King seems to have been infested the present year, but to have been checked by its roots having been submerged by a heavy rainfall continued for several days.

The coming spring, as soon as the new attack is discoverable, in the month of June, the sprinkling with kerosene oil should be generally resorted to. The best method for diluting the oil by first making an emulsion of it with soap suds, and the degree to which it should be diluted will be stated hereafter in a more extended publication to be made, which will embrace the natural history of the insect, and other interesting details in relation to it.

ALBANY, *October* 8, 1883.

In consultation with your Secretary, it was thought best, in view of the alarming character of the attack, that general attention should be called to it throughout the infested region, and instructions given as to the best means for arresting it, particularly such as should be at once resorted to, in order to reach as large a portion as possible of the present brood. A circular of this character was accordingly prepared. An edition of three thousand copies was printed, and they have been very generally distributed throughout the portions of the State where the attack had been observed, together with such contiguous territory as it may be expected to reach in another season. The circular is herewith presented ;

CIRCULAR No. 1. — OCTOBER, 1883.

NEW YORK STATE MUSEUM OF NATURAL HISTORY :

DEPARTMENT OF ENTOMOLOGY.

Directions for Arresting the Chinch-bug Invasion of Northern New York.

Portions of St. Lawrence county, New York, are now suffering from a serious attack of the chinch-bug (*Blissus leucopterus*) — perhaps the most injurious of our insect enemies.

It has already, in the third year (probably) of its introduction, and the second year of the observation of its attack, spread to such an extent, and shown such a rapid increase under very unfavorable conditions, that a continued increase in its diffusion and destructiveness is probable, unless effectual measures can be taken to prevent it.

At present, only timothy and other grasses seem to have been attacked. Wherever attacked, the root is destroyed, and the grass, consequently, is entirely killed.

With its increase, its ravages would extend to wheat, rye, barley and corn, which are its favorite food-plants.

Its extension over the State of New York, as now threatened, would be attended with an annual loss of millions of dollars.

It seems practicable, at this stage, to prevent this extension, by earnest and combined effort throughout the district now invaded.

The most favorable time for this effort has already passed ; but much may be accomplished by immediate action.

As it is of very great importance that this destructive insect — the terror of our Southern and Western farmers — should not be permitted to obtain a permanent footing in our State, hitherto free from its depredations, a prompt and full compliance with the following directions is strongly urged :

1. Let every farmer in St. Lawrence county and adjacent counties in Northern New York (particularly in the western portion of St. Lawrence and northern of Jefferson), examine his meadows for patches of dead grass, looking as if winter-killed, indicating the attack of the insect. As an aid to its ready recognition, the infested areas upon the

farm of Mr. H. C. King, of the town of Hammond, St. Lawrence county, may be examined.

2. If the attack is detected, burn the dead grass and its surrounding border of fifteen or twenty feet not yet showing attack. This may be effectually done by first applying a covering of straw. A favoring wind is desirable for the purpose.

3. Plow the burned area (better still if the plowing extends beyond this limit and embraces the entire meadow) in broad and deep furrows, turning the sod completely and flatly over, not permitting it to lie in ridges.

4. To insure the more effectual burying of the insects that may be at present feeding upon, or preparing to pass the winter among, the roots of the grasses, harrow the plowed surface slightly, and follow with a heavy rolling.

5. Where the meadows will not permit of plowing as above, gas-lime, wherever it can be conveniently obtained from the gas-works at Ogdensburg, Watertown, etc., may be distributed over the ground, at the rate of 200 bushels to the acre. The gas-lime would also serve as a valuable fertilizer.

Of the above directions, the first four should be followed *at once.* The application of gas-lime might be postponed until the month of November, before the setting in of winter, or to the early spring. It should be confined to the dead and infested portions of the meadows, as in its fresh state it would kill the grass. In the winter, during February, it may safely be distributed over the entire fields, where it would probably serve the additional purpose of a preventive of a spring attack.

New attacks and more widespread distribution may be looked for about the first of June in the ensuing year. Directions for meeting these, by other methods, will be given hereafter.

It is hoped that every one interested will cheerfully comply with the above directions, and not render necessary a resort to compulsory legislation, which would undoubtedly call for a large increase of labor and expenditure. The agricultural interests of the State of New York may justly demand that, if possible to prevent it, the chinch-bug shall not be allowed to gain a permanent footing as a grain and grass destroyer within its borders. Its injuries in the State of Illinois, in a single year, were estimated at seventy-three millions of dollars — almost five times the amount computed for the wheat-midge ravages in New York, at the time of its greatest destructiveness.

OFFICE OF THE STATE ENTOMOLOGIST, *October* 18, 1883.

The Chinch-bug in natural size and as enlarged (about ten diameters). Color: black, with white wing-covers, having a black subtriangular spot on the outer margin of each, and two black veins nearer the base. The legs, the sucking-tube, and the base of the antennæ, are deep honey-yellow; the feet and the last joints of the antennæ are black. Length, about three-twentieths of an inch.

The young, appearing early in June and late in August, are blood-red, with a white band across their middle; later they change to brown and afterward to black.

I regret to have to report that the response given to the directions of the circular have fallen short of their requirement. Plowing under the infested areas has been quite general, but I do not learn that it has approached the thorough character recommended. Burning has not been resorted to, except upon the farm of Mr. King. The application of gas-lime will probably not be made, to any great extent, as it is reported as not easily to be obtained. Perhaps no other result should have been anticipated at this stage of the attack, or before the absolute necessity of vigorous action should be unmistakably apparent. Former experiences show that our farmers, as a rule, are indisposed to yield ready compliance with recommendations simply, although calculated to save them from serious pecuniary loss, particularly if such recommendations involve any expenditure beyond that of quite a limited amount of extra labor on their part. It would, therefore, seem to be a wise economy for the State whenever a continued extension of any formidable insect attack presents itself, that a prompt resort be had to effectual preventive measures, through legislation compelling the action desired and not otherwise to be had. Several laws for the prevention and destruction of injurious insects exist upon the statute books of European countries. In our own State and others there are laws against noxious weeds; and it would indicate an enlightened progress if there were also those controlling the unlimited spread of some of our more harmful insect pests.

The distribution of the above circular has brought to light the existence of the chinch-bug attack very generally throughout the western angle of St. Lawrence county; its presence on almost every farm in the town of Alexandria in Jefferson county, and elsewhere in other northern towns of the same county; and also upon Deer river in the northern portion of Lewis county.

The re-appearance of the insect the coming season will be watched with much interest, as a test of the efficacy of the partial efforts put forth for its destruction. Although the late autumn and the winter up to the present have been favorable to its continuance, still I hope that the means already resorted to and those hereafter to be taken, will check the further distribution of this most dangerous pest throughout the State, and destroy it where it now exists.

CONCLUSION.

Not further anticipating the details of other insect studies which have engaged my attention during the past season, to be hereafter given in my regular annual report, I would state in conclusion:

The increasing recognition from various sources of the value of the investigations which are being made by this Department, are very gratifying to your Entomologist. They will serve to prompt him to, if possible, more earnest effort in the future, to the end that the great value to the State to the study of the insect world may continue to become more and more apparent until it shall be recognized by all in a cordial sympathy and aid extended to it.

Respectfully submitted,

J. A. LINTNER.

OFFICE OF THE STATE ENTOMOLOGIST,
ALBANY, *January* 8, 1884.

REPORT OF THE BOTANIST,

1883.

REPORT.

To the Honorable the Board of Regents of the University of the State of New York:

GENTLEMEN — The work of the year now past has been devoted to the poisoning, mounting and labeling of specimens of plants, to their collection, and in some instances to figuring them, in order to preserve as completely as possible the appearance and characters of the fresh growing plant, or to present to the eye at a glance the minute microscopic details and spore characters. Aid has also been rendered to several correspondents by identifying for them specimens of plants sent for that purpose, a work whereby knowledge is disseminated and the advantages of the herbarium are distributed and in a measure rendered available to those even who are not able personally to consult it. Attention has also been given to the examination of diseased specimens of cultivated plants, which have been sent for that purpose, in order that the cause of the affection might, if possible, be ascertained. Some time has also been spent in revising a part of the collection of fungi in the herbarium, the necessity for which is hereinafter set forth.

Specimens of one hundred and forty-nine species of plants have been mounted and added to the herbarium of the State Museum of Natural History, forty-four of which were not previously represented therein. The specimens of the remaining one hundred and five species serve to improve or render more complete the representation of the species or exhibit some form or variety of the plant not previously shown. The mounted specimens include both collected and contributed ones. A list of their specific names accompanies this report and is marked (A). A list of the names of contributors and of the species represented by their respective contributors is marked (B).

The operation of the Executive veto of the appropriation for the expenses of the Botanist in the year 1882 extended over a considerable part of the past year, consequently but little collecting could be done. The appropriation made for this purpose at the last session of the Legislature was not available until October first, the beginning of the present fiscal year, and then the season for field work had nearly closed. But a part of the summer was so favorable to the production of Agarici and other fleshy fungi that I was unwilling to let so good an opportunity pass unimproved. Accordingly I collected what I could in the counties of Albany and Rensselaer without incurring a greater expense than I was able and willing to bear out of my own pocket. The result was the collection of specimens of more than a hundred species of fungi, of which thirty-two are new to our State and several are new to science. The descriptions of the new species are contained in a part of the report marked (C). I have also added to this part of the report descriptions of new species contained in the Thirty-second Report, but which were never published in such a way as to be generally available to the public or to those most interested in having them.

The recent publication of the second volume of Prof. P. A. Saccardo's great work, Sylloge Fungorum, completes that part of the work which pertains to the Pyrenomycetous fungi and gives to mycologists a new system of arrangement and classification of the vast group of Sphæriaceous fungi. While this system recognizes as primary groups or families the Perisporiaceæ, Sphæriaceæ, Hypocreaceæ, Dothideaceæ, Microthyriaceæ, Lophiostomaceæ and Hysteriaceæ, the characteristics of which are based chiefly on external features, after the manner of the old system, it divides these families into sections whose characters are derived from the spores. By a most happy, simple and uniform system of nomenclature the very names of these sections are made to indicate their distinguishing characters and thereby to greatly simplify the system and facilitate the study, identification and classification of the numerous species. Many new genera have been introduced, some of which appear to be founded on rather slight characters, yet as a whole the system so ingeniously combines and employs both the external salient features and the internal spore characters of these fungi that it readily commends itself to favorable consideration. I am not aware that it has more than a single decided opponent, and in my opinion it will be adopted and followed in its general features by nearly if not quite all mycologists. I have, therefore, devoted some time to a revision of our collection of these fungi, that the nomenclature and arrangement of the specimens may keep pace with the advancement of the science and be in harmony with the new order of things thus introduced. This revisionary work is not yet fully completed. The great number of new genera requires the re-examination and re-labeling of many of the specimens. I have prepared a list of the names of our Sphæriaceous fungi, brought down to and including those of the thirty-first report, in which are placed in the left hand column the names as they stand under the new arrangement, in the right hand column the names as given under the former system of arrangement whenever they differ from the others. This list is marked (F).

A record of species new to our flora, but already described, new stations of rare plants, remarks upon new or noticeable varieties, etc., are given in a part of the report marked (D)

In pursuance of a plan devised for the purpose of giving to the public more complete and satisfactory descriptions of certain groups of our fungi than can be found in any works yet published. I have prepared monographs of the three genera, Paxillus, Cantharellus and Craterellus, so far as they are represented in our State. This part of the report is marked (E).

Respectfully submitted,

CHAS. H. PECK,

Botanist.

ALBANY, *December* 31, 1883.

TABLE OF CONTENTS.

(A.)

PLANTS MOUNTED.

Not new to the Herbarium.

Ranunculus abortivus, *L.*
Podophyllum peltatum, *L.*
Sarracenia purpurea, *L.*
Sisymbrium officinale, *Scop.*
Alyssum calycinum, *L.*
Draba arabisans, *Mx.*
Ampelopsis quinquefolia, *Mx.*
Tilia Americana, *L.*
Rhus typhina, *L.*
Geranium Robertianum, *L.*
Acer rubrum, *L.*
Lupinus perennis, *L.*
Lespedeza Stuvei, *Nutt.*
Prunus Virginiana, *L.*
P. serotina, *Ehrh.*
Cratægus pyrifolia, *Ait.*
C. coccinea, *L.*
Poterium Canadense, *Gr.*
Potentilla recta, *Willd.*
Rubus villosus, *Ait.*
R. Canadensis, *L.*
R. neglectus, *Pk.*
Pyrus Americana, *D. C.*
Saxifraga aizoides, *L.*
Epilobium molle, *Torr.*
E. palust. v. lineare, *Gr.*
Apium graveolens, *L.*
Lonicera oblongifolia, *Muhl.*
Viburnum Lentago, *L.*
V. Opulus, *L.*
V. dentatum, *L.*
Cornus alternifolia, *L.*
Galium lanceolatum, *Torr.*
Erigeron strigosum, *Muhl.*
Coreopsis discoidea, *T. & G.*
Lobelia Kalmii, *L.*
Vaccinium corymbosum, *L.*
Rhodora Canadensis, *L.*
Cynoglossum officinale, *L.*
Convolvulus arvensis, *L.*
Calystegia sepium, *L.*
Amarantus blitoides, *Wats.*
Rumex Britanica, *L.*
Corema Conradii, *Torr.*
Morus rubra, *L.*
Urtica gracilis, *Ait.*
Carya porcina, *Nutt.*
Quercus macrocarpa, *Mx.*
Q. Muhlenbergii, *Engelm.*
Abies nigra, *Poir.*
Potamogeton pauciflorus. *Pursh.*
Alisma Planta. v. Americanum, *Gr.*
Naias major, *All.*
Sagittaria variabilis, *Engelm.*
Spiranthes Romanzoviana, *Cham.*
Aplectrum hyemale, *Nutt.*
Habenaria hyperborea, *R. Br.*
Trillium erect. v. album, *Pursh.*
Juncus Can. v. coarctatus, *Engelm.*
Scirpus Smithii, *Gr.*
Carex Steudellii, *Kunth.*
C. Houghtonii, *Torr.*
C. tetanica, *Schk.*
C. virescens, *Muhl.*
C. mirabilis, *Dew.*
C. stram. v. festucacea, *Boott.*
C. Hitchcockiana, *Dew*
Panicum dichotomum, *L.*
P. Crus-galli v. hispidum, *Muhl.*
Eragrostis capillaris, *Nees.*
E. poæoides, *Beauv.*
E. Purshii, *Schrad.*
Danthonia spicata, *Beauv.*
Cinna pendula, *Trin.*
Festuca nutans, *Willd.*
Asplenium Bradleyi, *Eaton.*
Aspidium Goldianum, *Hook.*
Botrychium lanceolatum, *Angst.*
B. matricariæfolium, *A. Br.*
Isoetes Engel. v. gracilis, *Engelm.*
Azolla Caroliniana, *Willd.*
Parmelia oliv. v. aspidota, *Ach.*
Agaricus vaginatus, *Bull.*
A. vulgaris, *Pers.*
A. granulosus, *Batsch.*
A. melleus, *Vahl.*
A. arvensis, *Schæff.*
A. petaloides, *Bull.*
A. tener, *Schæff.*
A. fœnisecii, *Pers.*
A. præcox, *Pers.*
A. flavescens, *Pk.*
Hygrophorus borealis, *Pk.*
H. luridus, *B. & C.*
Lactarius distans, *Pk.*
L. pyrogalus, *Bull.*
Cantharellus cibarius, *Fr.*
Russula nitida, *Pers.*
R. flavida, *Frost.*
R. variata, *Banning.*
Polyporus brumalis, *Pers.*
Hydnum zonatum, *Batsch.*
H. graveolens, *Delast.*
Phallus impudicus, *L.*
Gnomoniella fimbriata, *Sacc.*

New to the Herbarium.

Sisymbrium canescens, *Nutt.*
Lonicera Xylosteum, *L.*
Scabiosa australis, *Wulf.*
Hieracium Pilosella, *L.*
Calamintha acinos, *Clærx.*
Atriplex hortensis, *L.*
Carex hirta, *L.*
C. flaccosperma, *Dew.*
Phalaris Canariensis, *L.*
Asplenium ebenoides, *Scott.*
Agaricus pantherinus, *D. C.*
A. infantilis, *Pk.*
A. phyllophilus, *Fr.*
A. pithyophilus, *Secr.*
A. basidiosus, *Pk.*
A. alcalinolens, *Pk.*
A. aquosus, *Bull.*
A. clavicularis, *Fr.*
A. albinellus, *Pk.*
A. Rodmani, *Pk.*
A. fuscofolius, *Pk.*
A. castanellus, *Pk.*
Agaricus bullaceus, *Bull.*
Paxillus simulans, *Pk.*
Lactarius albidus, *Pk.*
L. cilicioides, *Fr.*
L. lividus, *Pk.*
L. deceptivus, *Pk.*
Russula albida, *Pk.*
R. uncialis, *Pk.*
Cortinarius simulans, *Pk.*
C. cinnabarinus, *Fr.*
C. gracilis, *Pk.*
C. praepallens, *Pk.*
Hygrophorus virgineus, *Fr.*
H. minutulus, *Pk.*
Hydnum albidum, *Pk.*
H. rufogriseum, *Pk.*
H. hirsutum, *Pk.*
H. scrobiculatum, *Fr.*
Melanogaster Americanus, *Pk.*
Valsa sepincola, *Fckl.*
Cryptospora Betulæ, *Tul.*

(B.)

CONTRIBUTORS AND THEIR CONTRIBUTIONS.

Mrs. S. M. RUST, Syracuse, N. Y.

Atriplex hortensis, *L.*

Mrs. I. B. SAMPSON, Albany, N. Y.

Stellaria pubera, *Mx.*
Rhodora Canadensis, *L.*

Mrs. C. M. FERRY, Oneida, N. Y.

Agaricus trullisatus, *Ellis.*
Lenzites betulina, *Fr.*
Geaster hygrometricus, *Pers.*

F. W. BATTERSHALL, Clyde, N. Y.

Geranium Robertianum, *L.*

Prof. W. G. FARLOW, Cambridge, Mass.

Puccinia obscura, *Schrœt.*
P. Lantanæ, *Farl.*
Isariopsis pusilla, *Fres.*
Peronospora Linariæ, *Fckl.*
Microstroma leucosporum, *Niessl.*
Cercospora Pyri, *Farl.*
C. leptosperma, *Pk.*
Entyloma Lobeliæ, *Farl.*
E. Compositarum, *Farl.*
E. Menispermi, *F. & T.*

A. B. SEYMOUR, Cambridge, Mass.

Æcidium Hibisciatum, *Schw.*
Æ. Orobi, *Pers.*
Æ. Amorphæ, *Cke.*
Uromyces pyriformis, *Cke.*
U. Sparganii, *C. & P.*
U. Junci, *Schw.*
Microsphæra elevata, *Burrill.*
M. erineophila, *Peck.*
Puccinia Tanaceti, *D. C.*
P. Gentianæ, *Strauss.*
P. Amorphæ, *Curt.*
P. Hyssopi, *Schw.*
P. lateripes, *B. & K.*
P. Kuhniæ, *Schw.*
P. Silphii, *Schw.*
P. Aletridis, *B. & C.*

Prof. WM. TRELEASE, Madison, Wis.

Oidium irregulare, *Pk.*

With the compliments of

James Hall,

State Geologist,

Albany, N. Y., U. S. A.

THIRTY-EIGHTH ANNUAL REPORT

ON THE

NEW YORK STATE MUSEUM OF NATURAL HISTORY,

BY THE

REGENTS OF THE UNIVERSITY

OF THE

STATE OF NEW YORK.

TRANSMITTED TO THE LEGISLATURE JANUARY 15, 1885.

ALBANY:
WEED, PARSONS & COMPANY.
1885.

STATE OF NEW YORK.

No. 23.

IN ASSEMBLY,

JANUARY 15, 1885.

THIRTY-EIGHTH ANNUAL REPORT

OF THE

TRUSTEES OF THE STATE MUSEUM OF NATURAL HISTORY.

OFFICE OF THE REGENTS, *January* 8, 1885.

To the Legislature of the State of New York:

I have the honor to transmit herewith the thirty-eighth annual report of the Regents of the University as Trustees of the New York State Museum of Natural History, as required by law.

H. R. PIERSON,
Chancellor.

REPORT.

To the Legislature of the State of New York:

The Regents of the University, as Trustees of the State Museum of Natural History, submit, as required by law, their thirty-eighth annual report.

With respect to the operations of the Museum, and the measures taken for its increase, the Trustees refer to the report of the Director, which is herewith transmitted. In like manner the reports which are appended of the State Entomologist and State Botanist will give in detail the important additions made to the collections in their respective departments, and the work carried forward by them in the scientific investigation of subjects committed to them. By the liberality of the Legislature small appropriations have been made for the expenses of both the Entomologist and Botanist in the prosecution of their researches, and the collection and preservation of specimens for the Museum. This will enable these officers to conduct their departments with greater efficiency than before.

In connection with the State exhibit at the New Orleans Exposition, the Director of the Museum prepared an interesting collection of material to be sent thither. The limited time allowed for the purpose, and the want of means to collect and prepare what would have been desirable, made the collection less complete than might have been wished. It contains, however, some things of unique value and interest, for a full account of which the Trustees refer to the report of the Director.

The Trustees are gratified to be able to announce to the Legislature that the several reports of the State Museum, whose publication for various causes has been delayed, some of them for several years, have all been printed and issued during the past year. This list includes the thirty-third, which was presented to the Legislature in 1880, down to and including the thirty-seventh, which was presented in 1884; in all, five reports. The Trustees are glad to feel assured that under the new law passed in 1883, which provides for the scientific printing of the Museum, to be done under the direct care of the Museum staff, will prevent a recurrence of such an accumulation of material. Under this law the scientific papers prepared by the Museum staff will be issued whenever ready as Museum bulletins. In all cases of scientific publications the embarrassment and delay is occasioned by the cost and time required for the preparation of the illustrations. And it is impossible to procure such printing done with satisfaction under such a system of public printing as is provided by law for the legislative reports. The increased appropriation now provided for the Museum will enable the Trustees to print in appropriate style whatever the scientific workers of the Museum may prepare.

The Trustees announce to the Legislature that under the provisions of the law passed in 1883 the first of the new volumes on Palæontology was published last May. It is on the Lamellibranchiata, and contains descriptions and figures of the Monomyaria of the Upper Helderberg, Hamilton and Chemung groups. It is a volume of xvii and 268 pages, and is illustrated with forty-five plates. Another volume in this series is to be issued during 1885, which will be a continuation of the Lamellibranchiata. It is believed by the Trustees that under the provisions of this law this great and monumental work will be completed within the time designated.

The fitting up of the State Hall for the Museum, as provided by the law of 1883, has been necessarily delayed by the continued occupation of the building by the State officers. It may still require some time for the removal of all the departments of the government into the new Capitol, and until this is accomplished the plans of the Trustees for arranging the building cannot be carried out. In the mean time, however, the importance of providing fire-proof storage for the more valuable treasures of the Museum has led them to make a beginning. The east side of the third story of the building has been vacated, as well as several rooms in the basement. Accordingly the Trustees procured a careful measurement of the building, and a study of the means by which it might be adapted to the future wants of the Museum. Mr. Perry, Commissioner of the Capitol, kindly and gratuitously made the plans of the building and advised in reference to the repairs and changes which the building would require to adapt it to the purposes intended. Professor Hall, with the aid of Professor J. C. Smock, prepared a carefully devised scheme for the allotment of the space in the building. It is the purpose of the Trustees to carry out this plan and this allotment as rapidly as the room is vacated. The available space in the third story has been fitted up with drawers for the working and storage rooms of the future Museum, and the removal of the material to these rooms has been begun and will be carried forward as fast as possible.

It was found by the architect, when work on the rooms was begun, that the building itself was in need of material repairs. The roof required a thorough overhauling, and the chimneys and walls, and all the floors, not only in the rooms but the corridors, required to be relaid.

For the use of the building in the manner proposed it will require many additional changes. An elevator in the building is absolutely necessary, and some comprehensive system of heating by steam must be introduced. These changes and repairs in the building itself were not contemplated in the original law. The appropriation was intended and is probably sufficient for the fitting up with cases and furniture of the entire building. But the Trustees will be compelled to ask for the means to put the building itself in proper order for the full occupancy of the Museum.

The Trustees commend this great public institution to the continued liberality of the Legislature. It has been the work of many able men, and represents in a peculiar and noble sense the education, the culture, and the grandeur of the State. The Trustees are prepared to push forward the work of making this Museum, even more than now, useful to the State. They have plans for making it, in a true sense, a great educational center, from which influences shall reach every college and school in the State. These plans await the settled occupancy of a suitable and safe home for its extensive collections.

The Museum staff, as at present constituted, consists of James Hall, Director and State Geologist ; J. A. Lintner, State Entomologist ; Charles H. Peck, State Botanist ; James W. Hall, assistant in charge of the zoölogical collections ; John Gebhard, special assistant and guide. Charles E. Beecher has also been employed upon the work of the Museum in part, his services being otherwise given to the preparation of the Palæontology. It is proposed to add to this list another principal assistant, who shall supervise the removal of the Museum, and, as far as possible, leave the Director to give his time and strength to the preparation of his great work on Palæontology.

Respectfully submitted.

H. R. PIERSON,

Chancellor.

REPORT OF THE DIRECTOR.

ALBANY, *January* 2, 1885.

To the Honorable the Board of Regents of the University of the State of New York :

GENTLEMEN — I beg leave to communicate herewith the annual report upon the State Museum of Natural History, for the year 1884 (being the thirty-eighth report in the consecutive order) ; including a statement of the condition of the collections in the several departments, and the additions made thereto, a general account of the work done, and an enumeration of the publications made during the past year.

Since presenting my last report, the thirty-fifth, thirty-sixth and thirty-seventh Museum reports have all been issued, and also the reports of the State Geologist for the years 1882, 1883 and 1884, have all been printed and are ready for delivery. Some of these reports have been a long time awaiting publication, greatly to our disadvantage.

In order to complete the series of State Museum reports, we now require the reprinting of the thirty-second report, which exists only as a legislative document. As I have heretofore stated, there was no legislative order for the usual number of extra copies of that report, and the same was published without the map and plates which accompanied the report in its presentation to the Legislature. No copies of this report have ever been in the hands of the Regents, or of the Director, for public distribution, and it is very important that it should be republished without delay.

In the thirty-fifth report I have communicated a statement of the distribution of certain collections of fossils and minerals to colleges, normal schools, high schools and academies up to the date of that report. This statement does not include many smaller collections, of which we have no record. In the same report, I furnished a list of species of fossils used in the illustration of Vol. V, Part II, of the Palæontology of New York ; to this I shall have occasion to refer more particularly. I also presented a catalogue of the Unionidæ of the Gould collection, of the New York State collection, and of the general collections of the Museum ; also of the species of land shells of the United States possessed by the Museum. To these was added a list of the species of shells presented to the Museum by the late Dr. James Lewis, of Mohawk, N. Y. These catalogues may be of sufficient interest to have them printed separately from the report, both for use in the Museum and for distribution to collectors and others.

In the same report, Mr. George B. Simpson contributed an important paper on the Anatomy and Physiology of *Anodonta fluviatilis*. A preliminary Notice, Part I,* of the LAMELLIBRANCHIATA, *Monomyaria* has been published in the same report, in order both to give a wider circulation of the specific descriptions, and to fulfil a promise made many years since in the preliminary Notice, No. II, published in 1870.

The descriptions of corals (here published with illustrations) were issued in advance in pamphlet form in 1882.

With the thirty-fifth report, in 1882, I communicated a preliminary notice of some fossil reticulate sponges of the family Dictyospongidæ. The same, accompanied by illustrations, was read before the American Association for the Advancement of Science, at the Montreal meeting in 1882, with a discussion of the relations of Dictyophyton, Phragmodictya, and similar forms with Uphantænia. The investigation was at that time incomplete, and it became impossible to finish the work in the time required for the publication of the report. The plates now published were lithographed in 1882, and a partial synopsis of the genera and species is given in this report. In the mean time the drawings, beyond those already lithographed, have been completed, the whole making about twenty quarto plates. The descriptions, amounting to about ninety pages of manuscript, were finished in April, 1884. The whole now awaits the determination of the Board of the Regents as to its mode of publication. This manuscript, together with the figures arranged on cards, will be laid before you.

A list of the titles of papers in these several reports named, and of the plates illustrating the same, will be appended to this report.

CURRENT WORK OF THE MUSEUM.

The work of the Museum, in the care and preservation of the collections already arranged in the cases and drawers, has been carried on as usual.

In the Zoölogical collection, the stuffed skins of mammals and birds have been cleaned and rearranged. The jars of alcoholic specimens have been cleaned and refilled. The collection of skulls and skeletons of mammals have been removed from their cases, cleaned and rearranged. and also the stuffed skins and skeletons of fishes. The cases of Echinodermata and Radiata have been cleaned and the collections rearranged. The Historical and Antiquarian collections have also received the necessary attention for their preservation.

The work of cutting and preparing translucent sections of corals and

* This paper was communicated with a previous report but afterward withdrawn and again communicated with the Thirty-fifth Report.

other fossils, and the cutting, shaping and polishing of specimens, has been continued as in former years. Our facilities for accomplishing this work have been brought into requisition, in preparing specimens for the New York State exhibit in the New Orleans Industrial Exposition. During the past year, 683 sections have been cut and polished, besides the cutting and polishing of many larger specimens.

The records of additions to the library, and to the collections, are appended to this report. The examination and partial analysis of numerous specimens of rocks, ores or other minerals, of which written or oral information has been given, regarding their character and value, has occupied considerable time. This information has been given from an inspection of the specimens or testing for certain metals which they were supposed to contain. This work has been done, with a view of benefiting the parties interested, and generally with a hope of saving them the expenditure of money in analysis of specimens which every mineralogist or geologist knows to be of no practical or economic value.

The Emmons collection of crystallized minerals has been cleaned, packed in boxes, and taken to the State Hall for arrangement in the cases in the south-east room of the upper story, to remain until the rooms assigned to the entire mineralogical collection shall be prepared for its reception.

The report of the Botanist will show you that in original research an unusual amount of work has been done in his department.

The preparation and study of new material has been going on in the palæontological department, especially among the Corals, the Bryozoans and the Lamellibranchiata; likewise the study of the reticulate sponges preparatory to publication. Since the first part of the fifth volume of Palæontology — Lamellibranchiata I — was published, the collections of species there described, belonging to the Museum, have been carefully labeled and arranged in drawers. This portion of the collection is now ready for the selection of the Museum series, and the distribution of duplicates to the colleges and academies.

Some progress has been made in the preparation and study of the microscopic sections of the fossil Brachiopoda. The thirty-fifth and thirty-sixth Museum reports contain plates illustrating some of the work done. During the year about 200 microscopic sections were made, and twenty-four photographic negatives prepared. A well-equipped photographic dark room has been constructed in one of the working-rooms of the State Hall, and during the coming year it is proposed to devote some time to the furtherance of these investigations.

Early in the last year many boxes of fossils were packed with the intention of storing them in the basement of the State Hall, but while we had not entire possession of the building, and until we could come into complete control of the various rooms, it would have been unwise to use them for the storage of valuable specimens. The specimens to which I refer as prepared for removal, consist principally of large corals from the Upper Helderberg group, together with smaller specimens occupying several hundred drawers. It is hoped that during the present year the entire collection of fossil corals may be removed to the new quarters provided for them in the State Hall, and be properly arranged in drawers.

During the months of October, November and December, much time was spent by the Museum staff in preparing material for the State exhibit at the New Orleans Exposition. Owing to the limited time for preparation, and the small fund available, the exhibit is not as full nor as important as we could wish, still a fair display of the natural resources of New York is presented. Some of the leading features of the exhibit are as follows:

A geological column composed of large blocks of stone, representing the character and succession of the several rock formations of the State.

A collection of fossils containing the representive faunas of the New York palæozoic formations, comprising 323 entries, accompanied by a duplicate collection of 168 entries.

The principal building and ornamental stones of the State, the iron ores, and economic minerals were largely represented.

Copies of the lithographed plates of the Palæontology of New York, illustrating several classes of fossils, together with microscopic sections of the shells of Brachiopoda, and photo-micrographs of the same.

COLLECTIONS IN THE FIELD.

Considerable field-work became necessary for procuring the material destined for the New Orleans Exposition, and the Museum will profit by the accession of specimens collected, and by donations from parties who also contributed liberally to the Exposition material. These will be enumerated and due credit given to the contributors.

Five boxes of fossils were collected from the Chemung and Waverly groups of Warren county, Pennsylvania. These rocks are adjoining and a continuation of the New York formations, also a series of rock specimens to represent a section at that locality, from data furnished by Mr. F. A. Randall, and supplemented by the observations of Mr. C. E. Beecher. A geological section has been drawn to the scale of one inch to 100 feet, representing 1,900 feet of strata. The lower 1,100 feet show the rocks passed through in drilling for petroleum. This work is valuable in determining the probable horizon of the Panama conglomerate and its relations to the oil-bearing sands.

A collection of geological specimens was made from the Oneida conglomerate and Clinton group, near Ilion, N. Y. These will be useful in the Museum exchanges.

Two boxes of fossils and several large blocks of coralline limestone were obtained from Schoharie, and will afford valuable material for translucent sections of corals.

The additions to the various departments of the Museum, during the year 1884, will be found recorded in detail in the lists appended.

In the Botanical department, 151 species of plants have been received from twenty-three contributors. The State Botanist has collected 192 species of plants, of which 116 are new to the herbarium.

The Zoölogical collections have received specimens from four contributors. The principal addition is a collection of sixteen species of Achatinella, from Dr. W. D. Hartman, of West Chester, Pennsylvania.

The collections in Geology and Palæontology have received by donation sixteen specimens from six contributors, and by collection five boxes of fossils from Warren county, Pennsylvania; one box of fossils from Troy, N. Y., two boxes of Oneida conglomerate, Clinton iron ore and Clinton gray sandstone from Ilion, N. Y., two boxes of fossil corals from the coralline limestone of Schoharie, one box of fossils from Cortland, and nineteen large blocks of stone representing the Utica slate, Hudson river group, Tentaculite limestone, and Oriskany sandstone. Eleven specimens have been added by purchase, among which are seven very large and perfect examples of fossil reticulate sponges, from the Chemung group of Steuben county.

By donation and exchange, the library has received eighty-three books and pamphlets; ten volumes have been added by purchase.

The preparation for working and storage rooms in the upper story of the State Hall is so far advanced that some of the rooms may be occupied at once, and with the concurrence of the Secretary of the Board of Regents, I have already commenced to remove some of the valuable collections from the present Museum building to these rooms, which offer almost perfect security against fire. In this connection, and in regard to other collections of especial value now remaining in the present Museum building, I beg leave to call your attention to a recommendation made in my last report* regarding the removal of such as these from the present unsafe Museum building to the State Hall, where they may be temporarily arranged or otherwise provided for. Should this proposition meet the approval of the Trustees, I would ask for authority to transfer the same as early as practicable.

Should it be necessary to remove some of the material now on public exhibition in the cases, I would suggest that other specimens be substituted from the duplicate collections. Nearly all the material which

* Thirty-seventh Report on the State Museum of Natural History, page 23.

I have suggested to be removed may be placed in drawers, and the remainder may be provided with floor cases, as now arranged in the Museum.

The upper story of the State Hall contains nine large rooms, of which five are situated to the east of the large corridor and are now in the possession of the Regents. These five rooms have been numbered for convenience 1, 3, 5, 7 and 9, beginning at the north-east corner of the building. The rooms with even numbers are on the west side of the corridor and are now used for the storage of State documents, except room No. 2, which contains cases and furniture, and lithographed plates belonging to the State Museum.

Room No. 1, on the north-east corner, is designed as a library and study for the Director. It is furnished with book-cases, desks, etc.

Room No. 3, adjacent to the preceding, contains thirty ranges of drawers, two and one-half inches deep, with twenty-four drawers in each range, making in all, 720 drawers. It is intended to use this room for the reception of collections which are being studied and described for the Palæontology of New York. The cases and drawers in this and the other rooms are finished in oak and are very substantial and elegant in appearance.

No. 5 has twenty ranges of drawers with twenty-four drawers in each range. This room was without light and used as a store-room for stoves, boxes, etc. A large sky-light has been put in which converts it into a well-lighted and useful room. A photographic dark-room has also been constructed in the south-east corner of this room, with complete arrangements for pursuing the work of photo-micrography already begun. The cases of drawers in No. 5 are designed for the collection of fossil corals of the Hamilton group.

Room No. 7 is especially adapted for the large collection of the fossil corals of the upper Helderberg group, and has twenty-three ranges of drawers three inches in depth, and seven ranges of drawers four inches in depth.

No. 9, on the south-east corner of the building, is a large, well-lighted room, and is intended to be used as a working-room for the arrangement and distribution of collections. It is furnished with cases along one side containing 288 drawers.

The rooms as now finished are arranged to contain 2,067 drawers, distributed as follows:

Room No. 3 will contain 720 drawers.
Room No. 5 will contain 480 drawers.
Room No. 7 will contain 579 drawers.
Room No. 9 will contain 288 drawers.

At the time of present writing there are 740 drawers fitted in the cases and ready for use.

When the present and proposed arrangements have been completed, the Museum will have the most convenient and ample working rooms of any similar institution in the country.

The Gould types of shells, and some other rare forms may be transferred to a safe position in the State Hall, and unless the Museum were to engage in some special biological work, there appears no reason to recommend the appointment of any special assistant in the department of Zoölogy.

Since the State Museum of Natural History was placed in charge of the present Director, workers in this department have increased more than a hundred fold, and a very large number of them are afforded facilities for investigation, from the various organizations sustained either by the general government or by richly endowed institutions, such as our limited means could never afford.

Professor A. Agassiz, the Director of the Museum of Comparative Zoölogy at Cambridge, presents in his last report some very important considerations regarding the management of museums and their collections. In the course of his discussions he remarks that "since the foundation of this Museum the conditions for scientific research in this country have greatly changed. The general government has now undertaken, in connection with the United States Coast and Geodetic Survey, with the Geological Survey, with the National Museum, and with the United States Fish Commission, an amount of scientific investigation in various directions which makes it a mere waste of time for those not officially connected with these government establishments to undertake certain lines of work. Recognizing this, it becomes at once apparent that it is a mere waste of time and money for us to continue accumulations of collections which will most certainly be duplicated at Washington or New York, and that, beyond a very limited appeal to the public in the collections placed on exhibition, we should expend our resources only in the direction of fostering such original work as may most efficiently be conducted by the professors holding endowed chairs in our University."

In this matter I would advise that the present collections be rearranged and relabeled, and that the only special efforts in this department be directed toward a full representation of the Zoölogy of the State of New York, in its principal divisions, which could be done at a moderate cost, and thus leave the resources of the Museum to be used in sustaining those departments wherever original research is required to be carried on.

Since we have dispensed with the services of a special assistant in the department of Zoölogy, and the services of a special taxidermist, the collection have been cared for and preserved in as good condition as formerly. The additions made are not large, and there appears no good reason for incurring much expense in that direction. So long as the collections can be preserved from the ordinary destructive agencies by the present Museum staff, I see no reason for appointing special assistants to perform the work. Were we even to look upon the matter in its worst possible aspect, the salary of a special assistant would, in five years, be sufficient to replace the entire collection with fresh specimens. Of the stuffed skins, none can be regarded as types, or of special historic interest, and only a few of them are rare and difficult to be procured. I would therefore recommend that the special work which has heretofore devolved upon these assistants be henceforth performed, as in the past two years, by the assistant in charge of the Zoölogical department, with such temporary aid as he may require from time to time.

LIST OF THE SEPARATE SCIENTIFIC PAPERS CONTAINED IN THE THIRTY-FIFTH, THIRTY-SIXTH AND THIRTY-SEVENTH REPORTS OF THE STATE MUSEUM, AND IN THE REPORTS OF THE STATE GEOLOGIST FOR THE YEARS 1882, 1883 AND 1884, AS PUBLISHED DURING THE YEAR 1884.

1. Notice of the machinery and methods of cutting specimens of rocks and fossils at the New York State Museum of Natural History. By James W. Hall, 3 pp. and 2 plates.
2. Report of the State Botanist for 1882. Chas. H. Peck, 40 pp.
3. A list of the Rhizopoda found in the vicinity of Albany, N. Y. By D. N. DeTarr, 3 pp.
4. Anatomy and Physiology of *Anodonta fluviatilis*. By George B. Simpson, 23 pp. and 11 plates.
5. The Aboriginal Work on Bluff Point, Yates county, N. Y. By S. Hart Wright, 2 pp. and 1 plate.
6. Notes on the Geology of Yates county, N. Y. By Berlin H. Wright, 12 pp., 1 plate and map of Yates county.
7. Descriptions of new species of Fossils from the Trenton group of New York. By C. D. Walcott, 8 pp. and 1 plate.
8. Preliminary Notice of the Lamellibranchiate Shells of the upper Helderberg, Hamilton and Chemung groups. By James Hall, 199 pp.
9. Descriptions of Fossil Corals from the Niagara and upper Helderberg groups. By James Hall, 58 pp. and 8 plates.
10. Descriptions of the species of Fossil Reticulate Sponges, constituting the Family Dictyospongidæ. By James Hall, 17 pp. and 4 plates.

11. Illustrations of the structure of Strophomenoid Brachiopoda. By James Hall, 1 plate and explanation.
12. Report of the Botanist for 1883. Chas. H. Peck, 20 pp.
13. Some Abnormal and Pathologic Forms of Fresh-Water Shells from the vicinity of Albany, N. Y. By Chas. E. Beecher, 5 pp. and 2 plates.
14. Bryozoa (Fenestellidæ) of the Hamilton group. By James Hall, 16 pp.
15. On the Structure of the Shell in the Genus Orthis. By James Hall, 3 pp. and 2 plates.
16. Description of a new species of Stylonurus from the Catskill group. By James Hall, 2 pp. and 1 plate.
17. List of species of Fossils from an exposure of the Utica Slate and Associated Rocks, within the limits of the city of Albany. By C. E. Beecher, 1 p.
18. A Catalogue of the Published Works of James Hall, LL. D., 1836 to 1882. Communicated by Dr. David Murray, 16 pp.
19. A description of *Cryptozoon proliferum*. By James Hall, 1 plate and page of description and explanation.
20. Report of the State Entomologist for 1883. J. A. Lintner, 14 pp.
21. Report of the State Botanist for 1883. Chas. A. Peck.

The following papers are from the Reports of the State Geologist for 1882–1884.

22. Classification of the Lamellibranchiata. By James Hall, 8 pp. and 11 plates.
23. Discussion upon the manner of growth, variation of forms and characters of the Genus Fenestella, and its relations to Hemitrypa, Polypora, Retepora, Cryptopora, etc. By James Hall, 12 pp.
24. Fossil Corals and Bryozoans of the lower Helderberg group and Fossil Bryozoans of the upper Helderberg group. By James Hall, 33 plates and explanations. Palæontology of New York.
25. Brachiopoda, plates and explanations. By James. Hall, 28 plates and explanations. Palæontology of New York.
26. Bryozoans of the Hamilton group. By James Hall.

JAMES HALL,

Director of the State Museum of Natural History

ADDITIONS TO THE STATE MUSEUM DURING THE YEAR 1884.

APPENDIX A.

I. Botanical.

Specimens of *Trillium grandiflorum*, Salisb. var. *variegatum*, from Mrs. S. M. Rust, Syracuse, N. Y.

Specimens of *Trillium grandiflorum*, Salisb. var. *variegatum*, from Mrs. L. L. Goodrich, Syracuse, N. Y.

Specimens of *Juncus trifidus* L., from Prof. N. L. Britton, New York, N. Y.

Specimens of *Ledum latifolium* Ait., and *Andromeda polifolia* L., from Prof. O. R. Willis, White Plains, N. Y.

Specimens of eight species of fungi, from Prof. W. G. Farlow, Cambridge, Mass.

Specimens of three species of flowering plants and one entomophilous fungus, from Rev. J. L. Zabriskie, Nyack, N. Y.

Specimens of *Chondrioderma Michelii*, Lib. var. *sessile* Rostf., from Harold Wingate, Philadelphia, Pa.

Specimens of three species of Myxomycetous fungi, from George A. Rex, M. D., Philadelphia, Pa.

Specimens of three species of flowering plants, one of them, *Hydrangea arborescens* L., new to the herbarium, from E. A. Burt, Albany, N. Y.

Specimens of four species of flowering plants, from H. C. Gordinier, Troy, N. Y.

Specimens of *Castilleia coccinea*, Spreng., from D. Byron Waite, Springwater, N. Y.

Specimens of four species of flowering plants, one of them, *Listera convallarioides*, Hook., new to the State, and another, the very rare *Habenaria rotundifolia*, Rich., from Romeyn B. Hough, Lowville, N. Y.

Specimens of *Orontium aquaticum* L. and *Polygonatum biflorum* Ell., from J. D. Greenslete, Broadalbin, N. Y.

A specimen of *Lycoperdon giganteum* Oakes, from H. Andrews, Albany, N. Y.

A fine specimen of *Lycoperdon giganteum* Batsch., the giant puffball, from John D. Parsons, Albany, N. Y.

Specimens of an unusual form of *Uncinula spiralis* B. & C., a grapeleaf fungus, from D. A. A. Nichols, Dunkirk, N. Y.

Specimens of ten species of Characeæ, four of them new to the State, from T. F. Allen, M. D., New York, N. Y.

Specimens of monstrous development of two species of fungi from abandoned coal mines, from Prof. L. Lesquereux, Columbus, Ohio.

Specimens of four species of fungi, from Hon. G. W. Clinton, Albany, N. Y.

Specimens of eighteen species of fungi, from F. S. Earle, Cobden, Ill.

Specimens of *Secotium Warnei* Pk., from Aug. F. Foerste, Granville, Ohio.

Specimens of forty-nine species of fungi, from J. B. Ellis, Newfield, N. J.

Specimens of twenty-seven species of California fungi, from H. W. Harkness, M. D., San Francisco, Cal.

By collection of the Botanist, 192 species of plants, 116 of which are new to the herbarium. These are mostly fungi.

II. *Zoölogical.*

Large red-headed wood-pecker (female), from Andrew Lackey, Johnsburg, Warren county, N. Y.

Boa constrictor, thirteen feet in length. *By purchase.*

Specimens of *Estheria*, from Des Moines, Iowa.

Specimens of *Pyrgula Nevadensis*, Pyramid Lake, Nevada, from R. Ellsworth Call, David City, Nebraska.

List of *Achatinella* presented to the New York State Museum by Dr. W. D. Hartman, February 29, 1884:

A. adusta, Pf., four specimens.
A. affinis, Newc., seven specimens.
A. biplicata, Newc., two specimens.
A. Dunkeri, Cuming, var. Producta, Rve., five specimens.
A. elegans, Newc., five specimens.
A. flavescens, Newc., two specimens.
A. formosa, Newc., two specimens.
A. fulgens, Newc., three specimens.
A. Mastersi, Newc., one specimen.
A. pulcherrima, Newc. type, five specimens.
A. splendida, Newc., two specimens.
A. striatula, Gould, ten specimens.
A. textilis, Fer.; *ventulus*, Rve. & Pf.; *microstoma*, Gould, six specimens.
A. turgidula, Pse., two specimens.
A. variabilis, Newc., six specimens.
A. viridans, Mighels, non Pf., five specimens.

III. *Geological and Palæontological.*

Part of a mastodon tusk from Rochester, N. Y., found in the excavation of the Genesee Valley canal, 1837, from Prof. James Hall.

Plaster casts of the type specimens of *Echinocaris socialis, Tropidocaris bicarinata, T. interrupta, T. alternata* and *Elymocaris siliqua*, from C. E. Beecher.

Favosite from Freehold, Greene county; iron ore from Burden mine, Catskill, and piece of chert resembling a heel-bone, from C. H. Snyder, Freehold, N. Y.

Iron pyrites and iron ore from W. S. Snyder, Hoosick, N. Y.

Six specimens of *Dictyophyton tuberosum*, one specimen of *Dictyophyton patulum* from the Chemung group, Steuben county, N. Y. *By purchase* from Ward and Howell.

Plaster casts of *Stylonurus excelsior*, Catskill group, N. Y.

Plaster casts of *Cleodictya gloriosa*, lower Carboniferous, Indiana.

Plaster casts of *Dictyophyton cinctum*, Chemung group, Pennsylvania.

Plaster casts of *Dictyophyton parallelum*, Chemung group, New York.

Plaster casts of *Dictyophyton filitextile*, Chemung group, New York.

Plaster casts of *Equisetites* (?) *Wrightiana*, (a Crustacean) Chemung group, New York.

Five boxes of fossils of the Chemung and Waverly groups of Warren county, Pennsylvania. *By collection.*

One box of fossils from the dolomitic limestone breccia of Troy, N. Y. *By collection.*

Two large slabs of Potsdam sandstone. *By donation.*

One slab of Utica slate. *By purchase.*

Two blocks of Hudson river bluestone. *By collection.*

Two boxes of Oneida conglomerate, Clinton iron ore and gray sandstone of the Clinton group. *By collection.*

One block of Niagara limestone.

Two blocks of water limestone.

Six blocks of Tentaculite limestone. *By collection.*

Seven blocks of Coralline limestone. *By collection.*

Two boxes of corals from the Coralline limestone, Schoharie, N. Y. *By collection.*

Four blocks of Oriskany sandstone with fossils, Schoharie, N. Y. *By collection.*

One block of Gonatite limestone, Schoharie, N. Y. *By purchase.*

One block of Chemung sandstone, Ithaca, N. Y. *By purchase.*

One box of fossils from the Chemung group at Cortland, N. Y. *By collection.*

IV. *Additions to the Library of the State Museum during the year 1884.— Donations and exchanges.*

Additions to the library of the State Museum during the year 1884. Donations and exchanges :

Official Gazette U S. Patent Office, vol. 25, Nos. 12, 13 ; vol. 26, Nos. 1 to 13, incl. ; vol. 27, Nos. 1–13, incl. ; vol. 28, Nos. 1–14, incl. ; vol. 29, Nos. 1 to 10 (Nos. 4 and 5 missing).

Alphabetical Lists of Patentees and Inventions for the half year, January to June, inclusive, 1883.

Alphabetical Lists of Patentees and Inventions for the quarter ending September 30, 1883.

Index of Decisions of the Commissioners of Patents, July–September, 1883.

Alphabetical Lists of Patentees and Inventions for the quarter ending December 31, 1883.

Alphabetical Lists of Patentees and Inventions for the quarter ending March 31, 1884.

Official Gazette U. S. Patent Office, index to vol. 28, April 1 to June 24, 1884.

Alphabetical Lists of Patentees and Inventions for the quarter ending June 30, 1884.

Annual Report of Commissioner of Patents, 1883.

Journal of the Cincinnati Society of Natural History, vol. VI, No. 4, December, 1883, and vol. VII, No. 1, April, 1884, vol. III, No. 2.

Department of Agriculture, Chemical Division, Bulletin No. 1.
Department of Agriculture, Special Report, No. 5.
Department of Agriculture, Division of Statistics, Report No. 2.
Department of Agriculture, Division of Statistics, new series, Report No. 5; new series, Report No. 6, April, 1884; new series, Report No. 7.
Bulletin American Geographical Society, Nos. 3 and 4, 5 and 6, 1883.
Bulletin American Geographical Society, Nos. 1, 2, 1884.
Bureau of Education, Circulars of Information, No. 4, 1883; also "The Bufalini Prize," and "Education in Italy and Greece" (three pamphlets); Report of the Director of American School of Classical Studies at Athens, for the years 1882 and 1883.
Circulars of Information No. 5, 1883, and No. 1, 1884, Nos. 2 and 3, 1884, Nos. 4 and 5, 1884.
Cornell University Register, 1883, 1884.
Geological Map, Dr. F. V. Hayden, 1869–1880.
Canadian Record of Natural History and Geology; Montreal, 1884.
Bulletin U. S. Fish Commission, vol. III, 1883; vol. II, 1882.
U. S. Commission of Fish and Fisheries, Commissioners' Reports, 1881, 1882.
Bulletin of the California Academy of Sciences, No. 1, February, 1884.
Proceedings of the Canadian Institute. Toronto, vol. II. Fasciculus, No. 1, March, 1884, and July, 1884, vol. II; Fasciculus, 3, 1884.
Memoirs of the Boston Society of Natural History, vol. III, No. IX.
American Museum of Natural History, Bulletin, vol. I, No. V, February 13, 1884.
American Museum of Natural History, Annual Report, March, 1884.
Bulletin de la Societe Imperiale de Moscow, Nos. 3 and 4, 1882, and Nos. 1 and 2, 1883.
Johns-Hopkins University, Studies from the Biological Laboratory, vol. III, No. 1, March, 1884.
Isis in Dresden, Juli bis December, 1883.
Accessions to Indian Museum, Appendix A, quarter ending 30th September, 1883; quarter ending December 31, 1883; quarter ending 31st March, 1884; Appendices B, C and D.
Die Fortschritte Der Geologie, etc., C. F. Zincken, Leipzig, 1878.
Anales del Museo Nacional de Mexico, Tomo III, Eutrayo, 5ª.
Beiträge zur Palæontologie von Osterreich-Ungarn und den Angrenzenden Gebieten, E. v. Mojsisovics und M. Neumayr, Band I, Heft. 1, 2, 3, 4; Band II; Band III, Heft. 1, 2, 3, 4; Band IV, Heft. 1 and 11, Juli, 1884.
Coins of Japan, by William Bramsen.
Japanese Chronological Tables, by William Bramsen.
Tables of Japanese Weights, by William Bramsen.
Tables of Japanese Lineal Measures, by William Bramsen.
Milwaukie under the Charter, vol. 3, J. S. Buck.
University of Nebraska, Catalogue, 1883, 1884.
A Contribution of our Knowledge of Palæozoic Arachnida, by S. H. Scudder, June 11, 1884.
Bulletins of Massachusetts Natural History, June, July, 1884.
Zur Geschichte der Ueberreste von *Alca impennis*, Linn. von Prof.

Dr. Wilh. Blasius, Naumburg, 1884; also two pamphlets: "*Spermophilus rufescens*" and "*Alca impennis*."

Annual Report City Auditor, Boston, 1883 and 1884.

The Canadian Record of Science, Vol. 1, No. 1, Montreal, 1884.

Scientific Proceedings of the Ohio Mechanics' Institute, vol. II, No. 3, September, 1883.

Smithsonian (Regents) Report for 1881.

Report of Commissioner of Education, 1882 and 1883.

Contributions to the Geological History of the American Continent; the address of the retiring President, delivered before the first Montreal meeting of the American Association for the Advancement of Science, August, 1857, by James Hall. Salem, 1882, 8°, 42 pp., from the author.

Eurypteridæ from the Devonian and Carboniferous Formations of Pennsylvania, by James Hall. Harrisburg, 1884, 8°, 18 pp. and 6 plates, from the author.

Ceratiocaridæ from the Chemung and Waverly groups of Pennsylvania, by C. E. Beecher. Harrisburg, 1884, 8°, 22 pp. and 2 plates, from the author.

Notes on a Nevada Shell (*Pyrgula Nevadensis*), by R. E. Call and C. E. Beecher. Philadelphia, 1884, 8°, 5 pp., 1 plate, from the authors.

By purchase:

Photo-micrographs and how to make them, by George M. Sternberg. Boston, 1884, 8°, 204 pp., 19 plates.

Das Gebiss der Schnecken zur Begründung einer natürlichen Classification, untersucht von Dr. F. H. Troschel. Erster Band, Berlin, 1856–1863, 4to, 252 pp., 20 plates.

Zweiter Band, Berlin, 1866–1879, 4°, 246 pp., 24 plates.

Desmids af the United States and list of American Pediastrums, by the Rev. Francis Wolle. Bethlehem, Pa., 8°, 168 pp., 53 colored plates.

Science, vol. 2, Nos. 46 and 47; vol. 3, Nos. 48 and 49, 51 and 52 to 57, inclusive, Nos. 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73; vol. 4, Nos. 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97.

American Naturalist, January, vol. XVIII, No. 1; February, No. 2; March, No. 3; April, No. 4; May, No. 5; June, No. 6; July, No. 7; August, No. 8; September, No. 9; October, No. 10; November, No. 11; December, No. 12.

American Journal of Science, No. 157, vol. 27, January; No. 158, vol. 27, February; No. 159, March; No. 160, April; No. 161, May; No. 162, June; No. 163, July; No. 164, August; No. 165, September; No. 166, October; No. 168, December.

Nature, vol. 30, Nos. 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 23, 24, 25, 27; vol. 31, Nos. 1, 2, 3.

Encyclopædia Britannica, vol. 17.

Les Champignons de France, par G. C. Gillet, Texte, 1 col.; Atlas, 1 vol. Tableaux Analytiques des Hymenomycètes, par G. C. Gillet, 1 vol. Les Hymenomycètes, par G. C. Gillet Planches supplementaries 1–9 series.

LIST OF MINERALS IN THE GENERAL COLLECTION OF THE MUSEUM.

APPENDIX B.

MINERALS.

This list is here presented not as a catalogue, but rather as a guide to the collection. It is a transcript of the labels upon the specimens, with some additions of mineralogical terms necessary to proper explanation, and the insertion of specific names in some cases, to make the arrangement conformable to the newer systems of classification. Wherever the localities could be recognized with certainty from the characters and known occurrence, they have been added. Doubts as to species and localities are indicated by the mark ot interrogation. A few exceptions in the order of arrangement are due to a difference in the determination of the species, otherwise the arrangement in the cases and the order of numbering conform to the mineralogical system. The order of the list and of the collection in the cases agree; beginning at the west of the stairway in the case against the south wall in the third story, it continues to the corner and thence along the west wall to the front or street wall of the building. The reading is from left to right and from top downward in the several sections of the cases.

The sources of this general collection are in part here stated. All the specimens coming from the Van Rensselaer, Simms and Gebhard collections are thus credited. A few other donors are mentioned under their respective gifts.

The Brazilian collection was a donation from the National Museum of Rio de Janeiro. The list of minerals and ores in it was printed in the nineteenth annual report of the Regents on the State Cabinet, 1866.

The Pickett collection, principally one of fossils, was purchased for the Museum in 1867.* The minerals in it are mostly from Lockport, N. Y., and from New England.

The Simms collection, consisting of minerals, fossils and ethnological implements, with some historical relics, was added, by purchase in 1870.†

The minerals of the Gebhard collection were received in 1872.‡ This collection was purchased for its fossils, and the minerals were incidental to it. The localities are omitted on many of the original labels.

The minerals of the Van Rensselaer collection were added in 1872.§ They were collected mainly in New England by the late Dr. Jeremiah Van Rensselaer, and the collection was the gift of Mrs. Van Rensselaer through T. L. Harison, Secretary of the New York State Agricultural Society. Owing to the bad condition of the wrappings and labels through exposure in a damp storage place previous to their reception, the localities were not identified.

---

* Twenty-first Annual Report on Museum, pp. 20–21.
† Twenty-fourth Annual Report on State Museum, pp. 6, 7 and 27–28.
‡ Twenty-sixth Annual Report on State Museum, p. 7.
§ Twenty-sixth Annual Report on State Museum, pp. 7, 8 and 19.

The collection of zeolites and other minerals given to the Museum by Prof. A. R. Leeds, of Stevens' Institute, Hoboken, N. J., also deserves mention here. It came in 1877.*

The specimens other than in collections above mentioned are, in part, the donations of many individuals, who have thus favored the Museum. They are referred to in the annual reports of the Regents on the State Cabinet and the State Museum.† A large part of this general collection has been gathered incidentally through the efforts of the Director and the numbers thus obtained cannot now be indicated.

The list contains 1,342 numbers, tallying with the number of specimens in the collection.

General Collection.

Number.

1 Gold in quartz .... Chapel Hill, N. C.
Presented by Dr. Crump.

2 Gold in quartz .... California.
Presented by —— Rothout.

3 Gold in quartz .... Grass Valley, Cal.
Presented by George Pine.

4 Gold in quartz............. Pine Tree Vein, Mariposa, Cal.

5 Gold in quartz .... Honduras, C. A.
Pickett Collection.

6 Gold in quartz .... California. 132
Simms Collection.

7 Gold in quartz .... California.
Presented by Joseph Bigsby.

8 Gold in quartz, pyrite and silver blende,
Mariposa, Pine Tree vein, Cal.

9 Gold with chalcopyrite......... Diamond Spring mine, Cal.

10 Gold with chalcopyrite....... .... Charlotte, N. C.

11 Gold in quartz .... Nevada.
Pickett Collection.

12 Gold in trachyte...................................

12a Silver amalgam........ .... California.

13 Copper with calcite....................... Lake Superior.

14 Copper.................... .... Lake Superior.

15 Copper.................................... Lake Superior.

16 Copper.................................... Lake Superior.

17 Copper.................................... Lake Superior.

18 Copper.................................... Lake Superior.

19 Copper with calcite........................ Lake Superior.

20 Copper............................ ..... Lake Superior.

21 Copper...................... ... . Lake Superior.

NOTE.— The Emmons collection of crystallized minerals, purchased for the Museum in 1877, is not included in this list, as it is placed in cases in the State Hall.

* Thirty-first Annual Reports on State Museum, p. 13.

† Annual Reports on State Cabinet and on State Museum I, pp. 6 and 21–33; II, p. 67; III, pp. 29–37; IV, pp. 73–79 and 82–90; V, pp. 35–43; VI, pp. 27–28; VII, pp. 51–57; VIII, pp. 25–26; IX, pp. 41–44; X, pp. 187–8; XI, p. 44; XII, pp. 108–9; XIII, pp. 17–19; XIV, pp. 13–14; XVI, p. 15; XVII, pp. 20–21; XVIII, pp. 11–12; XIX, pp. 39–41; XX, pp. 15–18; XXI, pp. 15–19; XXII, pp. 10–12; XXIII, pp. 17–19; XXIV, pp. 21–24; XXV, pp. 19–22; XXVI, pp. 19–20; XXVII, pp. 30–33; XXVIII, 23–25; XXIX, pp. 22–23; XXX, pp. 15–17; XXXI, p. 13; XXXII, p. 12; XXXIII, p. 6; XXXIV, pp. 16–17; XXXV, p. 15; XXXVI, pp. 18–19; XXXVII, p. 28; XXXVIII, p. .

Number.
22 Copper with calcite........................Lake Superior.
23 Copper...................................Lake Superior.
24 Copper, calcite and heulandite ....Lake Superior.
25 Copper...................................Lake Superior.
26 Copper.... ....Lake Superior.
27 Copper with calcite........................Lake Superior.
28 Copper...................................Lake Superior.
29 Copper...................................Lake Superior.
30 Copper...................................Lake Superior.
31 Copper with calcite........................Lake Superior.
32 Copper...................................Lake Superior.
33 Copper in trap............................Lake Superior.
34 Copper in trap.........................Scovill Point, R. I.
35 Copper........... ....Lake Superior.
36 Copper...................................Lake Superior.
37 Copper with prehnite.......................Lake Superior.
38 Meteoric iron.... .. ..South Africa.
Presented by Professor Shepard.
39 Meteoric stone, fell in Bethlehem, Albany Co., August 11, 1859.
40 ....
41 Arsenic (crude).... ....
Presented by Peter Colburn, Esq.
42 Arsenic..........................Ouro Preto, P. de Minas.
Brazilian Collection.
43 Arsenic ....Freiberg ? Saxony.
44 Arsenic...............................Freiberg ? Saxony.
45 Bismuth in quartz.......................Monroe, Conn. 135
Gebhard Collection.
46 Bismuth in quartz ....Monroe, Conn.
Gebhard Collection.
47 Tellurium ....Meloneh mine, Amador Co., Cal. 219
48 Native sulphur.........................New Grenada, S. A.
49 Native sulphur and celestite..................Sicily ? Italy.
50 Native sulphur and gypsum................Auburn, N. Y.
Presented by F. Starr.
51 Native sulphur and celestite ....Sicily ? Italy.
52 Native sulphur ....New Grenada, S. A.
53 Native sulphur and celestite..................Sicily, Italy.
54 Native sulphur...............................Mexico.
55 ....
56 Graphite..........................Ticonderoga, Essex Co.
Presented by Hon. Robert Hale, June, 1874.
57 Graphite ....Barreiras, P. de Minas, Brazil. 10
58 Graphite with calcite ....Ticonderoga, Essex Co.
Presented by Hon. Robert Hale, June, 1874.
59 Graphite..........................Ticonderoga, Essex Co.
Presented by Hon. Robert Hale, June, 1875.
60 Graphite with calcite........Port Henry, Essex Co., N. Y.
61 Graphite..............................Johnstown, N. Y.
62 Graphite with calcite...............Port Henry, Essex Co.
63 Molybdenite in quartz ....
Van Rensselaer Collection.

Number.
64 Molybdenite..
Gebhard Collection.
65 Orpiment...................................Germany. 158
66 Stibnite.............. ....
Gebhard Collection.
67 Stibnite..
68 Stibnite ....
69 Stibnite ....
70 Stibnite ....
71 Stibnite ....
Gebhard Collection.
72 Galenite ....Martinsburgh, Lewis Co., N. Y. 175
Beck Collection.
73 Galénite with quartz..............Taubaté P. de S. Paulo.
Brazilian Collection.
74 Galenite with pyrite, containing trace of gold,
Amazon lode, Gilpin Co., Col.
75 Galenite (argentiferous) ....Iporanga, P. de Parana. 85
Brazilian Collection.
76 Galenite ....Alaethé, P. de Minas. 88
Brazilian Collection.
77 Galenite with calcite ....
78 Galenite (argentiferous), $300 p. ton....Washington Co., Nev.
79 Galenite and calcite (scalenohedron)....................
Van Rensselaer Collection.
80 Galenite ....Rossie, St. Lawrence Co.
81 Galenite ....Rossie, St. Lawrence Co.
82 Galenite and calcite ....
Van Rensselaer Collection.
83 Galenite and calcite.... ....
Van Rensselaer Collection.
84 Galenite and iron pyrites..............................
Van Rensselaer Collection.
85 Galenite and calcite........ ....
Van Rensselaer Collection.
86 Galenite......... ....La Motte mine, Mo.
From J. S. Schoonmaker.
87 Galenite...........................Santa Fé, New Mexico.
From G. W. Pine.
88 Galenite with sphalerite....... Flat Creek, Montgomery Co.
89 Galenite ....
90 Galenite ....
91 Galenite ....Allegrete, P. de S. Pedro de Sul. 86
Brazilian Collection.
92 Galenite, iron pyrites, etc................................ 90
Brazilian Collection.
93 Galenite................ .... Galena, Ill.
From Duncan Campbell.
94 Galenite.................................... Galena, Ill.
From Duncan Campbell.
95 Bornite ....Buena Esperanza.

Number.

96 Bornite .... Bristol, Conn.

97 Bornite .... Minas de Hegura Coquimbo, Chili.

98 Bornite ....

99 Alabandite ....

Van Rensselaer Collection.

100 Alabandite ....

101 Sphalerite in quartz .... Alaethe, P. de Minas.

Brazilian Collection.

102 Sphalerite in quartz ....

Van Rensselaer Collection.

103 Sphalerite ....

Van Rensselaer Collection and pyrite.

104 Sphalerite in Trenton slate ....

105 Sphalerite .... Jasper Co., Ark.

106 Sphalerite .... Derbyshire, Eng.

107 Sphalerite in dolomite, Niagara group, Rochester, Monroe Co.

108 Sphalerite in dolomite, Niagara group, Rochester, Monroe Co.

109 Sphalerite, Galenite and Calcite .... Jasper Co., Ark.

110 Sphalerite ....

Van Rensselaer Collection.

111 Sphalerite ....

Van Rensselaer Collection.

112 Sphalerite 85

Brazilian Collection.

113 Chalcocite and quartz ....

Van Rensselaer Collection.

114 Chalcocite .... Bristol, Conn.

Pickett Collection.

115 Chalcocite ....

Van Rensselaer Collection.

116 Chalcocite, Serpentine and Calcite .... Keweena Pt., L. S.

117 Cinnabar ....

Church Collection.

118 Cinnabar ....

Church Collection.

119 Cinnabar ....

Church Collection.

120 Cinnabar ....

Church Collection.

121 Cinnabar ....

Church Collection.

122 Cinnabar 70

Brazilian Collection.

123 Cinnabar in schist .... Villarica, P. de Minas.

Brazilian Collection.

124 Pyrrhotite .... Bodenmais, Ger.

Van Rensselaer Collection.

125 Pyrrhotite .... Bodenmais, Ger.

Van Rensselaer Collection.

126 Pyrrhotite nickeliferous .... Jay, Essex Co.

127 Niccolite ....

Number.
128 Skutterudite..............................
129 Erythrite (Cobalt bloom) ....
130 Erythrite (Cobalt bloom and Cobaltite?)..................
131 Pyrite ....
Van Rensselaer Collection.
132 Pyrite .... Schoharie, Schoharie Co., N. Y.
Beck Collection.
133 Pyrite ....Watervliet, Albany Co., N. Y.
J. D. Darling.
134 Pyrite auriferous in quartz..........Torquirn, P. de Minas.
Brazilian Collection.
135 Pyrite ....Schoharie, N. Y.
136 Pyrite ....
Pickett Collection.
137 Pyrite ....Schoharie, N. Y.
138 Pyrite and Galena ....
Van Rensselaer Collection.
139 Pyrite .... Schoharie, N. Y.
140 Pyrite .... Gouverneur, N. Y.
Pickett Collection.
141 Pyrite ....Schoharie, N. Y.
142 Pyrite ....Schoharie, N. Y.
143 Pyrite ....Schoharie, N. Y.
144 Pyrite ....Schoharie, N. Y.
145 Pyrite ....Schoharie, N. Y.
146 Chalcopyrite and quartz ....Sheffield, Mass.
From N. T. Brownell.
147 Chalcopyrite ....Honduras.
Pickett Collection.
148 Chalcopyrite ....Lake Superior.
From B. Known, Syracuse.
149 Chalcopyrite..
150 Chalcopyrite ....California.
Pickett Collection, Canton, St. Lawrence Co.
151 Chalcopyrite ....
152 Chalcopyrite with quartz ....San Juan, Mexico.
153 Chalcopyrite and pyrite..................Central City, Col.
Containing gold, silver and nickel.
154 Chalcopyrite in quartz and feldspar...... ....Bristol, Conn.
155 Chalcopyrite with Calcite.................................
156 Chalcopyrite ....
Van Rensselaer Collection.
157 Chalcopyrite with pyrite............. ....
158 Chalcopyrite.......... ....Wurtsborough, Sullivan Co., N. Y.
159 Chalcopyrite..
Pickett Collection.
160 Arsenical pyrites...................Edenville, Orange Co.
Beck Collection.
161 Arsenical pyrites...... ....
Brazilian Collection.
162 Arsenopyrite.........................Edenville, Orange Co.

Number.
163 Arsenical pyrites ....Caldbeck Fells, Cumberland, Eng.
164 Arsenopyrite.................Edenville, Orange Co., N. Y.
Gebhard Collection.
165 Arsenopyrite and quartz.......................California.
166 Scorodite ....
Brazilian Collection.
167 Aikinite ....
Van Rensselaer Collection.
168 Tetrahedrite ....South America.
Presented by Señor Asta.
169 Tetrahedrite, Galenite and Chalcopyrite ....
170 Pyrargyrite...... ....Freiberg, Saxony.
172 Halite, rock salt..........................Cheshire, Eng.
173 Halite, rock salt ....Cheshire, Eng.
174 Halite, rock salt ....Cheshire, Eng.
175 Halite, rock salt ....Cheshire, Eng.
176 Halite, rock salt ....Cheshire, Eng.
177 Silver ore ....Siberia.
178 Silver ore ....Blue Ophir Ledge, Cal.
Simms Collection.
179 Silver ore.................................California.
180 Fluorite.................................. ....
Gebhard Collection.
181 Fluorite and Galena......................................
Brazilian Collection.
182 Fluorite ....
183 Fluorite (green) . ...Cumberland, Eng.
184 Fluorite ....Derbyshire, Eng.
185 Fluorite and Barite.......................................
Van Rensselaer Collection.
186 Fluorite ....
187 Fluorite............... ....
Gebhard Collection.
188 Fluorite........................ ....
Gebhard Collection.
189 Fluorite...
Gebhard Collection.
190 Fluorite (polished)........................Matlock, Eng.
191 Fluorite..
192 Fluorite..
Gebhard Collection.
193 Fluorite.............Muskelonge lake, Jefferson Co., N. Y.
Pickett Collection.
194 Fluorite and pearl spar...................Rochester, N. Y.
195 Fluorite (purple)..
Van Rensselaer Collection.
196 Fluorite on Blende..........................Matlock, Eng.
197 Fluorite (octahedral).....................................
Van Rensselaer Collection.
198 Fluorite (veined)......................Derbyshire, Eng.
199 Yttrocerite in Calcite ....Amity, Orange Co.

Number.
200 Cryolite.................................Greenland.
From R. C. Ross.
201 Fluorite.................................
Van Rensselaer Collection.
202 Fluorite.................................
Van Rensselaer Collection.
203 Fluorite.................................
Gebhard Collection.
204 Cuprite.................................Honduras.
205 Cuprite.................................
Gebhard Collection.
206 Cuprite and Malachite.................................Chili, S. A.
Pickett Collection.
207 Cuprite.................................Bound Brook, N. J.
208 Cuprite.................................
Van Rensselaer Collection.
209 Cuprite and Malachite.................................
Van Rensselaer Collection.
210 Massicot (Oxide of lead).................................Galena, Ill.
Pickett Collection.
211 Zincite and Franklinite.................................Franklin, N. J.
Van Rensselaer Collection.
212 Zincite and Franklinite.................................Franklin, N. J.
Simms Collection.
213 Zincite and Franklinite.................................Franklin, N. J.
Van Rensselaer Collection.
214 Zincite and Franklinite.................................Franklin, N. J.
Van Rensselaer Collection.
215 Zincite and Franklinite.................................Franklin, N. J.
Van Rensselaer Collection.
216 Zincite and Franklinite.................................Franklin, N. J.
217 Melaconite.................................
Van Rensselaer Collection.
218 Melaconite.................................Minas de Andacollo.
219 Melaconite.................................Honduras.
Pickett Collection.
220 Melaconite and copper.................................
Gebhard Collection.
221 Melaconite.................................Flemington, N. J.
222 Melaconite.................................Lake Superior.
223 Corundum (Sapphire, blue).................................New Jersey. 38
224 Corundum (Sapphire, blue).................................New Jersey.
225 Corundum (Sapphire, blue)......Newton, Sussex Co., N. J.
226 Corundum (Sapphire, blue)......Newton, Sussex Co., N. J.
227 Hematite (Specular iron ore).................................
Van Rensselaer Collection.
228 Hematite (Specular iron ore).................................
Van Rensselaer Collection.
229 Hematite (Specular iron ore)............Gouverneur, N. Y.
230 Jasper on hematite.................................
Van Rensselaer Collection.

Number.
231 Hematite (Specular iron ore) ....
Van Rensselaer Collection.
232 Hematite (Specular hematite) .... Lake Superior.
233 Hematite (Micaceous oligiste) ....Itabira, P. de Minas. 53
Brazilian Collection.
234 Hematite (Lamellar oligiste) in quartz,
Serra da Gameleira, Bahia 44
235 Hematite 61
Brazilian Collection.
236 Hematite (Micaceous oligiste)..... ...Itabira, P. de Minas. 57
Brazilian Collection.
237 Hematite (Oligiste)........Cabaceiro, Rio Grande de Norte. 51
Brazilian Collection.
238 Hematite (Lamellose oligiste)
Mine of Tente Casimero, P. de Minas. 54
Brazilian Collection.
239 Hematite (Oligiste ochreous) ....Santaram, P. de Pará. 55
Brazilian Collection.
240 Hematite (Specular iron) 68
Brazilian Collection.
241 Chromite ....
Van Rensselaer Collection.
242 Hematite (Oligiste) ....Serra d'Araripe, P. de Ceará. 45
Brazilian Collection.
243 Hematite............Bagé, Rio Grande de S. Pedro do Sul. 46
Brazilian Collection.
244 Hematite (Itabyrite and Amphibolite)
Itabirado Campo, P. de Minas. 52
Brazilian Collection.
245 Hematite ....
Brazilian Collection.
246 Hematite ....
247 Hematite...
248 Hematite (Oligiste), in part hydrated..Caxias, P. de Maranhao. 56
Brazilian Collection.
249 Hematite............................Iron mountain, Mo.
250 Hematite (Specular iron) ....
Van Rensselaer Collection.
251 Hematite with quartz.....Potsdam, St. Lawrence Co., N. Y.
252 Martite.....................Arnold bed, Clinton Co., N. Y.
253 Martite.....................Loudonville, Albany Co., N. Y.
253a Martite ....
From J. F. Flannery.
254 Hematite (Lenticular iron ore) .... Pennsylvania. 56
255 Hematite......................................Pennsylvania.
256 Hematite (Lenticular iron ore)....Clinton, Oneida Co., N. Y.
257 Menaccanite (crichtonite)...Serra de Nassouras P. de Minas. 67
Brazilian Collection.
258 Menaccanite, replacing mica in granite,
Potsdam Junction, St. Lawrence Co., N. Y.
259 Magnetite ....Essex Co., N. Y.

Number.
260 Spinel..
Van Rensselaer Collection.
261 Spinel..
Van Rensselaer Collection.
262 Spinel..
Van Rensselaer Collection.
263 Spinel..........................Edenville, Orange county.
264 Spinel (red) ....Vernon, N. J.
265 Spinel, in Trachyte ....Germany.
266 Spinel ....
267 Spinel..
Van Rensselaer Collection.
268 Spinel..........................Amity, Orange Co., N. Y.
Beck Collection.
269 Spinel..........................Amity, Orange Co., N. Y.
270 Spinel..........................Amity, Orange Co., N. Y.
271 Spinel..........................Amity, Orange Co., N. Y.
272 Spinel..........................Amity, Orange Co., N. Y.
273 Spinel..........................Amity, Orange Co., N. Y.
274 Spinel (ruby) ....Amity, Orange Co., N. Y.
275 Spinel..........................Warwick, Orange Co., N. Y.
Beck Collection.
276 Cassiterite ....Cornwall, Eng.
277 Cassiterite, in granite ....Rio Paranpeba, P. de Minas. 69
Brazilian Collection.
278 Magnetite .... Moriah, Essex Co., N. Y.
279 Magnetite..... Barton Hill mine, Moriah, Essex Co., N. Y.
280 Magnetite..............Palmeriodos Indios, P. de Alageas. 58
Brazilian Collection.
281 Magnetite.....Barton Hill mine, Moriah, Essex Co., N. Y.
282 Magnetite ....Forest of Dean mine, Orange Co., N. Y.
283 Magnetite.........Forest of Dean mine, Orange Co., N. Y.
From W. C. H. Sherman.
284 Magnetite............. Barton Hill mine, Essex Co., N. Y.
285 Magnetite...............S. Jo de Ypanema, P. de S. Paulo. 59
Brazilian Collection.
286 Crystals of magnetite ....Cocoas. P. de Minas. 60
Brazilian Collection.
287 Magnetite (iron sand) ....Lake Champlain, N. Y.
288 Franklinite and zincite...................Franklin, N. J.
From Prof. James Hall.
289 Franklinite and zincite ....Franklin, N. J.
290 Franklinite and zincite ....Franklin, N. J.
291 Franklinite and zincite ....Franklin, N. J.
292 Magnetite..
293 Franklinite iron........................Sussex Co., N. J.
From Geo. R. Howell.
294 Magnetite..
Van Rensselaer Collection.
295 Siderite (and Uraninite ?) ....Cornwall, Eng.
296 Uraninite..

Number.
297 Chrysoberyl. .... Haddam, Conn.
298 Chrysoberyl.......................................
299 Chrysoberyl............... Greenfield, Saratoga Co., N. Y.
300 Chrysoberyl ....
301 Chrysoberyl............................ Haddam, Conn.
302 Rutile......................................
303 Manganite......................... Nazareth, P. de Bahia. 81
Brazilian Collection.
304 Manganite .... Antonio Pereira, P. de Minas. 65
Brazilian Collection.
305 Manganite .... Antonio Pereira, P. de Minas. 66
Brazilian Collection.
306 Manganite........... S. Jeronymo, P. de S. Pedro, de Sul. 82
Brazilian Collection.
307 Proylusite ....
Van Rensselaer Collection.
308 Pyrolusite.......................................
Van Rensselaer Collection.
309 Pyrolusite.......................................
Van Rensselaer Collection.
310 Pyrolusite....................................... 85
311 Pyrolusite on Limonite.................. Salisbury, Conn.
312 Pyrolusite.................................... Germany.
Van Rensselaer Collection.
313 Pyrolusite.................................... Germany.
314 Brucite........... ...... Woods' mine, Lancaster Co., Pa.
Pickett Collection.
315 Turgite on Limonite...... Fort Ann, Washington Co., N. Y.
316 Limonite..... .... Obidos, Para. 48
Brazilian Collection.
317 Limonite (Brown hematite, Stalactitic).. Itabira, P. de Minas. 50
Brazilian Collection.
318 Limonite (mammillary) ....
319 Limonite (botryoidal).................... Salisbury, Conn.
320 Limonite................................ Salisbury, Conn.
From H. Averill.
321 Limonite................................ Salisbury, Conn.
322 Limonite.......................................
323 Limonite.......................................
324 Limonite (fibrous) .... Bennington, Vt.
Simms Collection.
325 Limonite............................... Litchfield, Conn.
Pickett Collection.
326 Limonite (fibrous).................................
327 Limonite .... Iron Mt., Missouri.
Pickett Collection.
328 Limonite................................ Salisbury, Conn.
329 Limonite................................ Salisbury, Conn.
330 Limonite............... Fort Ann, Washington Co., N. Y.
331 Limonite (slaty) .... Ceritiba, P. de Parana.
Brazilian Collection.

Number.
332 Limonite.................................Salisbury, Conn.
From B. F. Otterson.
333 Limonite...............Fort Ann, Washington Co., N. Y.
334 Limonite.................................Parana, Brazil.
335 Limonite (bog ore) ....Saratoga Co., N. Y.
Pickett Collection.
336 Limonite (bog ore) ....Glen, Montgomery Co., N. Y.
Simms Collection.
337 Hematite .... P. de Sergippe, Brazil?
338 Brucite on serpentine......................Hoboken, N. J.
From Prof. Leeds.
339 Brucite with marmolite....................Hoboken, N. J.
340 Brucite in serpentine ....Hoboken, N. J.
341 Brucite ....Hoboken, N. J.
From Prof. Leeds.
342 Gibbsite...Pa.
Simms Collection.
343 Gibbsite.... ....Pa.
Simms Collection.
344 Gibbsite............................ ...Richmond, Mass.
345 Gibbsite.................................Steamboat, Pa.
Pickett Collection.
346 Gibbsite ....
Gebhard Collection.
347 Gibbsite..........................Richmond, Mass.
348 Bismite................................Clausthal, Bohemia.
349 Bismite ....Catla Branca, P. de Minas.
Brazilian Collection.
350 Quartz (crystals) ....
Van Rensselaer Collection.
351 Quartz (Rock crystal) ....
352 Quartz (Rock crystal) ....
353 Quartz (Rock crystal) ....
354 Quartz (Rock crystal) ....
355 Quartz............................ ....Easton, Pa.
Simms Collection.
356 Quartz...
357 Quartz...
358 Quartz...
359 Quartz...
360 Quartz (crystals) ....Middleville, Herkimer Co., N. Y.
Simms Collection.
361 Quartz penetrated by stibnite..............................
362 Quartz...
363 Quartz...
364 Quartz (crystals) ....
365 Quartz............................Craigville, Orange Co.
Beck Collection.
366 Quartz...........................St. Lawrence Co., N. Y.
367 Quartz.................... Rossie, St. Lawrence Co., N. Y.
368 Quartz...
Van Rensselaer Collection.

Number.
369 Quartz..............................Dauphiny, France.
Pickett Collection.
370 Quartz..
Pickett Collection.
371 Quartz.......... ....Ellenville, Ulster Co.
372 Quartz, calcite and galenite ....
Van Rensselaer Collection.
373 Quartz ....
374 Quartz..
Van Rensselaer Collection.
375 Quartz (Hyaline)..................Brumado, P. de Minas. 28
Brazilian Collection.
376 Quartz (Drusy) barite and malachite,
Catskill, Greene Co., N. Y.
377 Quartz (Hyaline)....................Itambe P. de Minas. 29
Brazilian Collection.
378 Quartz coated with chlorite........... ....
Van Rensselaer Collection.
379 Quartz..................Fowler, St. Lawrence Co., N. Y.
380 Quartz.... ....
Van Rensselaer Collection.
381 Quartz................. ....
Van Rensselaer Collection.
382 Quartz (yellow) ... .Rossie, St. Lawrence Co., N. Y.
383 Quartz.... ....
384 Quartz...............................Northern N. Y.
Pickett Collection.
385 Quartz...
Van Rensselaer Collection.
386 Quartz (crystals) ....Trout lake.
387 Quartz...........................Jefferson Co., N. Y.
Pickett Collection.
388 Quartz..
389 Quartz....... ....Rossie, St. Lawrence Co., N. Y
390 Quartz........ ....Dotterval, P. de S. Pedro.
Brazilian Collection.
391 Quartz (Rock crystal) with calcite..Moriah, Essex Co., N. Y.
392 ?.............................. ....
393 Quartz (Rock crystal).....Spraker's Basin, Montgomery Co.
394 Quartz crystals in limestone. W. Canada creek, Newport, N. Y.
395 Quartz..................Fowler, St. Lawrence Co., N. Y.
396 Quartz............................ ....
Van Rensselaer Collection.
397 Quartz ....
Pickett Collection.
398 Quartz....................Bear Valley, Mariposa Co., Cal.
Near Col. Fremont's residence.
399 Quartz ....Wurtsboro mine, Sullivan Co., N. Y.
Beck Collection.
400 Quartz .... Iserlohn, Germany.
401 Quartz (milky) ....

Number.
402 Quartz on ferruginous sandstone..........
Van Rensselaer Collection.
403 Quartz..........
404 Amethyst..........
Van Rensselaer Collection.
405 Amethyst..........
Van Rensselaer Collection.
406 Quartz (geode) amethyst..........
Van Rensselaer Collection.
407 Amethyst..........
From Dr. Chas. Martin.
408 Amethyst (geode)..........
Simms Collection.
409 Amethyst..........
410 Amethyst.......... gold mine, California.
411 Amethyst..........P. de Minas, various places. 35
Brazilian Collection.
412 Rose quartz ....Pedro Lavrada, P. de Rio Grande do Norte. 30
Brazilian Collection.
413 Rose quartz..........
414 Rose quartz..........Mt. Washington, N. H.
From J. V. L. Pruyn.
415 Rose quartz..........Rubinstein, Bavaria.
416 Smoky quartz..........
417 Smoky quartz and feldspar..........
Van Rensselaer Collection.
418 Smoky quartz..........
419 Smoky quartz..........
420 Smoky quartz ...Old iron ore bed, Moriah, Essex Co., N. Y.
421 Smoky quartz..........Essex Co., N. Y.
422 White quartz..........Bergen, N. J.
From Prof. Leeds, Hoboken.
423 Quartz and albite..........Pennsylvania.
Simms Collection.
424 Chalcedony..........
Pickett Collection.
425 Chalcedony..........Alabama.
426 Quartz (geode)..........
427 Chalcedony..........Alabama.
428 Chalcedony..........Alabama.
429 Chalcedony..........
430 Chalcedony..........Alabama.
431 Chalcedony..........Bosphorus, Asia Minor.
432 Chalcedony..........Massachusetts.
433 Chalcedony with Magnetite..........
434 Chalcedony and selenite..........Rochester, N. Y.
Pickett Collection.
435 Chalcedony..........
436 Chalcedony..........Terro de St. Roque, S. Pedro do Sul. 31
Brazilian Collection.
437 Chalcedony..........

Number.

438 Chalcedony .... Mt. Lebanon, Syria.

439 Chalcedony ....

440 Chalcedony ....

441 Chalcedony ....

442 Chalcedony ....

443 Chalcedony ....

Pickett Collection.

444 Chalcedony ....

445 Chalcedony ....

446 Chalcedony.....North part of Yellowstone park, Montana.

447 Chrysoprase ....

Gebhard Collection.

448 Chrysoprase .... Mähren, Germany.

449 Chrysoprase .... Bound Brook, N. J.

450 Chrysoprase .... Baumgarten, Germany.

451 Agate .... Ireland, 354

Simms Collection.

452 Agate ....

453 Agate .... Rock of Gibraltar.

Simms Collection.

454 Moss agate ....

455 Agate .... Rio Jaguarao, Brazil.

456 Agate ....

457 Agate ....

458 Agate ....

459 Agate ....

460 Agate .... Rio Jaguarao, S. Pedro do Sul, Brazil. 32

461 Agate .... Rio Jaguarao, S. Pedro do Sul.

Brazilian Collection.

462 Agate (Seixas rollados).......Rio de S. Francisco do Norte. 33

Brazilian Collection.

463 Jasper .... Saugus, Mass. 68

Simms Collection.

464 Jasper ....

Simms Collection.

465 Agate .... Rio Jaguarao, P. de S. Pedro do Sul. 34

Brazilian Collection.

466 Jasper and specular iron (boulder) .....Grand Rapids, Mich.

Pickett Collection.

467 Flint 157

Gebhard Collection.

468 Flint in chalk .... England.

Pickett Collection.

469 Quartz (Siliceous concretions) ....

470 Hornstone ....

471 Hornstone ....

472 Wood-opal .... Alexandria, Va.

473 Wood-opal .... Mt. Diablo, Cal.

Simms Collection.

474 Silicified wood ....

Pickett Collection.

Number.
475 Precious opal.................. ....
Gebhard Collection.
476 Common opal.. ....
477 Common opal ....
478 Common opal ....
Van Rensselaer Collection.
479 Chalcedony..... ....Keokuk, Iowa. (?)
480 Opal............ .... Gallatin Co., Mont.
481 Opal-agate ....
Van Rensselaer Collection.
482 Opal-agate ....California.
483 Silicified wood...............................California.
From Hon. Charles Daly.
484 Menilite ....
Van Rensselaer Collection.
485 Menilite .... Bohemia.
Gebhard Collection.
486 Menilite ....
Van Rensselaer Collection.
487 Cacholong in amygdaloid ....Partridge island, Nova Scotia.
Pickett Collection.
488 Hyalite...............................Vesuvius, Italy.
489 Silicified wood ....Wyoming territory.
From a log 12 feet long, 10 inches in diameter.
490 Enstatite (bronzite) fluorite and serpentine,
Amity, Orange Co., N. Y.
491 Enstatite .... Amity, Orange Co., N. Y.
492 Hypersthene rock ....
493 Wollastonite ....Essex Co., N. Y.
Pickett Collection.
494 Wollastonite ....Essex Co., N. Y.
Pickett Collection.
495 Wollastonite......................Lewis, Essex Co., N. Y. 1061
Pickett Collection.
496 Pyroxene ....
Van Rensselaer Collection.
497 Pyroxene, crystals ....
498 Pyroxene....................Monroe, Orange Co., N. Y.
499 Pyroxene...................Warwick, Orange Co., N. Y.
500 Pyroxene (coccolite)....................................
501 (Coccolite) with quartz and magnetite,
Port Henry, Essex Co., N. Y.
502 (Coccolite) ....Long pond, Essex Co., N. Y.
503 Pyroxene...Greenwood furnace, Monroe, Orange Co., N. Y.
504 Canaanite (white pyroxene)...............Canaan, Conn.
505 Jeffersonite (2 specimens).................Franklin, N. J.
506 Jeffersonite............... ....Franklin, N. J.
507 Jeffersonite............................Franklin, N. J.
508 Acmite ....Norway.
509 Rhodonite ....Cummington, Mass.
Pickett Collection.

Number.
510 Rhodonite ....Cummington, Mass.
Pickett Collection.
511 Rhodonite ....Cummington, Mass.
Pickett Collection.
512 Spodumene ....Sterling, Mass.
513 Petalite.......................................
Pickett Collection.
514 Petalite ....Bolton, Mass.
Gebhard Collection.
515 Amphibole (Tremolite) ....
Van Rensselaer Collection.
516 Amphibole (Tremolite) ....
517 Amphibole (Tremolite).......Canaan, Columbia Co, N. Y.
Gebhard Collection.
518 Amphibole (Tremolite).........Dover, Dutchess Co., N. Y. 309
Beck Collection.
519 Amphibole (Tremolite), Gouverneur, St. Lawrence Co., N. Y.
520 Amphibole (Tremolite)..... Port Henry, Essex Co., N. Y. 1047
Beck Collection.
521 Amphibole (Tremolite).......Edenville, Orange Co., N. Y.
522 Amphibole (Tremolite), Kane's quarry, Westchester Co., N.Y. 494
Beck Collection.
523 Amphibole (Tremolite) ....
Van Rensselaer Collection.
524 Amphibole (Tremolite) ....Amity, Orange Co., N. Y. 612
Beck Collection.
525 Amphibole (Tremolite)...... Patterson, Putnam Co., N. Y. 329
Beck Collection.
526 Amphibole (Tremolite).......Edenville, Orange Co., N. Y.
527 Amphibole (Tremolite) .... Sheffield, Mass.
528 Amphibole (actinolite) ....Middlefield, Mass.
529 Amphibole (actinolite)..... ....Middlefield, Mass.
530 Amphibole (actinolite)...................Middlefield, Mass.
531 Hornblende and talc.......................................
Van Rensselaer Collection.
532 Hornblende ....
533 Hornblende ....
Van Rensselaer Collection.
534 Hornblende ....Fitchburg, Mass.
Pickett Collection.
535 Hornblende ....Yonkers, Westchester Co., N. Y. 517
Beck Collection.
536 Hornblende ....
Van Rensselaer Collection.
537 Sahlite ....
Gebhard Collection.
538 Hornblende..................Edenville, Orange Co., N. Y.
Beck Collection.
539 Hornblende ....
540 ? ....
541 Hornblende...
Van Rensselaer Collection.

Number.
542 Hornblende ....Amity, Orange Co., N. Y.
543 Hornblende.....................Crag Harbor, Essex Co. 1033
Beck Collection.
544 Hornblende.........New Rochelle, Westchester Co., N. Y. 414
Beck Collection.
545 Hornblende, Spruce Swamp mine, Monroe, Orange Co., N. Y.
Gebhard Collection.
546 Actinolite.......................................
Van Rensselaer Collection.
547 Hornblende ....
Gebhard Collection.
548 Hornblende and quartz...............................
Van Rensselaer Collection.
549 Hornblende .... Monroe, Orange Co., N. Y. 354
Beck Collection.
550 Hornblende, Cummingtonite.... ....
Gebhard Collection.
551 Hornblende...............Rossie, St. Lawrence Co., N. Y. 226
552 Hornblende...............Piermont, Rockland Co., N. Y. 1062
Beck Collection.
553 Hornblende...............South East, Putnam Co., N. Y. 81
Beck Collection.
554 Hornblende ....
Van Rensselaer Collection.
555 Anthophyllite, Hydrous ....New York city.
556 Anthophyllite...........................New York city.
557 Anthophyllite ....
558 Anthophyllite ....Bucks Co., Pa.
From Prof. Leeds, Hoboken.
559 Pargasite ....Vermont.
560 Pargasite and chondrodite ....Vernon, Sussex Co., N. J.
561 Asbestus ....Quarantine, Staten Island. 358
Beck Collection.
562 Asbestus...........................Staten Island, N. Y.
From Prof. Leeds, Hoboken.
563 Asbestus ....
564 Asbestus ....
565 Asbestus ....DeKalb, St. Lawrence Co., N. Y.
566 Amianthus ....P. de Minas, Brazil. 39
Brazilian Collection.
567 Asbestus .... Massachusetts.
Pickett Collection.
568 Asbestus .... Wilks mine, Orange Co., N. Y.
Beck Collection.
569 Beryl...................................Acworth, N. H.
570 Beryl...................................Acworth, N. H.
571 Beryl...................................Acworth, N. H.
Pickett Collection.
572 Beryl ....
Van Rensselaer Collection.
573 Beryl ....Monroe, Orange Co., N. Y.

Number.
574 Beryl .... Acworth, N. H.
Pickett Collection.
575 Beryl.......................... Monroe, Orange Co., N. Y.
576 Beryl.......................... Monroe, Orange Co., N. Y.
577 Beryl..
Van Rensselaer Collection.
578 Beryl..
Van Rensselaer Collection.
579 Beryl..
Van Rensselaer Collection.
580 Beryl .... Monroe, Orange Co., N. Y.
581 Boltonite .... Bolton, Mass.
Pickett Collection.
582 Chrysolite.............................. Valvesais, France.
583 Chrysolite ....
584 Chrysolite (olivine lava).................. Vesuvius, Italy.
585 Chrysolite............................... Batschwald, Ger.
586 Furnace slag .... Palmer's furnace, Buffalo, N. Y.
Pickett Collection.
587 Furnace slag ....
Pickett Collection.
588 Willemite and Franklinite.................. Franklin, N. J.
From Prof. Leeds.
589 Willemite, zincite, etc .... Sterling Hill, N. J.
590 Willemite, zincite, etc...................... Franklin, N. J.
591 ....
592 Garnet.................. Yonkers, Westchester Co., N. Y.
593 Garnet...
Van Rensselaer Collection.
594 Garnet .... Rogers' Rock, Essex Co., N. Y. 532
Beck Collection.
595 Garnet...
Van Rensselaer Collection.
596 Garnet...
Van Rensselaer Collection.
597 Garnet ....
598 Garnet ....
Van Rensselaer Collection.
599 Garnet...
Van Rensselaer Collection.
600 Garnet...
Van Rensselaer Collection.
601 Garnet .... Schoharie, N. Y.
602 Garnet in gneiss .... Yonkers, Westchester Co., N. Y.
603 Garnet................................... New Hampshire.
604 Garnet ....
Van Rensselaer Collection.
605 Garnet in Talcose slate......... Dover, Dutchess Co., N. Y.
606 Garnets in Mica slate...................................
607 Garnet in Labradorite............ Lewis Corners, Essex Co.
608 Garnet in Hornblende...................................

Number.

609 Garnet (Melanite)..

610 Garnet (Melanite)........................Franklin, N. J.

611 Garnet.......................................Franklin, N. J.

612 Garnet.......................................Hanover N. H.

613 Garnet ....

614 Garnet (Cinnamon stone) ....Amity, Orange Co., N. Y. 599
Beck Collection.

615 Garnet (Colophonite).......Willsborough, Essex Co., N. Y.

616 Garnet...
Van Rensselaer Collection.

617 Garnet (Colophonite) ......Willsborough, Essex Co., N. Y.

618 Garnet (Colophonite)...
Van Rensselaer Collection.

619 Garnet (Colophonite)...
Van Rensselaer Collection.

620 Zircon ....Cornwall, Orange Co., N. Y.

621 Zircon..

622 Zircon in Scapolite...........Edenville, Orange Co., N. Y.

623 ?..

624 Zircon .... Warwick, Orange Co., N. Y.

625 Vesuvianite...............Sandford mine, Essex Co., N. Y.
Pickett Collection.

626 Vesuvianite...............................Vesuvius, Italy.
Gebhard Collection.

627 Vesuvianite ....Vesuvius ? Italy.
Gebhard Collection.

628 Vesuvianite ....

629 Vesuvianite in lava ?....................Vesuvius ? Italy.

630 Vesuvianite ....Vesuvius ? Italy.

631 Vesuvianite ....Vesuvius ? Italy.

632 Vesuvianite ....Vesuvius ? Italy.

633 Vesuvianite (Egeran)......................Eger, Bohemia.

634 Epidote..Norway.

635 Epidote..Norway.
Gebhard Collection.

636 Epidote..................................Warwick, Mass.
Pickett Collection.

637 Epidote..................................Harlem, N. Y.
Beck Collection.

638 Epidote...
Pickett Collection.

639 Epidote...Chester.
Gebhard Collection.

640 Epidote and garnet..

641 Zoisite ....Newfane, Vt.

642 Zoisite..
Gebhard Collection.

643 Axinite...................................Cornwall, Eng.

644 Lepidolite..................................... Paris, Me.
Pickett Collection.

645 Lepidolite..
Van Rensselaer Collection.

Number.			
646	Margarodite	Acworth, N. H.	
647	Margarodite	Trumbull, Conn.	
	Simms Collection.		
648	Margarodite	Acworth, N. H.	
649	Mica	Yonkers, Westchester Co., N. Y.	497
	Beck Collection.		
650	Muscovite	Moriah, Essex Co., N. Y.	
651	Mica in granite	Central Park, N. Y.	
652	Mica (muscovite)		
653	Mica (muscovite)		
654	Mica (phlogopite)		
	Pickett Collection.		
655	Phlogopite	Perth, Canada.	
656	Phlogopite	Perth, Canada.	
657	Phlogopite	Edenville, Orange Co., N. Y.	
658	Phlogopite	Edenville, Orange Co., N. Y.	
659	Phlogopite	Edenville, Orange Co., N. Y.	
660	Phlogopite	Monroe, Orange Co., N. Y.	
661	Mica	St. Lawrence Co., N. Y.	
662	Mica	Rossie, St. Lawrence Co., N. Y.	
663	Mica	Antwerp, Jefferson Co., N. Y.	
664	Phlogopite	Edwards, St. Lawrence Co., N. Y.	
665	Phlogopite	Edwards, St. Lawrence Co., N. Y.	
666	Phlogopite	Pope's Mills, St. Lawrence Co., N. Y.	
667	Biotite in quartz,	Quartz quarry, Crown Point, Essex Co., N. Y.	
668	Mica (Biotite)		
669	Scapolite		
670	Scapolite	Cheever mine, Essex Co., N. Y.	
671	Scapolite	Amity, Orange Co., N. Y.	
672	Scapolite	Edenville, Orange Co., N. Y.	
673	Scapolite		
	Van Rensselaer Collection.		
674	Scapolite	Lewis, Essex Co., N. Y.	
675	Scapolite	Ticonderoga, Essex Co., N. Y.	
	Beck Collection.		
676	Scapolite	Keene, Essex Co., N. Y.	
	Gebhard Collection.		
677	Scapolite		
678	Scapolite	St. Lawrence Co., N. Y.	
679	Scapolite		
680	Scapolite	Massachusetts.	
	Pickett Collection.		
681	Meionite and Natrolite in lava	Mt. Somma, Italy.	
682	Hauynite in lava	Mt. Vesuvius, Italy.	
683	Hauynite	Andernach, Lake Laach, Rhine, Germany.	
684	Hauynite in glassy feldspar,	Andernach, Lake Laach, Rhine, Germany.	
685	Leucite in lava	Vesuvius, Italy.	
686	Leucite	Vesuvius, Italy.	
687	Labradorite	Essex Co., N. Y.	

Number.
688 Labradorite.............................Essex Co., N. Y. 1076
Beck Collection.
689 Labradorite..
Gebhard Collection.
690 Labradorite..
691 Labradorite..............................St. Lawrence Co.
692 Albite and Schörl.......................East Haddam, Conn.
693 Albite...
694 Feldspar...
Van Rensselaer Collection.
695 Albite and Rubellite......................Massachusetts.
696 Albite and Rubellite......................Massachusetts.
697 Albite..................................Crown Point, Essex Co.
698 Albite...
699 Albite and Tourmaline....................Haddam, Conn. 346
Simms Collection.
700 Sanidin in trachyte......................Rhine, Germany.
701 Sanidin in trachyte......................Rhine, Germany.
702 Oligoclase in trachyte.......................................
703 Andesite...
704 Adularia.....................................Tyrol.
705 Adularia.....................................Tyrol.
706 Andesite in trachyte...
707 Amazonstone..................................Siberia.
708 Amazonstone..................................Colorado.
From W. H. Strahan.
709 Feldspar.................................New York Island.
Beck Collection.
710 Feldspar...
711 Orthoclase in granite..
712 Orthoclase and Quartz....................New York Island.
713 Feldspar, red............................Harlem, N. Y.
714 Orthoclase in granite..
715 Orthoclase in granite..
716 Orthoclase...........................Moriah, Essex Co., N. Y.
717 Feldspar...................Rossie, St. Lawrence Co., N. Y. 212
Beck Collection.
718 Orthoclase and Albite....................Brown Point.
Simms Collection.
719 Feldspar (Pelunze)...............Nictervy, Rio de Janeiro.
Brazil Collection.
720 Orthoclase...
721 Orthoclase...
722 Feldspar, red...........Ticonderoga, Essex Co., N. Y. 556
Beck Collection.
723 Feldspar.................................Connecticut.
Pickett Collection.
724 Feldspar.......................Little Falls, Herkimer Co. 437
Beck Collection.
725 Oligoclase and Blue Quartz...............Bucks Co., Pa.
From Prof. Leeds.

Number.
726 Oligoclase ....Westchester, Pa.
From Prof. Leeds.
727 Feldspar...
Van Rensselaer Collection.
728 Orthoclase.................. ....
Gebhard Collection.
729 Feldspar ....Essex Co., N. Y.
Pickett Collection.
730 Chondrodite, Magnetite and Calcite,
Schroon, Essex Co., N. Y.
731 Chondrodite and Spinel............Rossie, St. Lawrence Co. 383
Beck Collection.
732 Chondrodite and Spinel..Natural Bridge, Orange Co., N.Y. 395
Beck Collection.
733 Chondrodite.....................Amity, Orange Co., N. Y.
734 Chondrodite, Calcite and Graphite,
Edenville, Orange Co., N. Y.
735 Tourmaline...
736 Tourmaline (brown)...Gouverneur, St. Lawrence Co., N. Y.
737 Tourmaline ....De Kalb, St. Lawrence Co., N. Y.
738 Mesolite (?)............................Bergen Hill, N. J.
739 Tourmaline............. De Kalb, St. Lawrence Co., N. Y.
740 Tourmaline ....
741 Tourmaline................... ....
742 Tourmaline...
Van Rensselaer Collection.
743 Tourmaline.......................... ... .
744 Tourmaline...
745 Tourmaline...
Van Rensselaer Collection.
746 Tourmaline ....Monroe, Conn.
747 Tourmaline...
748 Tourmaline (black) ....
Van Rensselaer Collection.
749 Tourmaline in Quartz .... Chester, Mass.
750 Tourmaline...
Van Rensselaer Collection.
751 Tourmaline 300
Simms Collection.
752 Tourmaline..................Warwick, Orange Co., N. Y. 580
Beck Collection.
753 Tourmaline ....Port Henry, Essex Co., N. Y.
Pickett Collection
754 Tourmaline (brown)............................. ...
Van Rensselaer Collection.
755 Tourmaline (brown).................................
Van Rensselaer Collection.
756 Tourmaline (blue)........................ Massachusetts.
757 Tourmaline (green) ....
758 Tourmaline (Rubellite) in Albite ... .
Van Rensselaer Collection.

Number.
759 Tourmaline (Rubellite) in Albite........Chesterfield, Mass.
Pickett Collection.
760 Andalusite ....
Van Rensselaer Collection.
761 Andalusite ....Lancaster.
762 Andalusite ....Massachusetts.
Pickett Collection.
763 Andalusite .... Lancaster, Mass.?
Gebhard Collection.
764 Fibrolite (Monrolite) ....Monroe, Orange Co., N. Y.
Beck Collection.
765 Cyanite...................................Goshen, Mass.
766 Cyanite...
Gebhard Collection.
767 Cyanite in coarse granite........ ....
768 Cyanite and Quartz..........................New England.
769 Cyanite and Quartz.................... Chesterfield, Mass.
770 Cyanite...
771 Cyanite (Disthene) in quartz.....Missoens, S. Pedro de Sul.
Brazilian Collection.
772 Cyanite...
Van Rensselaer Collection.
773 Topaz ....Trumbull, Conn.
Simms Collection.
774 Topaz ... .
775 Topaz ....Trumbull, Conn.
Simms Collection.
776 Topaz (green) and Fluorspar ....Trumbull, Conn.
Gebhard Collection.
777 Topaz (Brazilian) .... Brazil.
From Hon. A. T. Johnson.
778 Topaz (Brazilian) ....Brazil.
From Hon. A. T. Johnson.
779 Topaz..... ....P. de Minas.
Brazilian Collection.
780 Datolite ....Bergen Hill, N. J.
781 Datolite...........................Bergen Tunnel, N. J.
From Prof. Leeds.
782 Datolite................................Bergen Hill, N. J.
783 Titanite .. ..Lewis, St. Lawrence Co.? N. Y.
784 Titanite (Sphene)...Phillips' iron mine, Putnam Co., N. Y.
785 Titanite (Sphene)...Phillips' iron mine, Putnam Co., N. Y.
786 Titanite (Sphene)..Bush's mine, Cornwall, Orange Co., N. Y.
787 Staurolite in Hornblende Slate..............................
788 Staurolite 329
Gebhard Collection.
789 Staurolite ....Vermont.
790 Staurolite and Garnet.........................New York.
791 Staurolite in mica Slate......................................
792 Staurolite ....
Van Rensselaer Collection.

Number

793, 794 Pectolite.......Bergen Tunnel, N. J.

From Prof. Leeds.

795 Pectolite.......Bergen Hill, N. J. 261

Simms Collection.

796 Pectolite.......Bergen Hill, N. J.

797 Laumonite.......Cold Spring? Putnam Co., N. Y.

798 Laumonite.......

Gebhard Collection.

799 Chrysocolla.......

800 Calamine.......Franklin, N. J.

From Prof. Leeds.

801 Prehnite.......Paterson, N. J.

802 Prehnite.......

Van Rensselaer Collection.

803 Prehnite.......

Van Rensselaer Collection.

804 Prehnite.......

Gebhard Collection.

805 Prehnite.......

Gebhard Collection.

806 Prehnite.......Bellows Falls, Vt.

Pickett Collection.

807 Prehnite.......

Van Rensselaer Collection.

808 Apophyllite.......

809 Apophyllite.......Staten Island, N. Y.

810 Apophyllite.......

811 Apophyllite.......Bergen, N. J.

Pickett Collection.

812 Allophane.......Silesia, Ger.

813 Thomsonite.......Peter's Pt., N. S.

814 Natrolite in phonolite.......Germany.

815 Natrolite in phonolite.......Germany.

816 Natrolite.......Bergen Tunnel, N. J.

From Prof. Leeds.

817 Natrolite.......

Van Rensselaer Collection.

818 Chabazite and Stilbite.......

819 Chabazite.......

Van Rensselaer Collection.

820 Chabazite.......Germany.

821 Chabazite.......Chester, Mass.?

822 Chabazite.......Nova Scotia.

823 Phillipsite (in lava).......Vesuvius, Italy.

824 Thomsonite in lava.......Mt. Somma, Italy.

825 Chabasite and Heulandite.......Nova Scotia.

826 Stilbite.......Kilmalcolm, Scot.

827 Stilbite.......

828 Analcite.......Aussig, Bohemia.

829 Analcite.......

Van Rensselaer Collection.

Number.
830 Analcite in malachite, with native copper..................
831 Analcite ....
Van Rensselaer Collection.
832 Analcite ....
Van Rensselaer Collection.
833 Analcite ....Nova Scotia.
834 Analcite ....
Van Rensselaer Collection.
835 Analcite ....
Van Rensselaer Collection.
836 Sepiolite (Meerschaum) ....
Pickett Collection.
837 Talc ....North Troy, Vt.
838 Talc ....England.
839 Talc ....Smithfield, R. I.
Pickett Collection.
840 Talc ....Connecticut.
841 Talc with Staurolite ....
842 Talc (foliated) ....Bridgewater, Vt. 78
Simms Collection.
843 Steatite ....Newfane, Vt.
844 Talc, Fluorite, etc..............Amity, Orange Co., N. Y. 646
Beck Collection.
845 Talc ....Fitchburg, Mass.
Pickett Collection.
846 Talc ....
Pickett Collection.
847 Talc and Fluorspar ....Amity, Orange Co., N. Y.
848 Talc ....
Van Rensselaer Collection.
849 Talc ....Middlefield, Mass.
850 Talc ....
Gebhard Collection.
851 Steatite ....Jefferson Co., N. Y.
852 Steatite ....Grafton, Vt.
853 Steatite ....
854 Serpentine (precious) ....Newburyport, Mass.
855 Serpentine with Chrysotile ....Newburyport, Mass.
856 Serpentine (precious) ....Massachusetts.
857 Serpentine (precious) ....Piedmont, Italy.
858 Serpentine ....
Gebhard Collection.
859 Serpentine ....Phillipstown, Putnam Co.
Beck Collection.
860 Serpentine ....Amity, Orange Co., N. Y.
861 Serpentine and Calcite ....Port Henry, Essex Co., N. Y.
862 Serpentine ....New Rochelle, Westchester Co., N. Y.
863 Serpentine ....New Rochelle, Westchester Co., N. Y.
864 Serpentine ....Mexico.
865 Serpentine ....Fort Ann, Washington Co., N. Y.
866 Serpentine (brown) ....Middlefield, Mass.
867 Serpentine (Marmolite) ....Hoboken, N. J.

Number.
868 Serpentine (Marmolite)........ Hoboken, N. J.
869 Serpentine (Marmolite)........ Hoboken, N. J.
870 Serpentine (Marmolite)........
871 Marmolite........ Staten Island, N. Y.
872 Serpentine (Marmolite)........ Staten Island, N. Y.
873 Serpentine (Marmolite)........ Hoboken, N. J.
874 Mamolite and Serpentine........
875 Serpentine and Chrysotile.. Phillipstown? Putnam Co., N. Y.
876 Cerolite........ Stony Pt., Rockland Co., N. Y. 18
Beck Collection.
877 Kaolinite........
878 Kaolinite........
879 Kaolinite........
880 Kaolinite........ 95
Brazilian Collection.
881 Kaolinite........
882 Clay (refractory)........ Belim, P. de Posa. 99
Brazilian Collection.
883 Kaolin........ Thesfureiro, P. de Minas. 97
Brazilian Collection.
884 (Argillaceous) schist........
Brazilian Collection.
885 Clay (siliceous)........ 98
Brazilian Collection.
886 Schistose slate........
Brazilian Collection.
887 Vermiculite........ Conshohocken, Pa.
From Prof. Leeds.
888 Iolite........ Haddam, Conn.
Pickett Collection.
889 Iolite........ Haddam, Conn.
890 Microlite........ Chesterfield, Mass.
891 Clintonite........ Amity, Orange Co., N. Y.
Simms Collection.
892 Clintonite........ Amity, Orange Co., N. Y.
893 Pimelite........ Silesia.
894 Pimelite........ Silesia.
895 Jefferisite........ near Westchester, Pa.
From Prof. Leeds.
896 Chlorite, with magnetite........
Gebhard Collection.
897 Clinoclore........ near Westchester, Pa.
From Prof. Leeds.
898 Apatite........
Pickett Collection.
899 Apatite........
Gebhard Collection.
900 Apatite........
901 Apatite........
Pickett Collection.
902 Apatite........

Number.
903 Apatite ....
Van Rensselaer Collection.
904 Apatite .... Crown Point, Essex Co., N. Y.
905 Apatite on galenite ....
From Dr. Crary, Albany.
906 Apatite .... Edenville, Orange Co., N. Y.
907 Apatite (Eupyrchroite) ..... Crown Point, Essex Co., N. Y.
908 Torbernite .... Europe.
909 Pyromorphite .... Germany?
Van Rensselaer Collection.
910 Pyromorphite and mimetite .... Cumberland, Eng.
(Coldbeck Fells.)
911 Pyromorphite ....
Van Rensselaer Collection.
912 Vivianite .... Mendham, N. J.?
Gebhard Collection.
913 Vivianite .... Mendham, N. J.?
914 Wavellite ....
Van Rensselaer Collection.
915 Wavellite ....
Van Rensselaer Collection.
916 Wavellite ....
Van Rensselaer Collection.
917 Wavellite .... Rochester, N. Y.
918 Wavellite .... Steamboat, Pa.
919 Erythrite ....
920 Erythrite ....
921 Erythrite (cobalt bloom), Antonio Pereira, P. de Minas, Brazil. 92
Brazilian Collection.
922 Soda nitre .... Peru.
From Miss E. Fischer.
923 Borax .... Borax lake, California.
924 Warwickite .... Edenville, Orange Co., N. Y.
925 Volborthite ....
926 Alum slate .... Hoosick, N. Y.
927 Barite .... Max Point? Jefferson Co.
928 Barite and Strontianite .... Schoharie, N. Y.
929 Barite ....
Pickett Collection.
930 Barite .... Little Falls, Herkimer Co., N. Y.
931 Barite .... St. Lawrence Co., N. Y.
932 Barite .... Devonshire, Eng.
933 Barite .... Watertown, Jefferson Co., N. Y. 74
Simms Collection.
934 Barite ....
Van Rensselaer Collection.
935 Barite (in Septarium) ..... Middleburg, Schoharie Co., N. Y.
936 Barite .... Cacapava, P. S. Pedro do Sul.
Brazilian Collection.
937 Barite .... Gouverneur, St. Lawrence Co., N. Y.
938 Barite ....
Van Rensselaer Collection.

Number.

939 Barite ....
Pickett Collection.

940 Barite and Fluorite ....
Van Rensselaer Collection.

941 Barite and Calcite ....
Van Rensselaer Collection.

942 Barite ....
Van Rensselaer Collection.

943 Barite .... Cheshire, Conn.
From H. S. Peck.

944 Barite .... N. New York.
Pickett Collection.

945 Barite ....
Gebhard Collection.

946 Barite .... Schoharie, Schoharie Co., N. Y.

947 Barite ....

948 Barite .... Gouverneur, St. Lawrence Co., N. Y.

949 Barite ....
Van Rensselaer Collection.

950 Barite ....
Van Rensselaer Collection.

951 Barite ....

952 Barite .... De Kalb, St. Lawrence Co., N. Y.

953 Barite ....

954 Barite ....

955 Barite ....
Van Rensselaer Collection.

956 Barite .... Carlisle, Schoharie Co., N. Y.
Simms Collection.

957 Barite .... Pillar Point, Jefferson Co., N. Y.

958 Barite ....
Van Rensselaer Collection.

959 Celestite .... Stark, Herkimer Co., N. Y. 1137
Beck Collection.

960 Celestite ....
Beck Collection.

961 Celestite .... Syracuse, Onondaga Co., N. Y.
Beck Collection.

962 Celestite .... Syracuse, Onondaga Co., N. Y.

963 Celestite ....

964 Celestite .... Tyrone, Pa.
From Prof. Leeds.

965 Anglesite, Cerussite and Galenite,
Village l'Orient, Island St. Baits.

966 Crocoite ....
Van Rensselaer Collection.

967 Crocoite ....
Van Rensselaer Collection.

968 Crocoite ....
Van Rensselaer Collection.

969 Crocoite ....
Van Rensselaer Collection.

Number.
970 Crocoite ....
Van Rensselaer Collection.
971 Crocoite ....
Van Rensselaer Collection.
972 Crocoite ....
Van Rensselaer Collection.
973 Crocoite ....
Van Rensselaer Collection.
974 Crocoite ....
Gebhard Collection.
975 Crocoite (chromate of lead).........Goyabira, P. de Minas.
Brazilian Collection.
976 Gypsum..............................Grand Rapids, Mich.
From C. K. Williams, Vermont.
977 Gypsum (fibrous)......................Ega, P. d'Amazona.
Brazilian Collection.
978 Gypsum ....
979 Gypsum ....
980 Gypsum ....
981 Gypsum..............................Grand Rapids, Mich.
From J. Ball, Kent county.
982 Gypsum (fibrous)..
Van Rensselaer Collection.
983 Gypsum (fibrous)..
Van Rensselaer Collection.
984 Gypsum ....
985 Gypsum ....
986 Gypsum. .... Scottsville, Monroe Co., N. Y.
Pickett Collection.
987 Gypsum..............................Grand Rapids, Mich.
Pickett Collection.
988 Gypsum ....
989 Gypsum.....................Lockport, Niagara Co., N. Y.
990 Gypsum..............................Grand Rapids, Mich.
Pickett Collection.
991 Gypsum...
Van Rensselaer Collection.
992 Gypsum......................................Grand Rapids.
993 Gypsum.......................................Paris, France.
994 Gypsum..............................Grand Rapids, Mich.
995 Gypsum.......................................Paris, France.
996 Gypsum......................................Grand Rapids.
997 Gypsum (fibrous)...............D'Alcantara, P. Maranhao.
Brazilian Collection.
998 Gypsum.....................Lockport, Niagara Co., N Y.
Pickett Collection.
999 Gypsum (fibrous) ....
Van Rensselaer Collection.
1000 Gypsum............................Alabaster Bay, Mich.
1001 Alum...
1002 Gypsum ?...

Number.
1003 Gypsum .... Auburn, Cayuga Co., N. Y.
From Fred. Starr, Auburn.
1004 Gypsum.........Do Appody, P. de Rio Grande del Norte. 25
Brazilian Collection.
1005 Gypsum (water worn) ....Onondaga Co., N. Y.
1006 Gypsum........................De Belmonte, P. de Ceara. 19
Brazilian Collection.
1007 Gypsum...........................Grand Rapids, Mich.
From C K. Williams.
1008 Gypsum...
1009 Gypsum ....Ellsworth.
Gebhard Collection.
1010 Gypsum ....Ellsworth.
From Dr. Crary.
1011 Gypsum...
Gebhard Collection.
1012 Gypsum ....
Van Rensselaer Collection.
1013 Gypsum ....Ellsworth.
Gebhard Collection.
1014 Gypsum.................... Scottville, Monroe Co., N. Y.
1015 Calcite ....
1016 Calcite..................Rossie, St. Lawrence Co., N. Y.
1017 Calcite .... Ox Bow, Jefferson Co., N. Y.
1018 Calcite .... Ox Bow, Jefferson Co., N. Y.
1019 Calcite...................... Ox Bow, Jefferson Co., N. Y.
1020 Calcite.... .... Ox Bow, Jefferson Co., N. Y.
1021 Calcite...................... Port Henry, Essex Co., N. Y.
1022 Calcite...................... Port Henry, Essex Co., N. Y.
1023 Calcite and pyrite........ Rossie, St. Lawrence Co., N. Y.
1024 Calcite.... ....Europe.
1025 Calcite ....
1026 Calcite ....Bergen Tunnel, N. J.
From Prof. Leeds.
1027 Calcite, dolomite, etc.,
Spraker's Basin, Montgomery Co., N. Y.
1028 Calcite ....
1029 Calcite (red) .... Cornwall, Orange Co., N. Y. 293
Beck Collection.
1030 Calcite ....
Van Rensselaer Collection.
1031 Calcite .... Port Henry, Essex Co., N. Y.
1032 Calcite, with indurated Bitumen in dolomite,
Flat Creek, Montgomery Co., N. Y.
1033 Calcite..
Van Rensselaer Collection.
1034 Calcite (Dog-tooth Spar)....Lockport, Niagara Co., N. Y.
1035 Calcite..................Rossie, St. Lawrence Co., N. Y. 301
Beck Collection.
1036 Calcite.....................Lockport, Niagara Co., N. Y.
Simms Collection.

Number.

1037 Calcite ....

Gebhard Collection.

1038 Calcite ....Rossie, St. Lawrence Co., N. Y.

1039 Calcite ....

1040 Calcite ....

1041 Calcite ....Ox Bow, Jefferson Co., N. Y.

1042 Calcite..............................Schoharie, N. Y.

1043 Calcite and quartz ....Burlington, Iowa.

Pickett Collection.

1044 Calcite ....Rossie, St. Lawrence Co., N. Y.

1045 Calcite and graphite.........Ticonderoga, Essex Co., N. Y.

1046 Calcite ....

Van Rensselaer Collection.

1047 Calcite ....

1048 Calcite............................Grand Rapids, Mich.

Pickett Collection.

1049 Calcite ....

1050 Calcite ....

1051 Calcite ....

Van Rensselaer Collection.

1052 Calcite (Hudson River Group).................... N. Y.

From J. McArdle, Albany.

1053 Calcite................ Middleville, Herkimer Co., N. Y.

1054 Calcite ....

1055 Calcite ....Rossie, St. Lawrence Co., N. Y.

1056 Calcite ....

Van Rensselaer Collection.

1057 Calcite ....

Van Rensselaer Collection.

1058 Calcite ....

Van Rensselaer Collection.

1059 Calcite and quartz................................

Van Rensselaer Collection.

1060 Calcite...

Simms Collection. ?

1061 Calcite ....Grand Rapids, Mich.

Pickett Collection.

1062 Calcareous tufa ...Boiling Spring, Humboldt Co., Nevada.

From G. W. Pine, Herkimer.

1063 Calcite ....

Gebhard Collection.

1064 Calcite coated with hyd. oxide of iron,
Mineville, Essex Co., N. Y.

1065 Stalagmite............ Ball's Cave, Schoharie Co., N. Y.

1066 Limerock..........................Bethlehem, Palestine.

1067 Calcite ....

Van Rensselaer Collection.

1068 Stalactite ....

1069, 1070 Stalactite ....Todd's Cave, Ky. 239

Simms Collection.

Number.
1071 Stalagmite............Howe's Cave, Schoharie Co., N. Y.
1072 Stalagmite........ .....Ball's Cave, Schoharie Co., N. Y.
1073 Stalagmite............. Ball's Cave, Schoharie Co., N. Y.
1074 Stalactite.............. Ball's Cave, Schoharie Co., N. Y.
1075 Stalagmite and arragonite,
Gebhard's Cave, Schoharie Co., N. Y.
1076 Stalactite........................Todd's Cave, Kentucky. 239
Simms Collection.
1077 Stalagmite (polished) ....Ball's Cave, Schoharie Co., N. Y.
1078 Stalagmite ....
1079 Stalactite............. Howe's Cave, Schoharie Co., N. Y.
1080 Calcite (geode)..
Pickett Collection.
1081 Calcite ....
Van Rensselaer Collection.
1082 Calcite ....
1083 Calcite ....
1084 Calcite and Quartz..
Van Rensselaer Collection.
1085 Calcite and Galenite...... Rossie, St. Lawrence Co., N. Y.
1086 Calcite ....
1087 Calcite ....
1088 Calcite ....
1089 Calcite ....
1090 Calcite ....
1091 Calcite and Quartz..
Van Rensselaer Collection.
1092 Calcite and Quartz............ ....
Van Rensselaer Collection.
1093 Calcite .... Ox Bow, Jefferson Co., N. Y.
1094 Calcite.............................. Jefferson Co., N. Y.
1095 Calcite.......... Parish ore bed, St. Lawrence Co., N. Y.
1096 Calcite .... Rossie, St. Lawrence Co., N. Y.
1097 Calcite (Dogtooth and Pearl Spar) ....Lockport, N. Y.
1098 Calcite (Dogtooth Spar).....Lockport, Niagara Co., N. Y.
1099 Calcite (Dogtooth Spar).....Lockport, Niagara Co., N. Y.
1100 Calcite .... Rossie, St. Lawrence Co., N. Y.
1101 Calcite (Dogtooth and Pearl Spar),
Lockport, Niagara Co., N. Y.
1102 Calcite...... .... Ox Bow, Jefferson Co., N. Y.
1103 Calcite .... Middleburg, Schoharie Co., N. Y.
1104 Calcite........................... Jefferson Co., N. Y.
1105 Fontainbleau Limestone........... ....
Van Rensselaer Collection.
1106 Fontainbleau Limestone.................................
Van Rensselaer Collection.
1107 Fontainbleau Limestone.................................
Van Rensselaer Collection.
1108 Fontainbleau Limestone.................................
Van Rensselaer Collection.
1109 Calcite ....

Number.
1110 Calcite, blue .... Diana, Lewis Co., N. Y.
1111 Calcite .... Diana, Lewis Co., N. Y.
1112 Calcite.............................. St. Augustine, Fla.
1113 Calcite................... ...Monroe, Orange Co., N. Y.
1114 Calcareous Schist.................... Batunte, P. de Ceara.
Brazilian Collection.
1115 Marble (Italian, white) ....Italy.
From Capitol, Washington.
1116 Marble (white)................Plains of Marathon, Greece.
1117 Marble (Lamellar, white)........................ Texas.
Pat. Office, Washington.
1118 Marble (Crystalline, white) .... Post-office, Baltimore, Md.
1119 Marble................... .... Massachusetts.
1120 Marble................De Campos, P. de Rio de Janeiro.
Brazilian Collection.
1121 Marble (Tenn.)....................Hawkins Co., Tenn.
1122 Marble (Calico) ....Montpelier, Vt.
1123 Marble (Breccia)....................... Pyrenees, Spain.
Pickett Collection.
1124 Marble (Coralline)................Bavarian Alps, Europe.
Pickett Collection.
1125 Marble (Statuary)......................Middlebury, Vt.
Pickett Collection.
1126 Marble (Variegated, Italian)......................Italy.
Simms Collection.
1127 Marble (Italian Dove) ....
1128 Marble.................................. ...Italy ?
1129 Marble (Egyptian) ....
Pickett Collection.
1130 Marble ....
Gebhard Collection.
1131 Limestone, (black) polished ....
1132 Marble (white) with Talc.............................
1133 Marble (white) ....N. Lee, Mass.
1134 Marble (Dove) ....Swanton, Vt.
Gebhard Collection.
1135 Marble, black .... Isle La Motte, Vt.
1136 Marble, Lower limestone, perhaps Trenton...............
1137 Marble, black . ...Galway, Ireland.
Gebhard Collection.
1138 Marble, black ....
1139 Marble, gray ....
1140 Marble, black ....
1141 Marble, birdseye ....Kingston.
1142 Marble ....Lisbon, Portugal.
Pickett Collection.
1143 Marble, white ....
1144 Marble, Coralline......... ....Bavarian Alps.
Pickett Collection.
1145 Marble, white .... Stockbridge, Mass.
1146 Marble, striped ....

Number.
1147 Marble, "Italian Bardilla" ....
1148 Marble, encrinal .... West Camp, Ulster Co., N. Y.
From J. H. Gould.
1149 Marble ....
Pickett Collection.
1150 Marble .... Columbia Co., N. Y.
1151 Marble, encrinal .... Ashland, Devonshire, Eng.
Pickett Collection.
1152 Marble, Shell .... Derbyshire, Eng.
Pickett Collection.
1153 Limestone, Black River ....
1154 Marble, Egyptian ....
Gebhard Collection.
1155 Marble, Variegated .... Devonshire, Eng.
Pickett Collection.
1156 Marble, Concretionary .... Derbyshire, Eng.
Pickett Collection.
1157 Limestone, Fibrous .... England.
1158 Marl .... Copenhagen, Lewis Co., N. Y.
1159 Marl .... Apulia, Onondaga Co., N. Y.
1160 Marl .... Claverack, Columbia Co., N. Y.
1161 Marl, Calcareous .... Fort Ann, Washington Co., N. Y.
1162 Marl .... Syracuse, Onondaga Co., N. Y. 1114
Beck Collection.
1163 Limestone, Concreted .... Rochester, N. Y.
Pickett Collection.
1164 Limestone, Hydraulic,
Van Epps Quarry, Amsterdam, Montgomery Co., N. Y. 425
Beck Collection.
1165 Limestone, Hydraulic...... Manlius, Onondaga Co., N. Y.
1166 Limestone, Hydraulic .... De Bacauga, P. de Maranhao.
Brazilian Collection.
1167 Limestone .... S. Jo d'Ypanama, P. de S. Paulo. 24
Brazilian Collection.
1168 Limestone .... Vassabarriz, P. de Sergipe. 23
Brazilian Collection.
1169 Limestone Marble........ Itabira de Campo, P. de Minas. 109
Brazilian Collection.
1170 Limestone, Hydraulic .... De Chepada, P. de Maranhao. 14
Brazilian Collection.
1171 Limestone, Saccharoidal .... Terra des Asperesas. 15
Brazilian Collection.
1172 Limestone .... Maijeus de Rio de Francisco do Norte. 17
Brazilian Collection.
1173 Marble, Egyptian ....
1174 Septarium ....
1175 Limestone .... Camravieiras, P. de Bahia.
Brazilian Colection.
1176 Sea Shells cemented by Silica ("Coquina stone").. Florida.
1177 Marble, variegated.... Pleasant Valley, Dutchess Co., N. Y.
1178 Marble, variegated ....

Number.
1179 Stalagmite.............. Ball's Cave, Schoharie Co., N. Y.
1180 Stalagmite.... .... Ball's Cave, Schoharie Co., N. Y.
1181 Stalagmite .... Ball's Cave, Schoharie Co., N. Y.
1182 Stalagmite .... Ball's Cave, Schoharie Co., N. Y.
1183 Stalactite .... Ball's Cave, Schoharie Co., N. Y.
1184 Calcareous Tufa ....Sharon Springs, Schoharie Co., N. Y. 173
Simms Collection.
1185 Calcareous Tufa.......... Schoharie, Schoharie Co., N. Y. 26
Simms Collection.
1186 Calcareous Tufa ....Van Hornesville, Herkimer Co., N. Y.
1187 Stalactite...... .... Gruta de Inferno, P. de Matte Grosso.
1188 Calcareous Tufa ....Jamesville, Onondaga Co., N. Y.
1189 Calcareous Tufa...........Litchfield, Herkimer Co., N. Y. 110
Simms Collection.
1190 Shells cemented ("Coquina stone").....Jacksonville, Fla.
1191 Lime rock......................... Bethlehem, Palestine. 52
1192 "Coquina stone"..................... St. Augustine, Fla.
1193 Dolomite (Pearl Spar)...... Lockport, Niagara Co., N. Y.
1194 Dolomite (Pearl Spar)...... Lockport, Niagara Co., N. Y.
1195 Dolomite (Pearl Spar)...... Lockport, Niagara Co., N. Y.
1196 Dolomite (Pearl Spar)...... Lockport, Niagara Co., N. Y.
1197 Dolomite (Pearl Spar)...... Lockport, Niagara Co., N. Y.
1198 Dolomite (Pearl Spar)...... Lockport, Niagara Co., N. Y.
1199 Dolomite (Pearl Spar)..... Rossie, St. Lawrence Co., N. Y.
1200 Dolomite (Pearl Spar).......Lockport, Niagara Co., N. Y.
1201 Dolomite (Pearl Spar)...... Lockport, Niagara Co., N. Y.
1202 Dolomite (Pearl Spar)...... Lockport, Niagara Co., N. Y.
1203 Dolomite.........Honeoye Falls, St. Lawrence Co., N. Y.
1204 Dolomite ....
1205 Dolomite..............................Cummington, Mass.
Pickett Collection.
1206 Dolomite........... Parish mine, St. Lawrence Co., N. Y.
1207 Dolomite.......... .... Lee, Mass.
Pickett Collection.
1208 Dolomite ....Lockport, Niagara Co., N. Y.
Pickett Collection.
1209 Dolomite (Pearl Spar) in Talc..............Marlboro, Vt.
1210 Dolomite (Rhomb Spar) in Talc ....Marlboro, Vt.
1211 Magnesite in granite ....
1212 Magnesite in Serpentine..................Hoboken, N. J.
1213 Magnesite.......... .... Chester Co., Penn.
1214 Dolomite (Gurhofite) ....
1215 Siderite (Spathic Iron) ....
Van Rensselaer Collection.
1216 Siderite...
1217 Siderite (Spathic Iron) and Quartz,
Mine Hill, Roxbury, Conn.
1218 Siderite (Spherosiderite).......... Hanau, Steinheim, Ger.
1219 Siderite (Spherosiderite).......... Hanau, Steinheim, Ger.
1220 Siderite (Spathic Iron) .....Antwerp, Jefferson Co., N. Y.
Pickett Collection.

Number.
1221 Siderite (Spathic Iron)......Rochester, Monroe Co., N. Y.
Pickett Collection.
1222 Siderite..
1223 ....
1224 Siderite and Galenite.....................Harz, Saxony.
Gebhard collection.
1225 Siderite (Spathic Iron) and Cacoxenite,
Antwerp, Jefferson Co., N. Y.
Pickett Collection.
1226 Siderite and Galena.................. Albemarle Co., Va.
1227 Siderite..
1228 Siderite and Zinc blende.................Roxbury, Conn.
1229 Siderite (Spathic Iron)...................................
Van Rensselaer Collection.
1230 Siderite..
1231 Siderite..
1232 Siderite (Spathic Iron) and Galena........Roxbury, Conn.
1233 Arragonite ....Ball's Cave, Schoharie Co., N. Y. 148
Simms Collection.
1234 Arragonite..............Schoharie, Schoharie Co., N. Y.
Gebhard Collection.
1235 Arragonite ....
Van Rensselaer Collection.
1236 Arragonite ....
Van Rensselaer Collection.
1237 Arragonite ....
Van Rensselaer Collection.
1238 Arragonite ....
1239 Arragonite..
Van Rensselaer Collection.
1240 Arragonite ....
1241 Arragonite (nodules),
Mammoth Hot Springs, Yellowstone Nat. Park, Montana.
1242 Arragonite........Hot Springs, Venus bath, Yellowstone.
1243 Arragonite........Hot Springs, Venus bath, Yellowstone.
1244 Arragonite..
Van Rensselaer Collection.
1245 Zaratite......................Texas, Lancaster Co., Pa.
1246 Hydrozincite..............................Franklin, N. J.
1247 Malachite ....
Van Rensselaer Collection.
1248 Malachite ....Arizona.
1249 Malachite....................... Melancias, P. de Minas.
Brazilian Collection.
1250 Malachite...
Gebhard Collection.
1251 Malachite............................. Amador Co., Cal.
1252 Malachite...
Gebhard Collection.
1253 Malachite ....Flemington, N. J.
Gebhard Collection.

Number.
1254 Malachite ....Schuyler mines, Belleville, N. J.
1255 Malachite ....Bristol, Conn.
From A. Marks.
1256 Malachite...................................Lake Superior.
1257 Malachite................Rio Jauru, P. de Matto Grosso.
Brazilian Collection.
1258 Malachite...
1259 Malachite...
1260 Malachite.......................Cacapava, S. Pedro do Sul.
Brazilian Collection.
1261 Malachite...
1262 Hydromagnesite........................ Hoboken, N. J.
From Prof. Leeds.
1263 Malachite...
1264 Malachite...
Van Rensselaer Collection.
1265 Malachite.............................Chili, S. America.
Pickett Collection.
1266 Malachite and Caprite ....Minas Salado, Brazil.
1267 Malachite...
Gebhard Collection.
1268 Azurite ....
1269 Azurite and Malachite.................................
1270 Azurite...
Van Rensselaer Collection.
1271 Azurite...
1272 Azurite and Chrysocolla...............................
1273 Malachite and Azurite on chalcopyrite ....
1274 Peat ....Cayuga Co., N. Y. 121
Simms Collection.
1275 Peat .... Cayuga Co., N. Y.
Simms Collection.
1276 Lignite ....Manaos, P. d'Amazona. 8
Brazilian Collection.
1277 Coal......................Do Jaguarao, S. Pedro do Sul.
Brazilian Collection.
1278 Peat............ Snedecor's landing, Rockland Co., N. Y.
1279 Brown-Coal................Curral Alto, S. Pedro de Sul. 5
1280 Lignite......................Camaragibe, P. de Alageas. 9
Brazilian Collection.
1281 Coal..................Rock Spring, Nat. Park, Wyoming.
1282 Lignite..........................Barcellos, P. de Bahia.
Brazilian Collection.
1283 Coal .... Do Jaguarao, S. Pedro do Sul.
Brazilian Collection.
1284 Brown Coal.. 2
Brazilian Collection.
1285 Brown Coal.. 4
Brazilian Collection.
1286 Brown Coal.. 1
Brazilian Collection.

Number.
1287 Brown Coal.. 3
Brazilian Collection.
1288 Peat..
1289 Peat (Pot-hole, Cohoes mastodon)......Cohoes, Albany Co.
1290 Peat (Pot-hole, Cohoes mastodon)......Cohoes, Albany Co.
1291 Peat (Pot-hole, Cohoes mastodon)......Cohoes, Albany Co.
1292 Peat...........................Copenhagen, Lewis Co.
1293 Strontianite............. Schoharie, Schoharie Co., N. Y.
1294 Strontianite ....Schoharie, Schoharie Co., N. Y.
1295 Strontianite .... Schoharie, Schoharie Co., N. Y.
1296 Strontianite .... Schoharie, Schoharie Co., N. Y.
1297 Strontianite .... Schoharie, Schoharie Co., N. Y.
1298 Strontianite............. Schoharie, Schoharie Co., N. Y.
Beck Collection.
1299 Strontianite, in water-lime group,
Schoharie, Schonarie Co., N.. Y
1300 Strontianite, in water-lime group,
Schoharie, Schoharie Co., N. Y.
1301 Strontianite, in water-lime group,
Schoharie, Schoharie Co., N. Y.
1302 Strontianite, in water-lime group,
Schoharie, Schoharie Co., N. Y.
1303 Strontianite, in water-lime group,
Schoharie, Schoharie Co., N. Y.
1304 Strontianite, in water-lime group,
Schoharie, Schoharie Co., N. Y.
1305 Strontianite..
1306 Strontianite............. Schoharie, Schoharie Co., N. Y.
1307 Strontianite and Calcite...Schoharie, Schoharie Co., N. Y.
1308 Strontianite and Calcite...Cobleskill, Schoharie Co., N. Y.
1309 Strontianite.......................Grose isle, Lake Erie.
1310 Strontianite...........................Schoharie, N. Y.
1311 Strontianite, with native sulphur....Girganti, Sicily, Italy.
1312 Cerussite and Copper Pyrites..........................
Van Rensselaer Collection.
1313 Cerussite ....Pennsylvania.
1314 Cerussite, Copper, etc..........Sette Lagoas, P. de Minas.
Brazilian Collection.
1315 Cerussite and Malachite.......................Germany.
1316 ....
1317 Petroleum..............................Oil wells, Penn.
From A. W. Haskins, Buffalo.
1318 Petroleum (purified)....................Oil wells, Penn.
1319 Petroleum.........................Gardner well, Penn.
1320 Petroleum.........................Gardner well, Penn.
1321 Petroleum.........................Gardner well, Penn.
1322 Asphaltum in Limestone.....................Dead Sea.
1323 Bitumen in Calcite.....Flat Creek, Montgomery Co., N. Y.
1324 Bitumen (indurated) in Dolomite,
Fort Ann, Washington Co., N. Y.

Number.
1325 Bitumen (indurated).. Flat Creek, Montgomery Co., N. Y.
1326 Bitumen (indurated)...Flat Creek, Montgomery Co., N. Y.
1327 Bituminous Schist...............Sarocaba, P. de S. Paulo.
Brazilian Collection.
1328 Bituminous Coal..........................Mt. Lebanon.
1329 Elaterite, (mineral Caoutchouc) ....
1330 Elaterite, (mineral Caoutchouc) ....
1331 Bitumen ....California.
From George W. Pine, Herkimer.
1332 Succinite (Amber)..........................New Jersey.
1333 Asphaltum....................................Dead Sea.
1334 Asphaltum (Albertite)..........Albert mine, Nova Scotia.
Pickett Collection.
1335 Asphaltic Limestone.......... Maran (Ilheos), P. de Bahia. 11
Brazilian Collection.
1336 Bituminous Schist............ Tabatinga, P. de Amazona. 7
Brazilian Collection.
1337 Bitumen (indurated) ....
1338 Schist, fetid........ Da'Chapada, P. de Maranhao, Brazil.
1339 Illuminating Clay ....Camauru, P. de Bahia.
Brazilian Collection.
1340 Anthracite ....Lehigh Co., Penn. 287
Simms Collection.
1341 Gypsum......................Mammoth Cave, Kentucky.
From Henry Russel.
1342 Gypsum......................Mammoth Cave, Kentucky.
From Henry Russel.

REPORT OF THE STATE GEOLOGIST.

To the Honorable the Board of Regents of the University of the State of New York:

Under the provisions of chapter 355 of the Laws of 1883, it is provided that the State Geologist shall communicate to the Board of Regents the results of his scientific researches, in lieu of the annual reports previously required by law.

In presenting for the first time a report of the State Geologist to the Regents of the University, I beg leave to state some facts which may not be familiar to every member of the Board.

When the preparation of the Palæontology of the State was committed to my charge as State Geologist, no annual reports were required, as I have elsewhere stated, and this I believe to have been unfortunate, since the long intervals between the publication of the quarto volumes left the public uninformed of the progress of the work, except as incidentally shown in the publications of the State Museum. Finally in 1881, the Legislature incorporated in the general appropriation bill a clause making it "the duty of the State Geologist to communicate to the Legislature, on or before the first day of March of each and every year, a report upon the condition of any work for the State upon which he may be engaged." In accordance with this requirement, three reports have been submitted to the Legislature. Copies of these reports are herewith communicated, and from their contents and the present report, it will be seen what has been already accomplished, and what is the present condition of the work which has been committed to the State Geologist.

The report made to the Legislature in 1882 presents a general statement of the nature of the work, with an enumeration of the volumes published up to that time, and the condition of the work then in progress. In order to give some definite idea regarding the work which at that time occupied the State Geologist, the report was accompanied by a synopsis of the fossil Lamellibranchiate shells, with illustrations, in twelve plates, giving the principal genera known in the upper members of the New York Geological series. As therein stated, eighty plates of this class of fossils had already been lithographed and printed many years before, but no provision existed for publication. Since that time, a law has been passed for the completion of the work, and a volume embracing descriptions and illustrations of less than one-half the known species of that class of fossils, in the rocks mentioned, has been finished. The printing of the remaining portion, Part II, of the Lamellibranchiata has been delayed, in the first place by my own illness, and since October, by the necessity of preparing material to illustrate the mineral resources of the State of New York in the New Orleans Exposition. This portion of the work will however soon be in the hands of the printer.

In the report made to the Legislature in 1883, I have given a resumé of the condition of the work done and in progress. In order to present before the public some tangible proof of the statements therein and previously made, I communicated a special paper on the relations of certain genera of the Bryozoans, together with copies of the plates of Corals and Bryozoans, as far as completed, which go to make up Vol. VI of the Palæontology; and also a set of twenty-seven plates of Brachiopoda, which had been completed many years since, together with explanations of the same. All the plates here mentioned have been reproduced in Photo-Lithography, and serve to illustrate the character and scope of two of the volumes of Palæontology yet to be published.

The report made to the Legislature in 1884 contains little beyond the descriptions of species of Bryozoans which are to be included in Vol. VI of the Palæontology of New York.

With the report of 1883, I communicated an outline map as a basis for a geological map of the State, together with colored maps, of some portions of the country which had been more critically studied, for incorporation in the general map. A contract was made by the State printer with Messrs. Julius Bien & Co., of New York to prepare a base for this geological map. A proof sheet of the western half of the map was finished, and this portion was returned with corrections. No complete copy of this map was furnished till the spring of 1884. A critical examination of the map showed such deficiencies in the representation of the drainage and other important features, that it was impossible to lay down accurately the limits of the geological formations. This deficiency may be remedied when the engraver shall have transferred, from a more correct topographical map, the water-courses which will often mark the boundaries or the limits of succession in the geological formations.

Owing to the accumulation of work, both preparatory and for several years in the hands of the printer, it was found impossible to give the time necessary for the completion of a geological map which would be worthy of publication by the State of New York. To issue a map based upon the work done more than forty-five years ago would have been inexcusable, and with no means for field-work at the disposal of the State Geologist he has been able to do little more than to study and determine some points or small areas of country, either by himself or by the aid of assistants engaged in the collection of fossils. He has also, in former years, and from time to time, employed special assistants at his own personal expense and without any appropriation from the State.

In 1881 the Legislature appropriated the sum of $1,000 for the purposes of work upon certain geological formations in the southern counties of the State, preparatory for the completion of the Geological map. This appropriation was vetoed by the Governor. The field-work, however, had already been commenced, and it was continued for the season at the personal expense of the State Geologist.

During the past year some geological work was done in Otsego and Chenango counties, with a view of comparison with the results of work done in that region between 1868 and 1871. In the autumn of last year (1884), I employed Mr. C. E. Hall to make some investigations for rectifying the limits of the geological formations in Saratoga, Warren and Washington counties, which we know to be incomplete and erroneous in their representation on the map. The investigation, however, was interrupted after a month of field-work, and the results, while contributing much to our knowledge of the limits and trend of certain formations, showed more clearly the necessity of farther exploration, before any creditable geological map of that part of the State can be completed.

I would most earnestly recommend that the completion of this important field-work be undertaken during the coming season, and that the State Geologist be authorized to employ some competent person under his immediate supervision to carry on the work in a systematic manner to its completion.

Some important contributions to our knowledge of the limits of the Chemung and Waverly groups, in the south-western part of the State and adjacent parts of Pennsylvania, have been made by Mr. C. E. Beecher, of the State Museum, as the results of his own observations and those of Mr. F. A. Randall, of Warren, Penn. Our information regarding the position of the Panama conglomerate of the Chemung group in Chautauqua county, and the relation of the upper members of this group with the Waverly group above, has been materially enhanced through the investigations made by Dr. J. W. Hall and Mr. George B. Simpson in their field work and collection of fossils during the past autumn in the same part of the country.

In the mean time (1884) Major Powell, Director of the United States Geological Survey, had proposed to complete and publish a geological map of the three States, New York, New Jersey and Pennsylvania, with a view of illustrating the geological order, subdivisions and nomenclature of the older formations in those States where the earlier geological surveys had already accomplished so much work. To aid in this object I furnished a copy of the map engraved by Julius Bien & Co., together with other maps, containing all the geological information possessed by us, for the use of the United States Geological Survey. This information has been transferred to a map more correct in its topography and on a larger scale; but since the accurate limits of the geological formations in the State of New York are confessedly incomplete, it is consequently impossible to satisfactorily adjust the New York cartography to that of Pennsylvania, and the publication of the combined map has been deferred.

Since the passage of the law extending the Geological and Geographical Surveys of the General Government over all the States and Territories of the Union I have sought to aid in establishing a cordial co-operation between the several State Geologists and the Director of the United States Geological Survey. Although at first opposed to and protesting against such extension of the survey by the General Government, I have become convinced, from my own experience, that few, if any, of the individual States will ever provide the necessary means for carrying on to proper completion the work of a geological survey.

In the State of New York — the most liberal, perhaps, of all the States in its publications — the work has been carried on under great disadvantages, delays, and great loss of time, and always with an element of uncertainty. At no time in the past has the State Geologist felt secure in the necessary legislative support for the completion of the work in which he has been engaged. In the original plan and organization of the Palæontological work, the great importance and final necessity of an accurate geological map of the State had not been sufficiently recognized, a desideratum so absolutely indispensable for the proper appreciation of its Palæontology, for the intelligent estimation of its own mineral and economic resources, and its vital relations to adjacent States. Feeling that the reputation of the State was involved in this matter, as well as his own personal reputation, your State Geologist, has sought to overcome the difficulties in the way by availing himself of the co-operation kindly offered by the Director of the United States Geological Survey, to aid in carrying out the original plan of our own survey, and in completing a proper geological map of the State, for publication by the Legislature of New York.

Some time since Major Powell offered to send a competent man to Albany to color a geological map under my direction. Pursuant to this arrangement Mr. W. J. McGee, one of the geologists in the United States Geological Survey, and a most able geological cartographer, came to Albany to carry out this plan. He also made, with me, several excursions into the field for the purpose of correcting former observations and of obtaining more accurate data for the completion of a geological map. We have been extremely careful to color no part of the map where the geological structure is not known, or where grave doubts exist regarding the received opinions of the geological structure and relations. Under this restriction a very considerable portion of the map will remain uncolored, but we shall have the great satisfaction of seeing what part of the State is known and what are the limits and extent of the unknown or incompletely determined areas; — those where critical work must be done before a complete geological map of the State can be presented.

The advantages of thus leaving uncolored all that is not fully known, or which requires further investigation, as in the instance cited of Saratoga and Warren counties, as also considerable portions of Washington, Rensselaer and Columbia counties, are that this knowledge may be introduced and expressed upon the map as it shall be ascertained by careful observation.

By the arrangements thus made I shall be able to present a colored copy of the geological map of the State, restricted as above, during the early part of February, which will be communicated to the Legislature during that month.

I may state in this place that if the Legislature refuse to order the publication of this map the United States Geological Survey will undertake its publication. I cannnot believe, however, that there remains so little State pride as to permit this; still there will be, in such case, no other alternative.

There are many reasons why I greatly prefer to accept the co-operation of the United States Geological Survey instead of leaving the control of the work in the hands of that organization; and, also, I believe that the Director of the Survey, himself, will fully coincide with me in that opinion.

By co-operation your work will be better accomplished, it will come before the public as under the auspices of the State authorities, and your State Geologist will be able to work with more freedom, and will be relieved of many burdens and anxieties assumed by him and consequent upon his relations with the State, and he will no longer be working as an isolated individual.

Through this co-operation better influences will be brought to our aid within the State. The fact that the United States Geological Survey is interested in our work and co-operating with us will greatly aid in giving us the support which we need. Arguments might be multiplied and extended. It is not only for the immediate occasion that I advise this coöperation, but for all the future, in all the scientific investigations and publications which may be proposed or undertaken by the State.*

Leaving in your hands the decision of the questions presented above, I am, very respectfully,

Your obedient servant,

JAMES HALL,

State Geologist.

Albany, N. Y., *January* 1, 1885.

---

* Since the presentation of this report to the Board of Regents, the following action has been taken by the Legislature and by the Governor in regard to the publication of the Geological map. This map was communicated to the Legislature with the report of the State Geologist and was referred by the Assembly to the Committee on Public Printing. The House and Senate Printing Committees met in joint session and recommended the printing of one thousand copies. A resolution embracing this recommendation was passed by the two Houses, as a joint resolution. The committee also recommended, that the sum of $2,500 be appropriated for the purposes of this resolution. An item in the supply bill providing for the payment of this amount, on the certificate of the Secretary of the Board of Regents, passed the two Houses of the Legislature. The Governor has thought proper to veto this item and therefore there are no means for the publication of the Geological map.

REPORT OF THE STATE ENTOMOLOGIST.

OFFICE OF THE STATE ENTOMOLOGIST,
ALBANY, *January* 6, 1885.

To the Honorable Board of Regents of the University of the State of New York:

GENTLEMEN — I beg leave to present the following report of some of the operations of my department, for the year 1884:

The work of the office has been assiduously carried on during the year. Fortunately for the agricultural interests of the State, no insect attack of unusual extent has been made upon any of the principal crops, nor have we to record the introduction from abroad of any very injurious insect pest.

So varied, however, is the economy of insect life, and so different are the conditions under which it presents itself to our notice, that even without any special and unusual subject of investigation, the past year has brought with it many forms and phases of insect attack of so interesting and important a character as to occupy all the time that could be devoted to their study.

To the larger number of these, my attention was called by requests made to me for the name of the insect, an account of its habits, changes, continuance, etc., and the best means for preventing its injuries.

To all such inquiries I have returned full reply whenever possible to do so, even when it has been necessary, in the case of new forms of attack, to make special study before satisfactory information could be given, and feasible and effectual remedies suggested.

By this means, I have endeavored to show the value of this department to the agriculturist, orchardist, gardener, and to community in general, in the confidence that with its work more widely known and appreciated, calls for its assistance would be more frequently made upon it, and the sphere of its usefulness thereby greatly extended.

It has been very gratifying to me that in several instances I have been able to indicate such measures of relief from insect depredations, that the success attending their use has been so signal as to demonstrate the value of the studies and investigations in economic entomology.

SPECIAL STUDIES.

Of the following insects, special study has been made by me during the past year, in consideration of (with one exception) injuries caused by them within our State:

Wheat joint-worm, *Isosoma tritici* Riley.
Squash-vine borer, *Melittia cucurbitæ* (Harris).
Angoumois moth, *Sitotroga cerealella* (Oliv.)
Great Leopard moth, *Ecpantheria scribonia* (Stoll).
Apple maggot, *Trypeta pomonella* Walsh.

White grub, *Lachnosterna fusca* (Frohl.)
Strawberry crown borer, *Otiorhynchus ligneus* Oliv.
——— ———, *Tribolium ferrugineum* (Fabr.)
Punctured clover-leaf weevil, *Phytonomus punctatus* (Fabr.)
Peach-root aphis, *Myzus sp.?*
Box psylla, *Psylla buxi* (Linn.)

The results of such study will appear in a report which I hope soon to present to your honorable Board.

PUBLICATIONS.

As many of the cases of insect attack submitted to me for information and advice were not confined to a single locality, but were of general importance, I have usually in such instances availed myself in my replies of the columns of agricultural and other journals, through which the desired publicity might be given. The larger number of my communications of this character have been contributed to the *Country Gentleman*, published in this city — a leading agricultural journal of extensive circulation, reaching in its distribution nearly every State of the Union, through one-seventh of the entire number of post-offices in the United States.

As a record of work in this direction, and as a means of reference for those who may desire to consult any of the articles, a list of my publications during the year is herewith given :

A NEW SEXUAL CHARACTER IN THE PUPÆ OF SOME LEPIDOPTERA.

[Psyche, IV, No. 115-116, November-December, 1883, pp. 103-106] — Issued February 11, 1884. An abstract in Proceedings of the American Association for the Advancement of Science, held at Montreal, Canada, August, 1882, XXXI, 1883, pt. II, p. 470-471.]

Remarks upon the interest attaching to the sexual characteristics of insects; mentions a number of such sexual features; they are fewer and less marked in the earlier stages. The particular feature noticed in this paper, is one pertaining to the *Cossinæ* and to the *Ægeridæ*, viz.: in the male, the *tenth segment* of the pupa (not counting the head as one) is furnished with two rows of teeth, while the female uniformly has but one (as have the two following segments in each sex).

CRESSON'S UROCERAS — *Uroceras Cressoni* Norton.

[Country Gentleman for January 3, 1884, XLIX, p. 9, c. 1 — 11 centimetres.]

In reply to an inquiry from Perth Amboy, N. J., the species is named, and its affinities given, and its habits in the larval and perfect stages. It occurs in the Middle States, and interesting varieties have been recorded from Albany, N. Y.

FULLER'S ROSE BEETLE — *Aramigus Fulleri* Horn.

[Country Gentleman for January 17, 1884, XLIX, p. 49, c. 2 — 32 cm.]

The species identified from Stamford, Conn. Its first notice as a pest in conservatories, in 1874, and its subsequent distribution; its life-history, as given by Prof. Riley in the *Rept. Commis. Agricul.* for 1878; remedies for it, and reference to publications upon it.

THE LUNATED LONG-STING — *Thalessa lunator* (Fabr.)

[Country Gentleman for April 17, 1884, XLIX, p. 331, c. 3-4 — 52 cm.]

Captured in Augusta, Ga., while ovipositing, April 1st, identified, a figure given, and method of oviposition stated; the insect upon the larva of which it is parasitic, *Tremex columba*, is also shown. A note from Prof. Riley is added, which gives the statement that the parasite feeds on the Tremex larva while attached to its exterior.

AN INSECT ATTACK ON AN IULUS.

[The Canadian Entomologist for April, 1884, XVI, p. 80 — 7 cm.]

Communicating an observation of a swarm of minute insects surrounding, darting upon, and seriously annoying an Iulus. Could they have been Ichneumons?

INSECT INJURY TO GRAPE-VINES.

[Country Gentleman for May 8, 1884, XLIX, p. 397, c. 1 — 25 cm.]

Some pieces of grape-vines bearing pinhole-like punctures, from Hopkinsville, Ky., are recognized as having been punctured for oviposition, by *Œcanthus latipennis* — one of the flower crickets, closely allied to *Œ. niveus*. The punctures and method of oviposition are described and reference made to figures in Fifth Missouri Report on Insects, page 119. The punctures are not injurious to the vine, but the crickets may possibly cut the stems of the grapes.

SQUASH BORERS.

[Country Gentleman for May 8, 1884, XLIX, p. 397, c. 2 — 6 cm.]

Injuries to squash vines noticed in the *Country Gentleman* of April 24th, and there ascribed by the editor to the striped cucumber beetle, *Diabrotica vittata*, are recognized as caused by the squash-vine borer, *Melittia cucurbitæ*.

THE PUNCTURED CLOVER-LEAF WEEVIL.

[Country Gentleman for May 29. 1884, XLIX, p. 457, c. 2-3 — 56 cm.]

Larvæ submitted from East Avon, Livingston county, N. Y., prove to be the mature forms of *Phytonomus punctatus* (Fabr.). Its present known distribution is given, the transformations, description of its cocoon, and reference to writings upon it. Prompt resort to effective remedies is urged, of which are thorough plowing, and rolling the clover after twilight, at which time the larvæ are feeding.

The same, in the *Ontario County Times*, Extra, of May 29, 1884.

A NEW CLOVER PEST — Its ravages in the southern portion of Canandaigua.

[Ontario Co. Times, Extra, May 29, 1884 — 30 cm.; Ontario Co. Times of June 4, 1884, p. 3, c. 4-5 — 85 cm.]

Examples of the larvæ sent by the editor are identified as *Phytonomus punctatus*. To resist the attack plowing is recommended, rolling not being as useful now after the insect has entered the ground for pupation. Reference is made to the notice of the insect in the *Country Gentleman* of May 29, and its republication recommended to the editor, which is accordingly done.

A CORN CUT-WORM.

[Bulletin No. LXXXVI, of the N.Y. Agricultural Experiment Station, Geneva, May 31, 1884—32 cm.]

In reply to an inquiry from Batavia, N. Y., of a cut-worm cutting off corn at the surface of the ground, the different habits of cut-worms are referred to, and recommendation is made of poisoning them by sprinkling London purple over the plants. Another method which has proved quite effective is to employ boys to dig them from the hills · mention of a crop saved by this means.

THE WHITE GRUB OF THE MAY BEETLE — *Lachnosterna fusca*. Read before the New York State Agricultural Society at the annual meeting January 16, 1884.

[Forty-third Annual Report of the N. Y. State Agricultural Society for the year 1883 [June 5], 1884, pp. 20-87, 5 figures.]

Gives an epitome of what is known of this serious pest, and indicates what is needed to complete its life-history. It is treated of under the following heads: The beetle; the white grub; the egg; injurious character of the insect, injuries from the grub; injuries of the beetle; life-history, distribution; its enemies; preventives and remedies; study of the insect desired.

THE SQUASH-VINE BORER — I. *Melittia cucurbitæ*.

[Country Gentleman for June 5, 1884, XLIX, p. 477, c. 2-4 — 50 cm.]

Gives, in reply to inquiries made from Coxsackie, N. Y., descriptions of the caterpillar and moth of the above-named insect, and remarks upon the family of *Ægeridæ*, to which it belongs.

THE SQUASH-VINE BORER — II.

[Country Gentleman for June 12, 1884, XLIX, p. 497, c. 2-3 — 40 cm.]

The life-history, so far as known, and habits of the insect are given. Its injuries appear to be increasing with the increase of cultivation of the Hubbard squash. Its abundance at times is shown in the fact that 142 larvæ have been cut from a single vine.

THE SQUASH-VINE BORER — III.

[Country Gentleman for June 19, 1884, XLIX, p. 517, c. 1-3 — 74 cm.]

Treats of remedies and preventives, viz.: Autumn plowing and harrowing, gas-lime, kerosene oil, strong-smelling substances as counter-odorants (especially bisulphide of carbon), covering the plants with netting, cutting out the larvæ, rooting the plants at the joints, guano and London purple and saltpetre. Additional observations are asked for upon points mentioned.

THE BACON BEETLE — *Dermestes lardarius* Linn.

[Country Gentleman for June 26, 1884, XLIX, p. 537, c. 2 — 25 cm.]

The beetle and larva are described, their food stated, allied species referred to, and inclosing bacon, etc., in whitewashed paper or cloth bags recommended as the best protective from attack. No method is known of preventing attack upon salted meats if exposed to the insect

THE MAPLE TREE SCALE-INSECT.

[Country Gentleman for July 3, 1884, XLIX, p. 556-7, c. 4-1 — 20 cm.]

Identifying *Lecanium innumerabilis* Rathvon, from Phœnix, N. Y., June 6; describing the scales as at present with the eggs beneath them, and later, when the eggs are extruded, enveloped in waxy fibres. The active larval stage the best time for killing the insects, with whale-oil soap solution or kerosene and milk emulsion.

THE SPRING CANKER-WORM — *Anisopteryx vernata* (Peck).

[Country Gentleman for July 10, 1884, XLIX, p. 577, c. 2-3 — 30 cm.]

In answer to inquiries and examples sent from two localities in Westchester county, N. Y.— identification of the species, remarks upon the importance of arresting its spread in the State, and recommendation of destroying the pupæ in the ground beneath the trees; arresting the ascent of the female moth by tarring the trunks or by tin bands; jarring the larvæ from the limbs into a straw fire beneath, and spraying the tree with Paris green or London purple in water.

THE BUFFALO GNAT.

[Country Gentleman for July 10, 1884, XLIX, p. 577, c. 3-4 — 52 cm.]

The gnat is an undescribed species of *Simulidæ*, few of which family have been studied — even the "black fly" of the Adirondack region bears only a manuscript name. The habits and transformations of the *Simulidæ*, in general, are given, with references to particular species observed. Various notices of the buffalo gnat are quoted.

THE CARPET BUG.

[Amsterdam (N. Y.) Daily Democrat of July 21, 1884, p. 3, c. 3-4 — 68 cm.]

In a letter to the editor in reply to inquiries, are given — What the insect is: habits of the insect, not possible to exterminate it; means of protection: means of destruction; hunting the "bug" urged.

THE ELM TREE BEETLE.

[New York Weekly Tribune for July 23, 1884, p. 10. c. 4 — 13 cm.]

Referring to a recent statement in the *Tribune* that the elm trees in Flushing, L I., were being destroyed by this insect, recommendation is made of the method given by Mr. Glover in the agricultural report for 1870, of placing frames around the base of the trees, so constructed as to prevent the egress of the larvæ that descend the trunks for pupation and their entrance into the ground, by a layer of cement. The northward progress of the insect in New York is stated.

THE CARPET BEETLE — *Anthrenus scrophulariæ* Linn.

[Country Gentleman for August 14, 1884, XLIX, p. 676-7, c. 3-1 — 48 cm.]

Gives in reply to inquiries from Manchester, Vt., its habits, habitat, injuries, materials eaten, and transformations. Among the best preventives and remedies are mentioned carbolic acid, creosote, gas-tar paper, benzine and kerosene, cyanide of potassium, fumigation of closets with sulphur, and frequent searches for the larvæ.

INSECTS MINING BEET LEAVES.

[Country Gentleman for August 14, 1884, p. 677, c. 2 — 13 cm.]

Leaves sent from Erie, Pa. are infested with larvæ of a species of the *Anthomyiidæ*, probably one of the three species mentioned in my *First Report on the Insects of New York*, pp. 203–211. Some of the characteristics of these flies are given, with notice of their mining operations in this country.

PEACH ROOT APHIS.

[Gardener's Monthly and Horticulturist, Phila., September, 1884, XXVI, pp. 271-2 — 29 cm.]

A root aphis which is destroying all the seedling peach trees of Mr. Lorin Blodget, at Philadelphia, is believed to be *Myzus persicæ* Salzer. For destroying it the following are suggested: Hot water, leached ashes and sulphur, bisulphide of carbon and soluble phenyle. As superior to the above, the sulpho-carbonates are recommended, and M. Dumas, of the French Academy, quoted upon their use.

A NEW ROSE PEST — *Homoptera lunata* (Drury).

[Country Gentleman for September 4, 1884, XLIX, p. 737, c. 1-2 — 25 cm.]

Caterpillars feeding at night upon rose buds in a rose-house in Madison, N. J., prove to be *Homoptera lunata*. This food-plant had not been previously recorded. The life-history of the species, as detailed by Prof. French, is given, together with Guenée's description of the caterpillar; also mention of the sexual difference in the moths, and the distribution of the species. Injury from the larvæ in rose-houses best prevented by hand-picking them.

JUMPING SEEDS.

[Country Gentleman for September 11, 1884, XLIX, p. 757, c. 1-2 — 40 cm.]

The seed-vessels described — said to be a species of *Euphorbia*. The contained insect (a lepidopter) causing the motion, was described and named as *Carpocapsa saltitans*, by Prof. Westwood, in 1858, later by M. Lucas as *C. Deshaiziana*. The interesting generic relation of the insect is referred to, its leaps described, their cause explained, and period of emergence of the moth stated. Three other kinds of jumping seeds are known. Reference to further information.

THE WHITE GRUB — *Lachnosterna fusca* (Frohl.).

[Country Gentleman for September 11, 1884, XLIX, p. 757 c. 2-3 — 22 cm.]

In reply to inquiries from West Stockbridge, Mass., of remedies, etc, reference is made to a paper upon the insect giving about all that is known of it, published in the *Forty-third Annual Report of the New York State Agricultural Society*, for 1883. The starvation remedy, as there given and believed to be effectual, is quoted.

AN INSECT ATTACK NEW TO THE STATE — *Isosoma tritici*, on wheat, in Geneva.

[Bulletin 100, New York Agricultural Experiment Station, Geneva, N. Y., Oct. 4, 1884 — 86 cm.]

First noticed in Illinois in 1880; its difference from *Isosoma hordei*; location in the upper internodes of the straw; the larvæ more abundant in the straw examined than elsewhere seen; the wheat greatly shriveled; life-history of the insect, its description; two parasites infest it: remedies found in burning the stubble and straw; preventive in rotation of crops.

A STINGING BUG — *Melanolestes picipes* H.-S.

[Country Gentleman for October 23, 1884. XLIX, p. 877, c. 2-3 — 40 cm.]

An insect reported as inflicting a painful sting upon a lady in Natchez, Miss., is *Melanolestes picipes*, or the "Black Corsair." It is distributed over the United States, and has been previously noticed for the serious wounds it inflicts. Other Hemiptera of the *Reduviidæ* having similar stinging habits, are the *Conorhinus sanguisuga* Leconte, *Melanolestes abdominalis* (H.-S.), *Reduvius personatus* (Linn.), and *Prionotus cristatus* (Linn.). The above are briefly noticed in their habits and painful wounds.

AN ATTACK UPON THE APPLE-WORM — A Friend, not a Foe.

[Country Gentleman for October 30, 1884, XLIX, p. 897, c. 2-4 — 52 cm.]

A larva sent from Crozet, Va., as injurious to apples, from eating large holes into their sides and causing rot, proves to be that of *Chauliognathus marginatus* (Fabr.). It is not injurious, but enters apples through holes already made, to feed upon the apple-worm — the larva of *Carpocapsa pomonella*. The larva and beetle are described, the latter by comparison with *Ch. Pennsylvanicus*. The holes in quinces, thought to have been made by the same larva, are probably those of the quince curculio, *Conotrachelus cratægi*, in leaving the fruit.

CLOVER INSECTS.

[Transactions of the N. Y. State Agricultural Society, XXXIII, 1877-1882, [October], 1884, pp. 206-207.]

In the republication of the paper on "The Insects of the Clover Plant," from the annual report of the society for the year 1880, a list of the names with reference to authorities of twenty-four species is given, as an addition to the forty-six previously recorded, making the number now known, seventy. Mention is made of the list of apple insects (additions in MS) being extended to one hundred and eighty.

THE WHITE GRUB.

[The New England Homestead for November 8, 1884, XVIII, p. 393, c. 1-3 — 80 cm.]

Treats of the insect under the following heads: The grub, the beetle, its distribution, its food-plants, injuries by the beetle, life-history, its enemies, preventives and remedies. Under the latter head, salt is recommended as an experiment, while starvation is pronounced infallible.

REPORT of the State Entomologist to the Regents of the University of the State of New York, for the Year 1883.

[Thirty-seventh Annual Report on the New York State Museum of Natural History, by the Regents of the University of the State of New York, (November), 1884, pp. 45-60.]

Reports upon the collections made during the year and other work of the entomologist. Among insects of special interest collected are some *Trypetidæ*- *Grapta Faunus* and *G. j-album*, *Feniseca Tarquinius*, *Agrilus torpidus*; remarks upon *Agrotis clandestina* and *Simulium molestum*; notice of the operations of *Orgyia leucostigma* in girdling elm twigs and causing them to drop; the English sparrow promoting insect injury; an extended notice of the appearance of the chinch-bug, *Blissus leucopterus*, in northern New York, with recommendations made, and distributed in a circular, for the arrest of its ravages.

THE APPLE-LEAF BUCCULATRIX.

[The Husbandman (Elmira, N. Y.) for December 3, 1884, XI, No. 537, p. 1, c. 5 — 31 cm.]

Apple twigs received from Malcolm, Seneca county, N. Y., are covered with the cocoons of *Bucculatrix pomifoliella*. The cocoon is described and life-history of the species given. The remedies mentioned are spraying, or scouring with a stiff brush the infested branches with a kerosene oil and soap emulsion, of which the formula is given, for killing the insect within the cocoon; Paris green in water for poisoning the caterpillars, and jarring the caterpillars from the trees and burning them in the months of July and September.

COLLECTIONS.

The collections made during the year have not been large. The appropriation by the Legislature for traveling and other expenses of the office commenced only on October 1st; other duties of the office, of greater importance at the present, occupied most of my time. No special excursions for collecting purposes have therefore been made. Quite an amount of material has, however, been obtained in the course of my studies and during a two weeks' vacation among the Catskills, in Palenville and the Kaaterskill Clove. The following is the enumeration in the several orders. Number of specimens mounted:

Hymenoptera	53
Lepidoptera	48
Diptera	49
Coleoptera	326
Hemiptera	157
Orthoptera	11
Neuroptera	8
Biological	111

Of unmounted specimens there are:

Hymenoptera	220
Coleoptera	777
Biological ... about	600
Making a total of specimens	2,360

CONTRIBUTIONS.

The following contributions have been made to the department:

Monohammus confusor Kirby: five examples, collected at Sodus Bay, N. Y. By Mrs. M. A. B. KELLY, Albany, N. Y.

The same, one example. By A. C. NELLIS & Co., Canajoharie, N. Y.

The same. By JOHN CHESTER, Albany, N. Y.

Hydrophilus triangularis (Say). By DUDLEY W. DEWITT, Albany, N. Y.

Coptocycla aurichalcea (Fabr.), taken upon *Calystegia sepium*. By Hon. G. W. CLINTON, Albany, N. Y.

Hibernated elm-tree leaf-beetles, *Galerucella xanthomelæna* Schr., April 28th; eggs of the same, on elm leaves, June 2d; larvæ and pupæ of the same, July 9th. By JAMES ANGUS, West Farms, N. Y.

Phytonomus punctatus (Fabr.), larvæ, about fifty specimens, from clover. By A. B. COCKINGHAM, East Avon, Livingston Co., N. Y.

The same, from a clover field. By CHARLES F. MILLIKEN, Canandaigua, N. Y.

The same in the beetle stage, feeding upon beans, July 2d. By J. F. ROSE, South Byron, Genesee Co., N. Y.

Otiorhynchus ligneus (Oliv.), from a dwelling-house at Lycoming infested with them. By Dr. C. M. COE, Lycoming, Oswego Co., N. Y.

Otiorhynchus ligneus, associated with *Anthrenus scrophulariæ* in a dwelling. By Prof. HENRY M. SEELY, Middlebury College, Middlebury, Vt.

Anthrenus scrophulariæ Linn., from Schoharie, N. Y. By Mrs. E. W. STREET, Albany, N. Y.

Tribolium ferrugineum (Fabr.), hundreds of specimens — infesting coarse flour "middlings" received from Chicago, Ill. By Messrs. DURANT & Co., Albany, N. Y.

Aræmegus Fulleri Horn, from a conservatory. By J. L. SIMMONS, Stamford, Conn.

Calandra oryzæ (Linn.), the rice weevil, infesting "rural branching sorghum seed;" many examples. By Dr. E. L. STURTEVANT, N. Y. State Agricultural Experiment Station, Geneva, N. Y.

Megilla maculata (De Geer), taken from corn upon which it was feeding. By Mr. STURGES, Fairfield, Conn.

Adalia bipunctata (Linn.), taken from a quince tree. By S. A. WALKER, Erie, Pa.

Galerucella xanthomelæna Schr., larva, pupa and imago; *Enchenopa binotata* (Say), the two-spotted tree hopper, fourteen examples. By Mrs. E. W. K. LASELL, Orange, N. J.

Chauliognathus marginatus (Fabr.), in the larval stage, taken from apples. By H. C. S., Crozet, Va.

Larva, pupa and imago of *Otiorhynchus ligneus*; larvæ of Anthomyiæ taken from the stomach of a robin. By CLARENCE M. WEED, Lansing, Mich.

Bruchus obsoletus (Say), from garden beans. By ISAAC COLES, Glen Cove, L. I.

Macrodactylus subspinosus (Fabr.), the rose beetle, with valuable notes upon its habits, and origin in sandy soil. By Mrs. L. G. CHRISMAN, Warren Farm, Chrisman, Rockingham Co., Va.

Pomphopœa ænea (Say), taken from wheat, butternut leaves and locust blossoms. By A. CASLER, Frankfort, Herkimer Co., N. Y.

Crioceris asparagi (Linn.), the asparagus beetle; many examples, in the egg, larval and perfect stages, collected at Geneva. By E. S. GOFF, Horticulturist N. Y. State Agricul. Experiment Station, Geneva, N. Y.

Lyctus opaculus Leconte, burrowing in grape stalks. By HOMER F. BASSETT, Waterbury, Conn.

Brachytarsus variegatus Say, taken from a bin of newly threshed wheat. By C. A. GILLETT, Shortsville, Ontario Co., N. Y.

Pityophthorus puberulus Leconte, obtained from pine twigs, into which the larvæ had burrowed; fifty or more examples. By CHARLES H. PECK, N. Y. State Museum of Natural History, Albany, N. Y.

Larva of *Nematus Erichsonii* Hartig, the Larch saw-fly, from tamarack. By Rev. THOMAS W. FYLES, South Quebec, Canada.

Wheat straw infested with *Isosoma tritici* Riley: from which was obtained December 23d and subsequently, the parasitic *Eupelmus Allynii* (French). By ROBERT J. SWAN, Rose Hill Farm, Geneva, N. Y.

Raspberry stalks containing cells of *Ceratina ampla* Say. By WM. H. EDWARDS, Coalburgh, W. Va.

A cluster of ichneumon cocoons on an apple twig, which disclosed *Apanteles congregatus* (Say). By T. J. HILL, Brooklyn, N. Y.

Larvæ of *Pieris rapæ* (Linn.), bearing the cocoons of one of its parasites, *Microgaster pieridis* Packard. By E. C. HILLS, East Hartford, Conn.

Larva of *Papilio Turnus* Linn., taken from a lemon tree, July 28th. By JAMES W. STEELE, Elizabethtown, N. Y.

Vanessa Antiopa (Linn.), larvæ of *Thyreus Abbotii* (Swains.), *Darapsa Myron* (Cramer), *Sphinx sp.?* and *Alypia octomaculata* (Fabr.), from grape-vines July 5th. By Dr. R. H. SABIN, West Troy, N. Y.

Eggs and young larvæ of *Darapsa versicolor* (Harris), occurring upon *Azalea* sp., July 21. Larvæ of *Tolype velleda* (Stoll), May 26th (failed to mature). By H. ROY GILBERT, Rochester, N. Y.

Larvæ of *Thyreus Abbotii* (Swains.), ten examples, from grape-vines; *Spectrum femoratum* Say, in act of moulting, June 16th; three cocoons of *Callosamia Promethea*, perforated by birds for feeding on the pupa. By S. C. BRADT, Albany, N. Y.

Larva of *Citheronia regalis* (Fabr.), taken from English walnut (*Juglans nigra*), August 22d. By WM. B. SPRAGUE, JR., Flushing, L. I.

Eggs of *Ecpantheria scribonia* (Stoll), from Florida, October 17th, from which the moths were obtained January 15th, *et seq.* By Mrs. JULIA P. BALLARD, Easton, Pa.

Larva of *Agrotis fennica* (Tausch.), quite injurious in meadows in northern Michigan. By Prof. A. J. COOK, Agricultural College, Lansing, Mich.

Larvæ of *Mamestra picta* (Harris), taken from peas and cabbage. By E. S. GOFF, Geneva, N. Y.

Larvæ of *Penthina nimbatana* (Clemens), from rose bushes. By D. J. GARTH, Scarsdale, Westchester Co., N. Y.

Cocoons of *Bucculatrix pomifoliella* (Clemens), upon apple twigs. By J. S. ROYS, Lyons, Wayne Co., N. Y.

Examples of the same. By MALCOM LITTLE, Malcom, Seneca Co., N. Y.

Sitotroga cerealella (Oliv.), the Angoumois moth, in ears of dried corn, October 27th. By E. H. LADD, State Agricultural Experiment Station, Geneva, N. Y.

Pœcilocapsus lineatus (Fabr.), with gooseberry twigs injured by it. By E. S. GOFF, Geneva, N. Y.

The same, taken from garden sage. By J. G. FARGO, Batavia, N.Y.

The same taken on parsnips and currants. By J. F. ROSE, South Byron, N. Y.

Lygus lineolaris Beauv., feeding upon and deforming young pears. By Messrs. ELLWANGER and BARRY, Mount Hope Nurseries, Rochester, N. Y.

Podisus cynicus (Say), preying upon the currant-worm, *Nematus ventricosus* Klug. By SAMUEL G. LOVE, Jamestown, N. Y.

Mytilaspis pomicorticis Riley, on Kilmarnack willow, which it had nearly destroyed. By W. F. OSBORNE, Ansonia, Conn.

Pulvinaria innumerabilis (Rathvon), occurring upon grape vines. By Dr. N. C. SCUDDER, Rome, N. Y.

Belostoma Americana Leidy. By D. G. BULKLEY, Albany, N. Y.

Diogmites discolor Loew, taken on a squash-vine and wrongly supposed by the sender to be injurious to it. By T. E. HAYWARD, Pittsford, N. Y.

Grape vine punctured for oviposition by a flower cricket, *Œcanthus latipennis* Riley. By D. J. HOOVER, Hopkinsville, Ky.

Larval Ant Lions, of species indeterminable, with observations upon their habits. By GEO. W. DUVALL, Annapolis, Md.

Corydalis cornutus Linn. By FRANK RICHARDSON, Rutland, Vt.

SEQUEL OF INSECT ATTACKS OF LAST YEAR.

In my preceding report a brief notice was given of a peculiar attack of the white-marked tussock-moth, *Orgyia leucostigma* (Sm.-Abb.), in girdling the young tips of the twigs of elms in Albany and the vicinity, and causing them to fall to the ground. This form of attack had never been recorded of the insect before, but it was thought possible that it might be continued to some extent in following years.

Nothing of the kind, however, was observed during the past year when the insect again appeared, although diligent watch was kept for its recurrence. Only a comparatively small number of the larvæ made their appearance in Albany, at their accustomed time — not enough to injure, in the slightest appreciable degree, the foliage of any of the shade trees. For several years previous the city had not been so free from its injurious presence. This may have been the result of the severe frosts that occurred as the larvæ were about emerging from the eggs, together with an unusual number of its parasitic enemies the preceding summer, when very few of the larvæ matured, and the cocoons bearing their deposit of eggs (showing completed transformations) were quite exceptional.

As a contribution to the life-history of the species, it may be noted, that on July 5, 1884, larvæ were seen spinning their cocoons upon the trunks of maples in Washington Park, Albany, together with newly-made cocoons, some containing unchanged larvæ and others the pupæ. On the 16th July, females had emerged and deposited eggs, while a larva was seen still feeding. On the 21st, a number of cocoons were collected in which the larvæ were found to have been destroyed by a parasitic Tachina.

At Philadelphia, Pa., on September 8, a second brood of the insect was observed, in female moths and egg-deposits, and larvæ constructing their cocoons.

In the notice of the chinch-bug, *Blissus leucopterus,* in my report for 1883, it is stated: "The re-appearance of the insect the coming season will be watched with much interest, as a test of the efficacy of the partial efforts put forth for its destruction."

The insect has not re-appeared, in northern New York, to the extent of committing serious injury. In localities where it had abounded the preceding year, and the land had not been plowed, its presence, in hibernated individuals, was observed soon after the snow had gone. No further damage from it was reported to me, nor could I learn of any through careful inquiry, except in one instance where no attention had been paid to the recommendation of thorough autumn plowing. Here a piece of wheat of several acres in extent was attacked by it and considerably injured.

Apparently, the increase of this dreaded pest in northern New York, at the present time, has been effectually checked.

For the details of my studies and investigations during the year, I beg leave to refer to my regular report, much of which is in MS., which will be hereafter presented to your honorable Board.

Respectfully submitted,

J. A. LINTNER.

REPORT OF THE BOTANIST.

To the Honorable the Board of Regents of the University of the State of New York :

Gentlemen — I have the honor to communicate to you the following statement of the work of the Botanist during the past year :

The investigation of our State flora and the collection and preparation of specimens to properly represent it in the State Herbarium, a work which had been partly interrupted for two years, has been fully renewed and actively prosecuted during the collecting season. Specimens were collected in the counties of Essex, Warren, Fulton, Lewis, Saratoga, Albany and Rensselaer. Of the collected specimens, those representing one hundred and ninety-two species have been prepared, mounted and added to the Herbarium. One hundred and sixteen of these, of which a considerable number are species of fungi not before published, were not previously represented therein. The remainder are species now more completely and satisfactorily illustrated in their different forms and varieties or by more perfect specimens.

Specimens of about one hundred and forty species of plants, mostly fungi, have been contributed by various botanists and correspondents. Of these there are two species of this State new to the Herbarium and not among my collections of the past season. These added to the number already given make a total of one hundred and eighteen added species. A list of their names is marked A. Also a list of contributors and their respective contributions is given and marked B.

Notices of plants not before reported, together with a record of the localities where they were found, also descriptions of such as are deemed new species are in a part of the report marked C. These descriptions, in nearly all cases, have been drawn up with the fresh plant before me. The microscope has been taken with me on my collecting trips, and the microscopical details studied at the time of collecting, in order to insure greater accuracy.

A record of observations on species not new to our flora has been made and is marked D. It contains remarks upon any matters of interest in connection with the variation, distribution, locality or habitat of the species.

A descriptive manual of our Hymenomycetous or fleshy fungi, among which are the mushrooms and mushroom-like Agarics, is greatly needed. The number of those desirous of becoming acquainted with our native species of these plants is constantly increasing, but a proper and convenient manual for their study and identification is wanting. Accidents from the use of poisonous kinds for food, by those, who, ignorant of the true characters of the species, have mistaken them for the edible mushroom occur from time to time. These accidents might readily be avoided by a better and more common acquaintance with the characteristic features of our edible species and their less valuable associates. As a step in this direction monographs of the different genera represented in our flora were commenced in the thirty-third report and continued in subsequent ones. For the present report a monograph has been prepared of our species of Lactarius, or milky-juice fungi, and also one of the genus (subgenus of Fries) Pluteus.

The genus Lactarius is a large one, at present represented in our State by forty species. Some of these rank as edible, others as poisonous. While the genus as such is easily recognized and accurately separated from all other genera, some of the species that compose it approach each other so closely and vary so considerably that without clear and explicit descriptions they are liable to be confused and their discrimination unsatisfactory. In this monograph it has been the design to make the specific descriptions so complete and at the same time to give such prominence to the distinguishing characters, that no difficulty need be experienced in the identification of our species. The spore characters are also given, a part of the description that is sometimes of great importance, and yet one that has generally been omitted by authors. A synoptical table has been prepared, by means of which, with good fresh specimens, it is believed, the name of any species described in the monograph may be easily and quickly ascertained. These monographs constitute a part of the report marked E. The revision of our specimens of Sphæriaceous fungi, which was commenced last year, has been continued and completed. This revision, as was explained in my preceding report, was necessary in order to bring the arrangement and nomenclature of our species into harmony with the recent Saccardoan system, which, from present indications, is destined to supersede the old Friesian system.

It is desirable, not only that our Agarics and other fleshy Hymenomycetous fungi, which so generally shrivel and change color in drying, should be illustrated by sketches of the fresh plant colored according to nature, but also that magnified drawings of the microscopic characters of the smaller and minute fungi should be made and accompany the specimens in the Herbarium. A considerable number of such sketches were made the past season, at the time the specimens were collected. From these I have prepared three plates of figures designed to illustrate, as far as possible, the characters of the new species described in the following pages

Thanks are hereby rendered to those botanists who have kindly aided me in the prosecution of my labors, both by the contribution of specimens and of information.

Most respectfully submitted,
CHAS. H. PECK.

ALBANY, *December* 31, 1884.

A.

PLANTS ADDED TO THE HERBARIUM.

New to the Herbarium.

Ipomæa purpurea, *L.*
Populus dilatata, *L.*
Listera convallarioides, *Hook.*
Molinia cærulea, *Mœnch.*
Festuca rubra, *L.*
Agaricus clypeolarius, *Bull.*
A. terræolens, *Pk.*
A. vexans, *Pk.*
A. purpureofuscus, *Pk.*
A. immaculatus, *Pk.*
A. discopus, *Lev.*
A. hiemalis, *Osbeck.*
A scyphoides, *Fr.*
A. jubatus, *Fr.*
A. unitinctus, *Pk.*
A. atrides, *Lasch.*
A. comosus v. albus, *Pk.*
A. villosus, *Fr.*
A. umboninotus, *Pk.*
A. maritimoides, *Pk.*
A. comatellus, *Pk.*
A. subexilis, *Pk.*
A. sordidulus, *Pk.*
A. parvifructus, *Pk.*
A. cærulipes, *Pk.*
A. madeodiscus, *Pk.*
Coprinus lagopus, *Fr.*
Cortinarius aureifolius, *Pk.*
C. multiformis, *Fr.*
C. decoloratus, *Fr.*
Hygrophorus purpurascens, *Fr.*
Lactarius varius, *Pk.*
L. hysginus, *Fr.*
L. paludinellus, *Pk.*
Russula basifurcata, *Pk.*
Lentinus suavissimus, *Fr.*
Boletus sulphureus, *Fr.*
B. versipellis, *Fr.*
Polyporus abortivus, *Pk.*
P. epileucus, *Fr.*
P. crispellus, *Pk.*
P. lætificus, *Pk.*
P. fimbriatellus, *Pk.*
P. ornatus, *Pk.*
P. odorus, *Pk.*
P. subacidus, *Pk.*
P. griseoalbus, *Pk.*
Merulius fugax, *Fr.*
M. aurantiacus, *Pk.*
Geaster striatus, *DC.*
Coniothyrium valsoideum, *Pk.*
Phoma Phytolaccæ, *B. & C.*
P. elevatum, *Pk.*
P. Pruni, *Pk.*
P. albifructum, *Pk.*
Sphæropsis alnicola, *Cke.*
Sphæropsis ribicola, *C. & E.*
Diplodia pinea, *Kx.*
Sphærographium hystricinum, *Sacc.*
S. lantanoidis, *Pk.*
Appendicularia entomophila, *Pk.*
Gelatinosporium fulvum, *Pk.*
Phyllosticta Podophylli, *West.*
P. Labruscæ, *Thum.*
P. Epigææ, *Pk.*
P. lantanoidis, *Pk.*
Ascochyta Cassandræ, *Pk.*
A. colorata, *Pk.*
Marsonia Quercus, *Pk.*
Pestalozzia monochætoidea, *S. & E.*
Stagonospora Smilacis, *Sacc.*
Glœosporium Salicis, *Wint.*
G. Ribis, *Cast.*
Septoria alnicola, *Cke.*
S. Ribis, *Desm*
S. Lysimachiæ, *West.*
S. Dentariæ, *Pk.*
S. Dalibardæ. *Pk.*
S. Diervillæ, *Pk.*
S. fumosa, *Pk.*
S. punicei, *Pk*
S. Trillii, *Pk.*
Rhabdospora subgrisea, *Pk.*
Hadrotrichum lineare, *Pk.*
Ramularia multiplex, *Pk.*
R. Prini, *Pk.*
R. Diervillæ, *Pk.*
R. Oxalidis, *Farl.*
Cylindrosporium veratrinum, *S. & W.*
Ovularia moniloides, *E. & M.*
Peronospora Arthuri, *Farl.*
P. Halstedii, *Farl.*
P. Potentillæ, *DeBy.*
Entyloma Saniculæ, *Pk.*
Cercospora Violæ, *Sacc.*
C. Majanthemi, *Fckl.*
C. Cephalanthi, *E. & K.*
C. Comari, *Pk.*
Cenangium balsameum, *Pk.*
Sphærotheca pannosa, *Lev.*
Asterina nuda, *Pk.*
Capnodium Citri, *B. & D.*
Valsa Friesii, *Fckl.*
V. cornina, *Pk.*
V. leucostomoides, *Pk.*
V. opulifoliæ, *Pk.*
Diatrypella Frostii, *Pk.*
Sphærella conigena, *Pk.*
Didymosphæria Typhæ, *Pk.*
Venturia Cassandræ, *Pk.*
Diaporthe Wibbei, *Nits.*
D. cylindrospora, *Pk.*

Leptosphæria eutypoides, *Pk.*
L. Corallorhizæ, *Pk.*
L. lycopodiicola, *Pk.*
Metasphæria Myricæ, *Pk.*
Mazzantia sepium, *S. & P.*
Sphærulina sambucina, *Pk.*
Cryptospora Caryæ, *Pk.*

Not New to the Herbarium.

Ranunculus repens, *L.*
Nuphar advena, *Ait.*
Caulophyllum thalictroides, *Mx.*
Podophyllum peltatum, *L.*
Capsella Bursa-pastoris, *Mœnch.*
Viola pubescens, *Ait.*
V. rostrata, *Pursh.*
V. can. v. sylvestris, *Regel.*
Hypericum ellipticum, *Hook.*
Acer dasycarpum, *Ehrh.*
Geranium maculatum, *L.*
Rhus typhina, *L.*
Rubus hispidus, *L.*
Rosa setigera, *Mx.*
Fragaria Virginiana, *Ehrh.*
Prunus serotina, *Ehrh.*
Aralia hispida, *Mx.*
A. nudicaulis, *L.*
Sambucus pubens. *Mx.*
Cornus sericea, *L.*
C. stolonifera, *Mx.*
Fedia umbilicata, *Mx.*
Tussilago Farfara, *L.*
Senecio aureus, *L.*
Tanacetum vulgare, *L.*
Vaccinium Pennsylvanicum, *Lam.*
Chiogenes hispidula, *T. & G.*
Amarantus blitoides. *Wats.*
Quercus palustris, *Du Roi.*
Alnus incana, *Willd.*
A. serrulata, *Ait.*
Salix fragilis, *L.*
Symplocarpus fœtidus, *Salisb.*
Corallorhiza multiflora, *Nutt.*
Uvularia perfoliata. *L.*
U. grandiflora, *Sm.*
Trillium grandiflorum, *Salisb.*
Juncus marginatus, *Rostk.*
Carex stipata, *Muhl.*
Carex grisea, *Wahl.*
C. laxiflora, *Lam.*
C. umbellata, *Schk.*
Holcus lanatus, *L.*
Agrostis vulgaris, *With.*
Glyceria fluitans, *R. Br.*
G. elongata, *Trin.*
Danthonia spicata, *Beauv.*
D. compressa, *Aust.*
Panicum dichotomum, *L.*
Bromus ciliatus, *L.*
Aira cæspitosa, *L.*
Millium effusum, *L.*
Lycopodium complanatum, *L.*
Agaricus muscarius, *L.*
A. naucinoides, *Pk.*
A. transmutans, *Pk.*
A. radicatus, *Relh.*
A. maculatus, *A. & S.*
A. stipitarius, *Fr.*
A. clavicularis, *Fr.*
A. atrocæruleus, *Fr.*
A. strictior, *Pk.*
A. rhodopolius, *Fr.*
A. præcox. *Pers.*
A. subochraceus, *Pk.*
A. Hypnorum, *Batsch.*
A. Rodmani, *Pk.*
A. arvensis, *Schæff.*
Coprinus atramentarius, *Bull.*
Cortinarius porphyropus, *A. & S.*
Marasmius anomalus, *Pk.*
M. androsaceus, *L.*
Panus lævis, *B. & C.*
Schizophyllum commune, *Fr.*
Boletus Clintonianus, *Pk.*
Polyporus lucidus, *Leys.*
P. undosus, *Pk.*

B.

CONTRIBUTORS AND THEIR CONTRIBUTIONS.

Mrs. S. M. Rust, Syracuse, N. Y.

Trillium grandiflorum. *Salisb.*

Mrs. L. L. Goodrich, Syracuse, N. Y.

Trillium grandiflorum. *Salisb.*

Prof. N. L. Britton, New York, N. Y.

Juncus trifidus, *L.*

Prof. O. C. Willis, White Plains, N. Y.

Ledum latifolium, *Ait.*
Andromeda polifolia, *L.*

Prof. W. G. Farlow, Cambridge, Mass.

Phoma Amelanchieris, *Farl.*
Coleosporium Senecionis, *Wint.*
Cylindrosporium Gei, *Farl.*
Entyloma Lobeliæ, *Farl.*
Ramularia Oxalidis, *Farl.*
Peronospora Halstedii, *Farl.*
Stictis Tsugæ, *Farl.*
Phyllachora Wittrockii, *Sacc.*

Rev. J. L. Zabriskie, Nyack, N. Y.

Rhus typhina, *L.*
Quercus palustris, *Du Roi.*
Juncus marginatus, *Rostk.*
Appendicularia entomophila, *Pk.*

Harold Wingate, Philadelphia, Pa.

Chondrioderma Michelii, *Lib.* v sessile, *Rostf.*

Geo. A. Rex, M. D., Philadelphia, Pa.

Trichia chrysosperma, *Bull.*
Comatricha longa, *Pk.*
Physarella mirabilis, *Pk.*

E. A. Burt, Albany, N. Y.

Hydrangea arborescens, *L.*
Carex stram v. festucacea, *Gr.*
Carex Houghtonii, *Torr.*

H. C. Gordinier, Troy, N. Y.

Aster ptarmicoides, *T. & G.*
Fedia radiata, *Mx.*
Trillium grandiflorum, *Salisb.*
Liparis Lœselii, *Rich.*

Romeyn B. Hough, Lowville, N. Y.

Listera convallarioides, *Hook.*
Liparis Lœselii, *Rich.*
Habenaria obtusata, *Rich.*
H. rotundifolia, *Rich.*

D. Byron Waite, Springwater, N. Y.

Castilleia coccinea, *Spreng.*

J. D. Greenslete, Broadalbin, N. Y.

Polygonatum biflorum, *Ell.*
Orontium aquaticum, *L.*

H. Andrews, Albany, N. Y.

Potamogeton Robbinsii, *Oakes.*

John D. Parsons, Albany, N. Y.

Lycoperdon giganteum, *Batsch.*

D. A. A. Nichols, Dunkirk, N. Y.

Uncinula spiralis, *B & C.*

T. F. Allen, M. D., New York, N. Y.

Nitella tenuissima, *Kutz.*
N. glomerulifera, *A. Br.*
N. opaca, *Ag.*
N. minuta, *Allen.*
Tolypella comosa, *Allen.*
Tolypella fimbriata, *Allen.*
T. intertexta, *Allen.*
Chara sejuncta, *A. Br.*
C. hydropitys, *A. Br.*
C. gymnopus, *A. Br.*

Prof. L. Lesquereux, Columbus, O.

*Polyporus lucidus, *Leys.?*
*Polyporus applanatus, *Fr.?*

* These are monstrous growths from abandoned coal mines, and therefore their specific identification is uncertain.

F. S. Earle, Cobden, Ill.

Septoria Bromi, *Sacc.*
S. Pentstemonis, *E. & E.*
S. asciculosa, *E. & E.*
S. podophyllina, *Pk.*
Glœosporium Potentillæ, *Ouds.*
Phyllosticta Fraxini, *E. & W.*
P. pyrorum, *Cke.*
Sporidesmium Fumago, *Cke.*
Æcidium Epilobii, *DC.*
Cercospora sordida, *Sacc.*
C. Persicæ, *Sacc.*
C. fuscovirens, *Sacc.*
Entyloma Lobeliæ, *Farl.*
E. Physalidis, *Wint.*
Peronospora Arthuri, *Farl.*
Microsphæra Platani, *Howe.*
Phyllactinia suffulta, *Sacc.*
Dimerosporium pulchrum, *Sacc.*

Hon. G. W. Clinton, Albany, N. Y.

Lentinus lepideus, *Fr.*
Rhabdospora subgrisea, *Pk.*
Polyporus squamosus, *Fr.*
P. applanatus, *Fr.*

J. B. Ellis, Newfield, N. J.

Polyporus oblectans, *Berk.*
Irpex coriaceus, *B. & R.*
Phlebia zonata, *B. & C.*
Thelephora cæspitulans, *Schw.*
Stereum subpileatum, *B. & C.*
Hymenochæte scabriseta, *Cke.*
Peniophora flavido-alba, *Cke.*
Physarella mirabilis, *Pk.*
Septoria Helianthi, *E. & K.*
S. Speculariæ, *B. & C.*
Pestalozzia Myricæ, *E. & M.*
Pestalozziella subsessilis, *S. & E.*
Stilbospora fenestrata, *E. & E.*
Puccinia nigrescens, *Pk.*
P. splendens, *Vize.*
P. mirabilissima, *Pk.*
P. asperior, *E. & E.*
P. Angelicæ, *E. & E.*
Triphragmium echinatum, *Lev.*
Ustilago Vilfæ, *Wint.*
U. lineata, *Cke.*
Sorosporium Ellisii, *Wint.*
Peridermium orientale, *Cke.*
Æcidium porosum, *Pk.*
Æ. Xanthoxyli, *Pk.*
Æcidium Æsculi, *E. & E.*
Æ. Collinsiæ, *E. & E.*
Æ. Ceanothi, *E. & E.*
Ramularia Celastri, *E. & M.*
Peronospora Sicyicola, *Trel.*
P. Halstedii, *Farl.*
Cenangium asterinosporum, *E. & E*
Pecillum Americanum, *Cke.*
Pilacre Petersii, *B. & Br.*
Saccardia Martini, *E. & S.*
Valsa sordida, *Nits.*
V. cercophora, *Ell.*
Cucurbitaria Coremæ, *E. & E.*
Diatrypella deusta, *E. & M*
Didymosphæria cupula, *Ell.*
Trabutia quercina, *S. & R.*
Hypoxylon pruinatum, *Kl.*
Diaporthe Conradii, *Ell.*
D. densissima, *Ell.*
Venturia pezizoides, *S. & E.*
Massaria sudans, *B. & C.*
Leptosphæria Xerophyli, *Ell.*
Linospora ferruginea, *E. & M.*
Microthyrium Juniperi, *Desm.*

H. W. Harkness, M. D., San Francisco, Cal.

Hymenula aciculosa, *E. & H.*
Octaviania rosea, *Hark.*
Gautiera monticola, *Hark.*
Splanchnomyces Behrii, *Hark.*
Septoria Hosackiæ, *Hark.*
S. Lupini, *Hark.*
Marsonia Neilliæ, *Hark*
Glœosporium Pteridis, *Hark.*
Septoglœum Fraxini, *Hark.*
S. maculans, *Hark.*
S. Nuttallii, *Hark.*
Harknessia longipes, *Hark.*
Pestalozzia corynoidea, *Hark.*
P. anomala, *Hark.*
Pestalozzia Moorei, *Hark.*
Puccinia anachoreta, *Hark.*
P. evadens, *Hark.*
P. variolans, *Hark.*
P. melanconioides, *E. & H.*
P. digitata, *E. & H*
Uromyces Nevadensis, *Hark.*
U. Spragueæ, *Hark.*
U. Eriogoni, *E. & H.*
Morthiera Mespili, *Fckl.*
Melanconium magnum, *Berk.*
Rhytisma Andromedæ, *Fr.*
Lophodermium petiolicolum, *Fckl.*

Aug. F. Fœrste, Granville, Ohio.

Secotium Warnei, *Pk.*

C.

PLANTS NOT BEFORE REPORTED.

Ipomœa purpurea, *Lam.*

Along railroads and in waste places. West Albany. It is commonly cultivated as an ornamental plant and for the sake of shade. It continues to reproduce itself from year to year and spreads readily by seed.

Populus dilatata, *Ait.*

Sandy soil beyond West Albany. This tree, formerly introduced for ornament, produces only staminate flowers with us, and therefore does not propagate itself by seed. But it spreads freely by its roots, and having once obtained a foothold it does not often yield its ground unless compelled to do so by man. In the station whence our specimens were taken, there is a grove of thrifty young trees at a considerable distance from any dwelling, but they are probably the descendants of trees planted there many years ago, perhaps in front of some dwelling, all traces of which have long since disappeared.

Listera convallarioides, *Hook.*

Turin, Lewis county. *Romeyn B. Hough.* The three North American species of this genus have now all been found in our State, but they are all rare with us.

Festuca rubra, *L.*

Wet ground. Caroga, Fulton county. July. This was formerly considered a variety of *F. ovina*, sheep's fescue, but it is now generally classed as a distinct species. It is said to be indigenous about Lake Superior and northward, but has probably been introduced in the locality here mentioned. It was found in a clearing recently made, and could not have occupied the station many years. According to Professor F. L. Scribner, our specimens correspond to the variety *fallax*, which is common in Europe.

Molinia cærulea, *Mœnch.*

Wet ground. Caroga. July. A grass introduced from Europe, and perhaps not yet fully established here. It was found growing with the preceding species, and with several of our native grasses, and was apparently well able to take care of itself. It forms dense tufts, and has an erect, somewhat rigid appearance.

Tolypella comosa, *Allen.*

Seneca lake. *T. F. Allen.*

Tolypella fimbriata, *Allen.*

Lake Ontario. *Allen.*

Tolypella intertexta, *Allen.*

Seneca lake. *Allen.*

Chara hydropitys, *A. Br.* v. genuina, *A. Br.*

Saranac river. Aug. *Paul Allen.*

Agaricus clypeolarius, *Bull.*

Copses and thin woods. Karner. Oct. This species was reported in the Twenty-third Museum report, but erroneously, as the specimens were afterward found to belong to *A. metulæsporus*, a species which closely resembles this in external characters. The specimens now under consideration are believed to belong to the true *A. clypeolarius*. The spores in them are much smaller than those of *A. metulæsporus*. In many cases the spores furnish important characters for distinguishing species of Agarics, and it is to be regretted that European mycologists have so generally neglected them in their descriptions.

Agaricus (Tricholoma) terræolens, *n. sp.*

Pileus thin, convex or nearly plane, slightly silky fibrillose, whitish with a brownish or grayish brown slightly prominent disk; lamellæ sub-distant, emarginate, white, stem equal, slightly silky, shining, stuffed or hollow, white; spores subglobose or broadly elliptical, .00025 to .0003 in. long, .0002 to .00025 broad; flesh white, taste and odor strong, unpleasant and earthy.

Plant 1 to 2 inches high, pileus 10 to 15 lines broad, stem about 2 lines thick.

Under ground hemlock, *Taxus Canadensis*. South Ballston, Saratoga county. Sept.

The species belongs to the section SERICELLA, and is closely related to *A. inamœnus*, from which it is separated by its smaller size, less distant lamellæ, stuffed or hollow stem and different odor. Nor do I find the stem radicating or the disk tinged with yellow as in that species. Fries compares the odor of *A. inamœnus* to that of *Geranium Robertianum*, but the odor of our plant is decidedly earthy, resembling that of vegetable mold or mossy rocks. Its taste is similar to its odor, and remains in the mouth and throat a long time.

Agaricus (Mycena) immaculatus, *n. sp.*

Pileus membranaceous, conical or sub-hemispherical, glabrous, slightly striate on the margin, pure white; lamellæ moderately broad, distant, adnate or uncinate-decurrent, white; stem slender, pellucid, white, glabrous, generally villose strigose at the base, and slightly thickened at the apex; spores oblong or cylindrical, .0003 to .00035 in. long, .00012 broad.

Plant 8 to 18 lines high, pileus 2 to 4 lines high and broad, stem scarcely .5 line thick.

Among moss and fallen leaves and on naked ground. Adirondack mountains. June.

The species belongs to the section ADONIDEÆ and is related in size and color to *A. lacteus*, from which I have separated it on account of the decurrent toothed lamellæ and the longer spores. The striations of the pileus are also more distinctly visible in our plant when dried than they are when it is fresh.

Agaricus (Mycena) vexans, *n. sp.*

Pileus membranous, conical sub-campanulate or convex, rather distantly striate, blackish-brown, sometimes slightly pruinose; lamellæ subdistant, ascending, adnate or uncinate-adnate, slightly venose-connected, at first white, becoming grayish or smoky white, the edge paler; stem slender, rather tenacious, hollow, glabrous, colored like the pileus, somewhat floccose-villose at the base; spores sub-elliptical, .0003 to .00035 in. long, .0002 to .00025 broad; odor slight, alkaline.

Plant scattered or gregarious, not cæspitose, 2 to 2.5 inches high, pileus 4 to 6 lines high and broad, stem scarcely 1 line thick.

Ground in thin woods and open places. Adirondack mountains. June.

I have placed this species in the section FILIPEDES, although the slightly venose interspaces ally it to the RIGIDIPEDES, and the alkaline odor shows a relationship to the FRAGILIPEDES. It appears to be closely related to *A. uranius*, from which it may be distinguished by its larger size, different color and pileus not expallent. The pileus is not hygrophanous, and is striate even in the dried state. The lamellæ in the dried plants are brownish, with the edge nearly white.

Agaricus (Mycena) purpureofuscus, *n. sp.*

Pileus membranous, campanulate or convex, obtuse, glabrous, striate, purplish-brown; lamellæ ascending, lanceolate, subdistant, adnate, white or whitish, purplish-brown on the edge; stem slender, even, hollow, glabrous, with white hairs at the base, colored like the pileus or a little paler; spores sub-globose or broadly elliptical, .00025 to .0003 in. long, .00025 broad.

Plant 1 to 3 inches high, pileus 4 to 8 lines broad, stem scarcely 1 line thick.

Mossy prostrate trunks of spruce trees in woods. Caroga. July.

This species belongs to the section CALODONTES, and is so closely related to *A. rubromarginatus*, that it is with some hesitation that I have separated it. Because of its darker color and the absence of the hygrophanous character of that species, it has seemed best to keep it distinct. Its even, not striated, stem forbids its reference to *A. atromarginatus*.

Agaricus discopus, *Lev.*

Base of dead fern stems. Sandlake and Karner. Sept. and Oct.

The bulb at the base of the stem in our specimens is not as distinct as in the published figures of the species, but in other respects the specific characters are present.

Agaricus hiemalis, *Osbeck.*

Prostrate trunk of spruce, *Abies nigra*. Adirondack mountains. June.

The specimens agree very well with the description of the species, but they appear to have occurred out of season.

Agaricus scyphoides, *Fr.*

Bare soil and on decaying wood. South Ballston. Aug.

Agaricus jubatus, *Fr.*

Damp ground in thin woods. West Albany. Sept.

The specimens were few in number and not fully developed. The pileus was conical, and clothed with a short, close, velvety pubescence, and the stem was solid. In these respects the specimens do not agree well with the description of the species, although bearing a striking resemblance to the figure of the species in Mycological Illustrations. We have, therefore, for the present, referred them to this species.

Agaricus (Clitopilus) unitinctus, *n. sp.*

Pileus thin, flexible, convex or nearly plane, centrally depressed, glabrous, subshining, sometimes concentrically rivulose, grayish-brown; lamellæ narrow, moderately close, adnate or slightly decurrent, colored like the pileus; stem slender, straight or flexuous, subtenacious, equal, stuffed, slightly pruinose, grayish-brown, with a close, white mycelioid tomentum at the base, and white, root-like fibres of mycelium penetrating the soil; spores elliptical, .0003 in. long, .0002 broad; flesh whitish or grayish-white, odor almost none, taste mild.

Plant 1 to 2 inches high, pileus 6 to 12 lines broad, stem about 1 line thick.

Thin pine woods. Karner. Oct.

The species is apparently related to *A. cicatrisatus.*

Agaricus atrides, *Lasch.*

Damp ground in woods. Caroga. July.

This species differs from *A. serrulatus* by its decurrent lamellæ, and from *A. Watsoni* by its darker color and blackish denticulations on the edge of the lamellæ.

Agaricus villosus, *Fr.*

Prostrate trunks of poplars. West Albany. Aug.

Our specimens are pale-yellow or buff, becoming darker with age. In other respects they correspond to the characters of the species.

Agaricus comosus, *Fr.*, var. albus, *Pk.*

Trunks of horsechestnut. Albany. Oct.

Two specimens only were found. These were white, becoming tinged with yellow in drying. The typical form of the species is tawny. From *A. destruens*, with which our specimens agree more closely in color, the viscidity of the pileus will separate them. The spores are ferruginous, .0003 to .00035 in. long, .0002 to .00025 broad.

Agaricus (Inocybe) umboninotus, *n. sp.*

Pileus broadly campanulate or expanded, prominently umbonate, rimose-fibrillose, dark-brown; lamellæ at first whitish, then ferruginous-brown; stem equal or slightly thickened at the base, solid, fibrillose, paler than the pileus, pruinose at the apex; spores nodulose, .0003 to .00035 in. broad.

Plant 1.5 to 2 inches high, pileus 6 to 10 lines broad, stem 1 to 2 lines thick.

Mossy ground in woods. Caroga. July.

Its spores separate it from *A. rimosus*, and its prominent umbo from *A. asterosporus.*

Agaricus (Inocybe) maritimoides, *n. sp.*

Pileus subconical or convex, dry, obtuse, densely squamulose with small erect or squamose-fibrillose scales, fibrillose on the margin, dark-brown; lamellæ close, rounded behind and adnexed, ventricose, whitish, becoming brownish-ochraceous; stem equal, solid, fibrillose, paler than the pileus; spores irregular, angular, brownish-ochraceous, .0003 to .00035 in. long, .0002 to .00025 broad.

Plant about 1 inch high, pileus 6 to 12 lines broad, stem 2 lines thick.

Thin woods. Karner. Oct.

Apparently related to *A. maritimus*, but not hygrophanous. The spores are slightly angular, resembling in shape those of species of Entoloma and other Hyporrhodii, but are scarcely nodulose.

Agaricus (Inocybe) comatellus, *n. sp.*

Plate 2, figs. 5–8.

Pileus submembranous, convex or expanded, clothed with whitish or gray hairs, fimbriate on the margin; lamellæ subdistant, adnexed, pale-tawny; stem equal, solid, flexuous, pallid or reddish-brown, a little darker above, slightly mealy or pruinose-hairy, with a white mycelium at the base, spores subelliptical, even, .0003 to .0004 in. long, .0002 to .00025 broad.

Plant 6 to 12 lines high, pileus 2 to 4 lines broad, stem scarcely half a line thick.

Sticks and bark buried under fallen leaves. Caroga. July.

A small species remarkable for the hairy covering of the pileus. This is sufficiently dense to give to the pileus a whitish or pale-gray appearance. The species is apparently related to *A. tricholoma*, A. & S., and *A. strigiceps*, Fr.

Agaricus (Inocybe) subexilis, *n. sp.*

Pileus thin, convex or subcampanulate, then expanded, umbonate, fibrillose on the margin, at first pale chestnut color, then yellowish or subochraceous, lamellæ narrow, rather close, rounded behind, subventricose, whitish, becoming dull-ochraceous; stem equal, solid, flexuous, minutely pruinose, finely striate under a lens, pinkish, then yellowish; spores subglobose, nodulose, about .0003 in. in diameter.

Plant 8 to 12 lines high, pileus 3 to 5 lines broad; stem about .5 line thick.

Damp, mossy ground, in woods. Caroga. July.

A very small species, related to *A. paludinellus*, from which it differs in its smaller size, shape of the spores and brighter colors of the pileus.

Agaricus (Hebeloma) sordidulus, *n. sp.*

Pileus thin, rather firm, convex, viscid when moist, dingy brownish-red or tawny-brown, paler or whitish on the margin, flesh white, with a radish-like odor; lamellæ broad, close, rounded behind, slightly adnexed, pallid, then brownish-ochraceous; stem short, equal, stuffed or hollow, slightly fibrillose, white, pruinose at the apex; spores subelliptical, .0005 to .00055 in. long, .00025 to .00028 broad.

Sandy soil, in open places. Karner. Oct.

Plant about 1 inch high, pileus 8 to 15 lines broad, stem 1.5 to 2 lines thick.

A small species, belonging to the section PUSILLI.

Agaricus (Hebeloma) parvifructus, *n. sp.*

Pileus convex, then expanded, slightly viscid, dingy-white, becoming grayish-brown or pale-chestnut colored with age, often paler on the margin; lamellæ broad, moderately close, slightly emarginate, at first white, then brownish-ochraceous; stem equal, silky-fibrillose, solid, whitish, stained with ferruginose or brown toward the base, pruinose and substriate at the apex; spores brownish-ochraceous, .00025 to .00028 in. long, .00016 to .00018 broad; veil white, arachnoid.

Plant three to four inches high, pileus two to three inches broad, stem three to five lines thick.

Sandy soil in pine woods. West Albany. Oct.

The spores of this plant are smaller than usual in species of this subgenus, and this character has suggested the specific name. The lamellæ are at first concealed by the copious, webby filaments of the veil. The species belongs to the section INDUSIATI.

Agaricus (Hypholoma) madeodiscus, *n. sp.*

Pileus thin, convex, becoming nearly plane, hygrophanous, pale chestnut or reddish brown when moist, grayish-tawny or pale-ochraceous and rugose on the disk when dry, the margin, when young, slightly silky-fibrillose; lamellæ close, slightly emarginate, whitish, then brown; stem equal or slightly thickened at the base, hollow, white, sub-silky; spores brown, elliptical, .00035 to .0004 in. long, .00025 broad.

Plant 2 to 3 inches high, pileus 1 to 2 inches broad, stem 2 to 3 lines thick.

Decaying wood in wet places. Adirondack mountains. June.

This species differs from *A. appendiculatus*, its nearest ally, by its larger size, less rugose pileus and larger spores. Also, it is unlike that species in parting with the moisture of the margin of the pileus first, the disk retaining it some time, a character which is suggestive of the specific name. I have not seen the plant growing in tufts. The veil is whitish and very delicate, and at first conceals the lamellæ from view. It at length adheres in fragments to the margin of the pileus.

Agaricus (Psilocybe) cærulipes, *n. sp.*

Pileus thin, subcampanulate, then convex and obtuse or obtusely umbonate, glabrous, hygrophanous, slightly viscid, watery brown and striatulate on the margin when moist, yellowish or subochraceous when dry, the disk sometimes brownish; lamellæ at first ascending, close, adnate, grayish-tawny, becoming ferruginous-brown, whitish on the edge; stem slender, equal, flexuous, tenacious, hollow or containing a separable pith, slightly fibrillose, pruinose at the apex, bluish, sometimes whitish at the apex; spores elliptical, .0003 to .0004 in. long, .00016 to .0002 broad.

Plant single or cæspitose, 1 to 1.5 in. high, pileus 5 to 10 lines broad, stem scarcely 1 line thick.

Decaying wood. South Ballston. Aug.

The species is easily recognized by the peculiar blue color of the stem. Sometimes the pileus also assumes a blue color where bruised.

Corprinus lagopus, *Fr.*

Decaying wood and vegetable mold in woods. South Ballston. Sept.

Cortinarius multiformis, *Fr.*

Pine woods. Karner. Oct.

Cortinarius decoloratus, *Fr.*

Pine woods. Karner. Oct.

Cortinarius (Dermocybe) aureifolius, *n. sp.*

Pileus convex, then plane or slightly depressed, densely fibrillose-tomentose, sometimes slightly squamulose, especially on the disk, cinnamon-brown; lamellæ rather broad, moderately close, subventricose, rounded behind, adnexed, yellow, becoming yellowish-cinnamon, stem short, solid, equal, fibrillose, yellow, brownish within; spores oblong, .00045 to .0005 in. long, .00016 to .0002 broad; flesh of the pileus yellow or pallid, odor like that of radishes.

Plant gregarious, 1 to 1.5 in. high, pileus 8 to 15 lines broad, stem 2 to 3 lines thick.

Sandy soil in thin pine woods. Karner. Oct.

The species resembles *C cinndmomeus* in color, but its short stem, longer spores and different habit easily distinguish it. Its general appearance is similar to that of some species of Inocybe.

Hygrophorus purpurascens, *Fr.*

Sandy soil under pine trees. Karner. Oct.

In our specimens the pileus is fibrillose rather than squamulose, the stem is slightly mealy at the apex, not roughened with purplish squamules, and there is a webby veil which, in the young plant, conceals the lamellæ and forms a slight but evanescent annulus. Should these differences between our specimens and the species to which we have referred them be constant, it may be necessary to separate our plant as a distinct species.

Lactarius hysginus, *Fr*

Mossy ground in woods and swamps. Caroga and Sandlake. July and Aug.

Lactarius varius, *Pk.*

Sandy soil. West Albany and Karner. Sept. and Oct.

Lactarius paludinellus, *Pk.*

Sphagnous marshes. Sandlake. Aug. For the descriptions of this and the preceding species of Lactarius see the article on the New York species of Lactarius.

Russula basifurcata, *n. sp.*

Pileus firm, convex, umbilicate, becoming somewhat funnel form, glabrous, slightly viscid when moist, the thin pellicle scarcely separable except on the margin, dingy-white, sometimes tinged with yellow or reddish-yellow, the margin nearly even; lamellæ rather close, narrowed toward the base, adnate or slightly emarginate, many of them forked near the base, a few short ones intermingled, white becoming yellowish; stem firm, solid, becoming spongy within, white; spores elliptical, pale yellow, uninucleate or shining, .00035 in. long, .00025 broad; flesh white, taste mild, then bitterish.

Pileus 2 to 3 inches broad, stem 8 to 12 lines long, 5 to 6 lines thick.

Dry hard ground in paths and wood roads. Caroga. July.

This species belongs to the section FRAGILES, but in some respects it closely resembles pale forms of *R. furcata*, from which it is separated by the absence of any silky micor and by the yellowish color and elliptical shape of the spores and by the yellowish hue of the lamellæ.

Lentinus suavissimus, *Fr.*

Dead willows, *Salix discolor*. Caroga. July. The strong but agreeable odor, resembling that of melilot, and the lamellæ crisped and anastomosing at the base readily distinguish this species, which is apparently very rare with us.

Boletus sulphureus, *Fr.*

Thin woods. Caroga. July.

But a single specimen was found and this does not fully agree with the description, but it is for the present placed here.

Boletus versipellis, *Fr.*

Sandy soil. West Albany and Karner. Oct.

This species so closely resembles some forms of *B. scaber* that it is not surprising that Persoon regarded it as a variety of that species. The reddish color, dry pileus and appendiculate margin are the most available distinguishing characters of the species. It is apparently quite rare.

Polyporus abortivus, *Pk.*

Buried sticks and decomposing vegetable matter. South Ballston. Aug. and Sept.

This species is remarkable for the abundance of its spores. It is so deformed and apparently imperfect in its development that such fruitfulness would scarcely be expected. The pileus, when sufficiently developed to be recognizable, is of a reddish or alutaceous color.

Polyporus epileucus, *Fr.* var. candidus, *Pk.*

Decaying prostrate trunks of hemlock, *Abies canadensis*. Osceola, Lewis county. Aug.

Pileus snowy-white, scrupose, scarcely villose, somewhat fibrous within and slightly zonate toward the margin; pores plane or convex.

Our specimens, while not agreeing fully with the published characters of *P. epileucus*, approximate so closely to them that we have characterized this form as a variety.

Polyporus crispellus, *n. sp.*

Pileus thin, fleshy, laterally elongated, undulate or subcrispate on the margin, radiate-rugose, subglabrous, whitish varied with brownish zones, flesh white, marked by a few linear hyaline or slightly colored zones; pores short, about equal in length to the thickness of the pileus, minute, subrotund, white, the thin dissepiments more or less dentate.

Pileus 8 to 12 lines broad, extending laterally 1 to 4 inches.

Prostrate trunks of hemlock. Osceola. Aug.

Closely allied to *P. destructor*, but distinguished by its zonate pileus and short pores. It is also apparently thinner and more undulate than that species.

Polyporus (Physisporus) lætificus, *n. sp.*

Effused, thin, tender, not readily separable from the matrix, bright orange with a subtomentose yellowish margin; tubes short, often oblique minute, subrotund, the dissepiments thick, obtuse.

Decaying wood. South Ballston. Aug.

The fungus forms patches two or three inches long, following the inequalities of the surface. In the dried state the pores appear like little ruptured vesicles as in *P. vesiculosus*, B. & C. The species appears to approach *P. fulgens*, Rost., which has the margin white fibrillose and the pores acute.

Polyporus (Physisporus) griseoalbus, *n. sp.*

Effused, thin, tender, adnate, uneven, scarcely margined, indeterminate, grayish-white, with a thin pulverulent subiculum; pores very minute, subrotund, often oblique.

Soft decaying wood of deciduous trees. Osceola. July.

The pores are sometimes collected in little heaps or tubercles as in *P. molluscus* and *P. Vaillantii*. In the dried state they are slightly tinged with creamy yellow.

Polyporus (Physisporus) fimbriatellus, *n. sp.*

Widely effused, thin, tenacious, separable from the matrix, with a thin white fimbriate margin and a white subiculum, running into rhizomorphoid branching strings of mycelium or forming a somewhat reticulate fimbriate membrane; pores minute, subrotund, equal, whitish inclining to cream color.

Under side of prostrate trunks of maple, forming extensive patches on the wood and bark. Osceola. Aug.

By its rhizomorphoid mycelium this species is related to *P. Vaillantii*, but the pores are smaller and not collected in heaps as in that species. By reason of its tenacious substance it is readily separable even from an irregular matrix.

Polyporus (Physisporus) ornatus, *n. sp.*

Effused, 1 to 2 lines thick, somewhat tenacious, adnate or inseparable from the matrix, white, the surface slightly undulate or uneven, the margin definite, studded with drops of moisture when fresh, spotted with dot-like depressions when dry; pores subrotund, minute, unequal, often oblique.

Decaying prostrate trunks of deciduous trees. Osceola. Aug.

This species is at once distinguished by its adnate subiculum and its peculiarly spotted margin. The spots are watery white in the fresh state and each one is covered by a drop of moisture. In the dried plant the place previously occupied by the drop of moisture becomes a small depression in the subiculum.

Polyporus (Physisporus) odorus, *n. sp.*

Effused, 2 to 3 lines thick, even, firm but brittle, moist, separable from the matrix, white, sometimes stained with reddish-yellow on the abrupt, rather thick, slightly fimbriate margin; pores very minute, rather long, equal, entire, white, arising from a thin but distinct subiculum; odor strong, disagreeable.

Under surface of decorticated prostrate trunks of spruce. Osceola. Aug.

It forms patches several inches broad and sometimes more than a foot long. It is distinguished from *P. vulgaris* by being separable from the matrix, moist, having longer pores and a strong odor. From the next following species it may be known by its smaller pores, more brittle texture and its different odor.

Polyporus (Physisporus) subacidus, *n. sp.*

Effused, separable from the matrix, tenacious, flexible, uneven, determinate, the margin downy, narrow, pure white; pores small, subrotund, 1 to 3 lines long, often oblique, whitish inclining to dingy-yellowish pale tan color or dull cream color, the dissepiments thin, more or less dentate; odor strong, subacid.

Prostrate trunks and decaying wood of various trees, hemlock, spruce, birch, etc. Osceola. July.

This species is not rare, but it has probably been confused with its allies. It forms extensive patches, sometimes several feet in length. It adheres somewhat closely to the matrix, but its texture is so tough that it is generally easy to strip it from its supporting substance. It is apparently closely related to *P. medulla-panis*, but the description of that species gives the pores as medium size and entire, and makes no mention of any odor, in consequence of which we have thought our plant distinct. It is, however, extremely variable.

Var. *tenuis* is very thin, scarcely a line thick, with short pores and the surface nearly even. It occurs on the smooth decorticated trunks of hemlock.

Var. *tuberculosus* has the surface more or less roughened by unequal prominent tubercles, which are either scattered or clustered. They appear to be a monstrous development of the mycelium on the surface of the pores.

Var. *stalactiticus* incrusts mosses and therefore has the surface very uneven with numerous and unequal porous protuberances. It most often occurs on prostrate mossy trunks of birches.

Var. *vesiculosus* (*P. vesiculosus*, B. & C.) has shallow scattered pores as if formed from ruptured vesicles.

Specimens of this Polyporus, unless dried under pressure, shrink and roll up in unmanageable shapes. They often contain considerable moisture when collected, and if put in press in this condition they are liable to become brown or blackish in drying. Specimens collected in a dry time or in dry situations retain their characters best. The thinner forms, if partly dried before they are put in press, sometimes retain their color and characters well. When growing on bark the patches are sometimes interrupted and irregular, in which case the margin is broader than usual and well defined.

Merulius (Resupinati) aurantiacus, *n. sp.*

Effused, membranous, tender, very soft, separable from the matrix, pale orange color, the subiculum soft, silky-tomentose, whitish and pale orange ; hymenium gyrose-plicate and dentate, becoming paler with age ; spores broadly elliptical, .00025 in. long, .0002 broad.

Soft decayed wood of hemlock. Osceola. Aug.

The species is distinguished by its soft tomentose texture and its orange hues. It is closely related to *M. aureus* but is at once distinct by its orange, not golden, color. The subiculum is composed of a stratum of whitish filaments next the matrix and another of orange color next the hymenium. Hence the margin in young plants is generally whitish. In mature ones the whole becomes orange colored. Notwithstanding the tender substance the membrane is separable from the matrix and pieces three or four inches in extent are thus obtainable.

Merulius fugax, *Fr.*

Soft decayed wood of deciduous trees. Osceola. Aug.

This has the tender, soft and delicate texture of the preceding species, but it is at first of a pure white color. Soon the hymenium assumes a creamy or yellowish hue and the folds appear, but there is often a wide margin destitute of them. In drying, the folds mostly collapse and disappear and the hymenium often becomes tinged with incarnate or flesh color. The wood on which it usually grows is so much decayed that it easily crumbles to pieces. Nevertheless the plant is separable from its matrix.

The spores are oblong, .0003 in. long, .0001 broad.

Geaster striatus, *DC.*

Sandy soil. Karner. Sept.

When the external peridium first opens and expands the inner peridium appears to be globose and sessile, but as the plant matures and dries the inner peridium is seen to be narrowed below and raised on a short pedicel.

Phyllosticta Labruscæ, *Thum.*

Living leaves of grapevines, *Vitis Labrusca.* Highland Mills, Orange county. July.

This differs from *P. viticola* in its more numerous, larger and more prominent perithecia and in its larger spores.

Phyllosticta Epigææ, *n. sp.*

Spots large, irregular, brown or reddish-brown ; perithecia minute .0045 to .0055 in. broad, covered by the epidermis, erumpent, epiphyllous, black ; spores elliptical, colorless, .0003 in. long, .00016 broad.

Living leaves of trailing arbutus, *Epigæa repens.* Caroga. July.

Phyllosticta lantanoidis, *n. sp.*

Spots rather large, suborbicular, cinereous, sometimes with a brown margin ; perithecia minute, .004 in. broad, slightly prominent, epiphyllous, black; spores elliptical, colorless, binucleate, .00025 to .0003 in. long, .00016 broad.

Living leaves of hobble bush, *Viburnum lantanoides.* Caroga. July.

This differs from *P. tinea* Sacc. in the larger size and binucleate character of the spores.

Phyllosticta Podophylli, *Winter.*

Living leaves of mandrake, *Podophyllum peltatum.* Albany. June.

Externally this resembles *Ascospora Podophylli* Curt., but the spores are very different.

Ascochyta Cassandræ, *n. sp.*

Spots suborbicular or irregular, reddish-brown or grayish with a reddish-brown margin; perithecia epiphyllous, minute, erumpent, blackish; spores oblong-fusiform, acute at each end, uniseptate, colorless, .0004 to .00065 in. long, .00012 to .00016 broad.

Living leaves of leather-leaf, *Cassandra calyculata.* Adirondack mountains. June and July.

Ascochyta colorata, *n. sp.*

Plate 2, figs. 9 and 10.

Spots indefinite, often confluent, red with a brownish center, paler on the lower surface ; perithecia minute, .004 to .005 in. broad, black ; spores oblong, somewhat pointed at one or both ends, straight or curved, slightly constricted in the middle, obscurely uniseptate, colorless, .0007 to .001 in. long, .0003 to 00035 broad.

Living leaves of strawberry, *Fragaria Virginiana.* West Albany. Aug.

This differs from *A. Fragariæ* Sacc. in the color of the spots and in the size and character of the spores.

Phoma Phytolaccæ, *B. & C.*

Dead stems of poke weed, *Phytolacca decandra*. Albany. June.
In our specimens the spores are a little longer than the dimensions given in the description of the species and the perithecia are sometimes slightly compressed or subhysteriiform.

Phoma elevatum, *n. sp.*

Perithecia numerous, small, rotund, oval or hysteriiform, sunk in the matrix but occupying small elevations or ridges, black; spores ovate or subelliptical, colorless, .0003 in. long, .00016 broad.
Decorticated wood of deciduous trees. Adirondack mountains. June.
The marked feature of the species and one suggestive of the name is the position of the perithecia. Each one occupies a minute ridge or pustular elevation of the wood.

Phoma Pruni, *n. sp.*

Perithecia small, slightly prominent, subconical, at first covered by the epidermis, then erumpent, black; spores oblong-elliptical or subfusiform, binucleate, hyaline, .00035 to .00045 in. long, .00012 to .00016 broad, supported on equally long or longer sporophores.
Dead branches of choke cherry, *Prunus Virginiana*. Karner. June.

Phoma albifructum, *n. sp.*

Perithecia numerous, large, .02 to .03 in. broad, conical or subhemispherical, sometimes irregular and two or three confluent, erumpent, black; spores oblong-fusiform, acute at each end, two to four-nucleate, colorless, .00065 to .00085 in. long, .0002 to .00025 broad, oozing out and forming a white globule.
Dead bark of maple, *Acer rubrum*. Karner. June.
The perithecia and spores are unusually large for a Phoma and would seem to justify Prof. Saccardo's proposed genus Macrophoma.

Sphæropsis ribicola, *C. & E.*

Dead stems of *Ribes floridum*. Bethlehem, Albany county. May.

Sphæropsis alnicola, *n. sp.*

Perithecia numerous, .0014 to .002 in. broad, prominent, hemispherical, erumpent, sometimes confluent, forming black patches, spores oblong, colored, .0006 to .00095 in. long, .00035 to .0004 broad.
Dead branches of alder. West Albany. Apr.
S. Alni C. & E. has smaller spores and inhabits living branches.

Appendicularia, *gen. nov.*

Plate 3, figs. 1-4.

Perithecium thin, delicate, rostrate, supported on a filamentous pedicel and accompanied by an appendage at its base. Entomophilous.
This genus has been formed to receive the single species here described. Its name is suggested by the appendicular organ at the base of the perithecium and supported with it by the common pedicel.

Appendicularia entomophila, *n. sp.*

Perithecia oval, brown, .0045 to .0055 in. long, .0035 to .004 broad, tapering abruptly above into a long, pale, somewhat pointed, straight or slightly curved rostrum .008 to .0095 in. long and about one-tenth as broad, supported below by a pale pedicel .012 to .013 in. long, about one-tenth as broad; pedicel two-septate, slightly thickened at the apex and bearing on one side, at the base of the perithecium, an oblong appendage about .0016 in. long; spores narrowly fusiform, pointed at each end, septate near the middle, colorless, .0012 to .0018 in. long, about one-tenth as broad, escaping at the apex of the rostrum.

On small flies, *Drosophila nigricornis*, Nyack, Rockland county. March. *Rev. J. L. Zabriskie.*

Specimens of this minute but interesting fungus, beautifully mounted on microscopic slides, were sent me by Mr. Zabriskie, who discovered them on small flies in his cellar in March last. He writes that they appeared during the first warm days of Spring, but disappeared upon the return of colder weather a few days later. The fungus grows upon almost any part of the body, the head, thorax, abdominal rings and occasionally on the costæ of the wings, but most frequently on the legs. Attached to one leg sent me are seven well-developed specimens of the fungus and one or two imperfect ones. The whole fungus is about one-fortieth of an inch long, or less than one-third of a line. It would not, therefore, be readily seen by the untrained naked eye of an observer. The perithecium, which is of a beautiful amber-brown color in the mounted specimens, appears like an enlargement of the central part of the fungus, its long rostrum or beak extending above it nearly as far as its pedicel does below it. The pedicel has one septum a little below the perithecium and another a little below the middle. At the apex it is slightly thickened, which gives it a somewhat clavate shape, and this enlargement is obscurely marked by short transverse and longitudinal septa or wrinkles. On one side, at the base of the perithecium is the singular erect appendage, the office of which is involved in obscurity. It is even and glabrous on the side next the perithecium, but elsewhere it is roughened by short ascending projections or serrations.

The affinities of the fungus are not clear. The non-ascigerous perithecium, the long, slender rostrum and the free spores oozing out at its apex indicate a relationship to species of Sphæronema (a genus of imperfect fungi), but the delicate texture and filamentous pedicel are very unlike any thing in that genus. Possibly its true relationship may be with the Saprolegniæ, but for our present purpose it is placed with the imperfect fungi.

Sphærographium hystricinum, *Sacc.*

Plate 3, figs. 5–7.

Dead stems of *Viburnum nudum*. Caroga. July.

This is *Sphæronema hystricinum*, Ellis, and is possibly a condition of some species of Cenangium.

Sphærographium lantanoidis, *n. sp.*

Perithecia minute, terete or subconical, truncate at the apex, black; spores subfiliform, curved or flexuous, slightly narrowed toward each end, colorless, sometimes multinucleate, .0016 to .0025 in. long, oozing out and forming a whitish globule

Dead stems of *Viburnum lantanoides*. Adirondack mountains. June.

Gelatinosporium fulvum, *n. sp.*

Perithecia cæspitose, crowded, erumpent, externally pulverulent, pale-tawny, opening at the apex when moist and revealing the white spore-mass within ; spores elongated, curved, gradually tapering toward each end, colorless, .003 in. long.

Dead branches of birch, *Betula lutea*. Caroga. July.

This is the third species of this genus that has its habitat on birch.

Coniothyrium valsoideum, *n. sp.*

Perithecia cæspitose, crowded, erumpent, surrounded by the laciniæ of the ruptured epidermis, subglobose or angular from mutual pressure, black ; spores numerous, subglobose or ovate, colored, .0002 to .00025 in. long, nearly as broad.

Dead branches of alder. West Albany. Apr.

Septoria Ribis, *Desm.*

Living leaves of fetid currant, *Ribes prostratum*. Adirondack mountains. June.

Septoria alnicola, *Cke.*

Living leaves of alder, *Alnus incana*. Caroga. July.

Septoria Lysimachiæ, *West.*

Living leaves of *Lysimachia ciliata*. Osceola. Aug.

Septoria Dalibardæ, *n. sp.*

Spots small, whitish or cinereous, with a reddish-brown margin, perithecia minute, epiphyllous, few, black ; spores filiform, nearly straight, .0015 to .002 in. long.

Living leaves of *Dalibarda repens*. Caroga. July.

This species closely resembles *S. Waldsteiniæ*, but the spores are much longer than in that species.

Septoria Dentariæ, *n. sp.*

Spots large, suborbicular, indefinite, greenish, perithecia minute, numerous, slightly prominent, epiphyllous, black ; spores filiform, nearly straight, .0008 to .0012 in. long, oozing out in yellowish or amber-colored tendrils or masses.

Living or languishing leaves of pepper-root, *Dentaria diphylla*. Adirondack mountains. June.

Septoria punicei, *n. sp.*

Spots two to four lines broad, indefinite, blackish-brown above, brown or reddish-brown below, perithecia hypophyllous ; spores very long, flexuous, filiform, white in the mass, .004 to .0045 in. long.

Living leaves of *Aster puniceus*. Caroga. July.

The species is well marked by its very long and very white spores.

Septoria Trillii, *Pk.*

Living leaves of *Trillium erectum.* Adirondack mountains. June.

Septoria fumosa, *n. sp.*

Spots angular or irregular, often confluent, smoky-brown or grayish-brown with a darker margin ; perithecia epiphyllous, .0025 to .003 in. broad, black ; spores filiform ; .0012 to .002 in. long.

Living or languishing leaves of *Solidago Canadensis.* Albany. June.

The spores are shorter than those of *S. Virgaureæ.*

Septoria Diervillæ, *n. sp.*

Spots suborbicular, whitish or cinereous, with a broad indefinite brown or purplish-brown margin ; perithecia epiphyllous, minute, black; spores filiform, curved or flexuous, very slender, .001 to .0016 in. long.

Living or languishing leaves of *Diervilla trifida.* Adirondack mountains. June.

The spots, which are at first brown or purplish-brown, at length become paler and arid in the center, and on this central part the perithecia appear.

Rhabdospora subgrisea, *n. sp.*

Perithecia numerous, punctiform, depressed, black, covered by the epidermis, generally forming long, indefinite, grayish-brown spots ; spores filiform, straight or curved, .0012 to .0025 in. long.

Dead stems and galls of various species of Solidago. Albany. *G. W. Clinton.* West Albany. Apr. and May.

Diplodia pinea, *Kx.*

Dead bark of pine, *Pinus Strobus.* West Albany. May.

In our specimens the spores are .0008 to .0014 in. long and .0005 to .0007 broad, which is somewhat less than the dimensions given in the description. Our plant is, therefore, distinguished as variety *corticola.*

Staganospora Smilacis, *Sacc.*

Living leaves of *Smilax herbacea.* Albany. *G. W. Clinton.* West Albany. May.

The spots closely resemble those of *Sphæropsis smilacina,* Pk., *Phoma smilacina,* Sacc., which may be an immature or imperfectly developed form of the same species. It is *Ascochyta Smilacis,* E. & M.

Glœosporium Ribis, *Cast.*

Living or languishing leaves of fetid currant, *Ribes prostratum.* Adirondack mountains. June.

In our specimens the spores are a little longer than in our European specimens and longer than the dimensions given in some of the descriptions, but I see no other difference.

Glœosporium Salicis, *West.*

Languishing leaves of *Salix longifolia.* North Greenbush. Sept.

Our specimens have the spores either simple or two or three-nucleate and generally a little thicker toward one end. In size they are .0006 to .0009 in. long, .0003 to .0004 broad. Fuckel considers the species as the stylosporous condition of *Trochila Salicis*, Tul. It is very unlike *Glœosporium saliciniium*, Pk., which is rather a Septoglœum, though the septa are obscure.

Marsonia Quercus, *n. sp.*

Spots angular or suborbicular, whitish or reddish-gray, definite, nucleus hypophyllous; spores oblong or subcylindrical, straight or curved, slightly constricted in the middle, obscurely uniseptate, colorless, .0005 to .0006 in. long, .0001 to .00016 broad, oozing out and forming a reddish or reddish-amber colored tendril or mass.

Living leaves of *Quercus ilicifolia*. Karner. Aug.

Pestalozzia monochætoidea, *S. & E.*

Dead stems of nine-bark, *Spiræa opulifolia*. West Albany. Apr.

Ramularia Diervillæ, *n. sp.*

Plate 1, figs. 16–18.

Spots suborbicular, whitish or cinereous with a dark-brown margin, definite; flocci amphigenous, minute, tufted; spores cylindrical, colorless, .0005 to .001 in. long, .00008 to .00016 broad.

Living leaves of *Diervilla trifida* Adirondack mountains. June.

Ramularia multiplex, *n. sp.*

Spots large, sometimes occupying the whole leaf, red or greenish-yellow, becoming brown when old, the lower surface, and sometimes both surfaces, frosted by the fungus; flocci and spores whitish or subcinereous, the latter very variable, subglobose elliptical, oblong or cylindrical, .00016 to .002 in. long, .00016 to .0002 broad. sometimes catenulate.

Living leaves of cranberry, *Vaccinium Oxycoccus*. Caroga. July.

Ramularia Prini, *n. sp.*

Plate 1, figs. 19–21.

Spots small, suborbicular, cinereous or whitish, with a brown margin, definite; spores hypophyllous, oblong or subfusiform, colorless, .0005 to .0009 in. long, .00016 to .0002 broad.

Living leaves of *Ilex verticillata*. Caroga. July.

The spores are tufted, but so minute that they are scarcely visible to the naked eye. This and the two preceding species are referred to the genus Ramularia with some hesitation. The hyphæ are minute and obscure, and I have seen no septate spores, but in other respects they appear to belong here. The next species, which rarely has uniseptate spores, forms a connecting link between these and the succeeding one.

Ramularia Oxalidis, *Farl.*

Plate 1, figs. 13-15.

Living leaves of wood sorrel, *Oxalis acetosella*. Adirondack mountains. June.

Cylindrosporium veratrinum, *S. & W.*

Plate 1, figs. 10–12.

Living leaves of Indian poke, *Veratrum viride*. Adirondack mountains. June.

This fungus appears to me to be ambiguous, between the genera Cylindrosporium and Ramularia. Distinct, though short hyphæ are present; and the spores are very long and clearly septate, in violation of the generic character of Cylindrosporium. The fungus is sometimes either associated with or followed by oblong black spots or patches, which are sometimes confluent, and which bear minute black perithecia containing oblong or cylindrical spore-like bodies about .0002 in. long.

Ovularia moniloides, *E. & M.*

Plate 2, figs. 1-4.

Living leaves and dead branches and aments of sweet gale, *Myrica Gale*. Adirondack mountains. June.

A very variable species. Sometimes the spots are few and scattered, again they are numerous, small or large, and often confluent, occupying nearly the whole leaf. Sometimes the fungus extends to the branches, both dead and living, which it surrounds with its white flocculent patches.

Peronospora Arthuri, *Farl.*

Living leaves of evening primrose, *Œnothera biennis*. Albany. June.

Peronospora Halstedii, *Farl.*

Living leaves of *Ambrosia trifida*. North Greenbush. Sept.

This often grows upon the spots occupied by *Protomyces polysporus*.

Peronospora Potentillæ, *De By.*

Living leaves of purple avens, *Geum rivale*. Adirondack mountains. June.

Entyloma Saniculæ, *n. sp.*

Plate 1, figs. 7-9.

Spots numerous, small, close or subconfluent, orbicular or subangular, varying in color from whitish or greenish to brown or reddish-brown; conidia amphigenous, filiform or linear, straight or curved, colorless, .0012 to .0024 in. long, .00008 to .0001 broad. Sometimes plurinucleate; spores subglobose, .00055 to .00065 in. broad.

Living leaves of sanicle, *Sanicula Marilandica*. North Greenbush. May.

The very long slender conidia are a distinguishing feature in this species.

Cercospora Violæ, *Sacc.*

Living leaves of violets, *Viola blanda*. Osceola. Aug.

In our specimens the spores are shorter than the dimensions given for the type, from which it is probable that they are a variety. They are .003 to .004 in. long, but pluriseptate as in the typical specimens.

Cercospora Cephalanthi, *E. & K.*

Living leaves of *Cephalanthes occidentalis*. Karner. Aug.

Cercospora Comari, *n. sp.*

Plate 1, figs. 1-3.

Spots irregular, indefinite, sometimes confluent, reddish-brown ; flocci minutely tufted, amphigenous, slender, flexuous, colored, .005 to .0065 in. long, .0002 broad ; spores clavate, obscurely two to three septate, slightly colored, .002 to .003 in. long, .0003 broad in the widest part.

Living leaves of *Potentilla palustris* (Comarum palustre). Karner. July.

Cercospora Majanthemi, *Fckl.*

Living leaves of two-leaved Solomon's Seal, *Majanthemum bifolium.* Caroga. July.

Our specimens vary a little from the description of the species to which we have referred them, but they are probably only an American variety of the species. The spots are margined with red or brownish-red and the spores are nucleate, but I have not seen them septate. They appear to rise from a minute reddish or pink-colored tubercle.

Hadrotrichum lineare, *n. sp.*

Plate 1, figs. 4-6.

Flocci amphigenous, densely cæspitose, subflexuous, black, forming oblong or linear black sori ; spores terminal, ovate, oblong-ovate or oblong-pyriform, colored, .00065 to .0011 in. long, .00045 to .00055 broad, sometimes becoming constricted in the middle.

Living and dead leaves of *Calamagrostis Canadensis.* Adirondack mountains. June.

I have referred this fungus provisionally to the genus Hadrotrichum, although it does not rigidly agree with the description of that genus, in which the flocci are characterized as short. In our plant they are .002 to .003 in. long. By their tufted mode of growth they appear to deviate from the allied genus Monotospora. The spores, so far as observed, do not become definitely uniseptate, though in a few instances the endochrome seemed to be divided and the spores constricted in the middle as if about to multiply by division. They are colored, but are slightly paler than the flocci. These form definite linear or oblong sori or patches which are often parallel and sometimes repeatedly interrupted and look like a series of dots. At first sight they might be mistaken for some species of Puccinia.

Cenangium balsameum, *n. sp.*

Receptacle single or cæspitose, sessile, erumpent, externally black or blackish, greenish-yellow within, disk plane or convex, blackish bay-red or greenish-yellow when moist, black and somewhat uneven when dry ; asci clavate, .004 to .0055 in. long, .0005 to .0006 broad; spores oblong or subfusiform, sometimes slightly curved, simple, greenish-yellow, .0008 to .0012 in. long, about .0003 broad.

Dead branches of balsam, *Abies balsamea.* Caroga. July.

This has probably been confused with *C. ferruginosum*, which it somewhat resembles, but the spores are much larger than the dimensions ascribed to the pores of that species, and larger than the spores in the specimens of that species in Mycotheca Universalis.

Sphærotheca pannosa, *Lev.*

Living leaves of wild rose, *Rosa parviflora* Ehrh. West Albany. Aug.

Microsphæria Nemopanthis, *n. sp.*

Mycelium arachnoid, thin, amphigenous; appendages few, five to twelve, equal to or a little longer than the diameter of the perithecia, terminally four or five times dichotomous, colored, sometimes forked near the base, the ultimate ramuli recurved; asci about four; spores six to eight.

Living leaves of *Nemopanthes Canadensis*. Karner. Sept.

The species is apparently allied to *M. Berberidis*, from which it is separated because of its fewer asci and colored appendages.

Capnodium Citri, *B. & D.*

On oranges, Albany. Not ascigerous. Introduced with the fruit which it inhabits.

Asterina nuda, *n. sp.*

Plate 2, figs. 11–15.

Perithecia numerous, closely gregarious or crowded, superficial and naked or with a few short obscure radiating filaments at the base, globose or subdepressed, .003 to .004 in. broad, black; asci oblong or subcylindrical, .0016 in. long, .0005 broad; spores crowded or biseriate, oblong, uniseptate, colorless, .0004 to .0005 in. long, .0002 to .00025 broad.

Dead leaves of balsam fir, *Abies balsamea*. Adirondack mountains. June.

Externally this species resembles *Sacidium Pini*, but its fruit is very different. The perithecia are generally arranged in three linear patches, one along the middle of the upper surface of the leaf and two on the lower surface, one on each side of the midvein. They are less numerous on the upper surface than on the lower, and are sometimes entirely absent there. The radiating mycelioid filaments are not always present, and but for the superficial perithecia the species might easily be referred to the genus Sphærella. The bilocular colorless spores indicate the section Asterella.

Valsa pauperata, *C. & F.*

Dead bark of maple, *Acer rubrum*. Karner. June.

In our specimens it is not uncommon to find a half dozen perithecia in one pustule, although in the typical form there are but two or three. A whitish or pale-grayish pulverulent disk often exists, which is at length obliterated by the black ostiola. The spores are .00064 to .0008 in. long, .0002 to .00025 broad, which is somewhat larger than the dimensions given in the description of *V. pauperata*, nevertheless we think our specimens are only a form or perhaps a variety of that species. The pustules are often arranged in long flexuous lines as in the type.

Valsa cornina, *n. sp.*

Pustules small, scattered, at first covered by the epidermis, which is at length longitudinally ruptured; perithecia two to five in a pustule, nestling in the inner bark, black, the ostiola scarcely exerted; asci clavate, blunt, .002 to .0024 in. long; spores collected in the upper part of the ascus, allantoid, .0006 to .0007 in. long, .00016 broad.

Dead branches of *Cornus paniculata*. Albany. Apr.

I have distinguished this species from others growing on Cornus, because of its different habit and larger spores.

Valsa Friesii, *Fckl.*

Dead bark of *Abies balsamea*. Adirondack mountains. June.

Valsa opulifoliæ, *n. sp.*

Pustules subconical or subhemispherical, erumpent; perithecia five to twenty in a pustule, nestling in the inner bark, crowded, often angular from mutual pressure, ostiola crowded, black, obliterating the grayish disk; asci subclavate, the sporiferous part .0012 to .0016 in. long, .00025 to .0003 broad; spores allantoid, crowded above, uniseriate below, .0004 to .0005 in. long, .00008 to .0001 broad.

Dead branches of *Spiræa opulifolia*. West Albany. Apr.

The species is apparently related to *V. pustulata* Aw., but the crowded ostiola are central on the disk. When the epidermis is torn away the pustules appear much like those of *V. colliculus* Wormsk.

Valsa leucostomoides, *n. sp.*

Pustules numerous, minute, covered by the epidermis which is pierced by the orbicular white or grayish disk; perithecia two to six or more in a pustule, the ostiola punctiform, black, dotting the disk; asci clavate or subfusiform, .0016 to .002 in. long, .00035 to .0004 broad; spores crowded, allantoid, colorless, .0005 to .00065 in. long, .00016 to .0002 broad.

Dead branches of sugar maple, *Acer saccharinum*. Helderberg mountains. May.

The very small size of the pustules and the minute white pulverulent disk give to this species an external appearance resembling that of *V. leucostoma* Fr., but there is no circumscribing black line and the species is apparently quite distinct and easily known by this character.

Diatrypella Frostii, *Pk.*

Dead stems of wild hazel-nut, *Corylus Americana*. West Albany Nov.

Diaporthe Wibbei, *Nits.*

Dead branches of sweet gale, *Myrica Gale*. Adirondack mountains. June.

The species is placed in the section Tetrastaga, but in our specimens there is no circumscribing black line. The spores are a little broader than the dimensions given in the description, being .0002 to .00025 in broad, and they sometimes terminate in a slight bristle-like point. In other respects the specimens agree well with the specific characters.

Diaporthe cylindrospora, *n. sp.*

Pustules valsoid, somewhat prominent, erumpent, scattered; perithecia numerous, fifteen to thirty or more, crowded, covered by the thin blackened surface of the inner bark, the ostiola rather long, crowded, exserted, about equalling the surrounding elevated epidermis, black; asci narrow, subfusiform, .0018 to .0022 in. long, .00025 to .0003 broad; pores subcylindrical, crowded or biseriate, quadrinucleate, colorless, .0005 to .00065 in. long, .00012 to .00016 broad.

Dead branches of wild bird cherry, *Prunus Pennsylvanica*. Adirondack mountains. June.

I have not been able to detect any distinctly septate spores, yet in every other respect this fungus evidently belongs to this genus, and I have thought best to refer it here for the present.

Didymosphæria Typhæ, *n. sp.*

Perithecia minute, punctiform, subglobose, covered by the epidermis, which is pierced by the scarcely papillate ostiolum; asci cylindrical, .0025 to .0035 in. long, .0003 to .0004 broad; spores oblong or elliptical, uniseriate, uniseptate, not at all or but slightly constricted at the septum, colored, .0004 to .0006 in. long, .0002 to .00025 broad; paraphyses filiform.

Base of dead leaves of *Typha latifolia*. Guilderland, Albany county. May.

Sphærella conigena, *n. sp.*

Perithecia small, scattered or gregarious, slightly prominent, erumpent, black; asci subcylindrical, .0025 to .0035 in. long, about .0005 broad; spores crowded, oblong-clavate, constricted at the septum, .0004 to .0005 in. long, .00016 to .0002 broad, the cells unequal, the lower one tapering downward, narrower than the subglobose or elliptical upper one.

Fallen cones of hemlock, *Abies Canadensis*. Helderberg mountains. May.

It differs from *S. Pinsapo* in its longer asci, and longer and differently shaped spores, as well as in its habitat. A similar, if not the same, species occurs on cones of *Thuja occidentalis* in the same locality, but owing to the immaturity of the fruit it is still in doubt.

Venturia Cassandræ, *n. sp.*

Plate 3, figs. 11–14.

Spots reddish-brown or brownish, sometimes with a grayish center; perithecia on one or both surfaces, minute, .0028 to .0032 in. broad, black, with a few short, straight, diverging black setæ above, .0012 to .0016 in. long; asci oblong, gradually and slightly narrowed above, .0016 to .0018 in. long, .0003 to .0004 broad; spores biseriate, oblong, quadrinucleate, .0005 in. long, .0002 broad.

Living leaves of *Cassandra calyculata*. Caroga. July.

The perithecia sometimes occur on the upper surface of the leaf, but oftener on the lower. They are so small that they are scarcely visible to the naked eye. Sometimes they emerge from beneath the scales of the leaf, and then they appear erumpent, although in reality they are superficial.

Leptosphæria Corallorhizæ, *n. sp.*

Plate 2, figs. 20–23.

Perithecia numerous, minute, .004 to .005 in. broad, erumpent, black, with a minute ostiolum; asci cylindrical, sessile, .002 to .003 in. long, .0003 to .00035 broad; spores crowded or biseriate, subfusiform, triseptate, slightly constricted at the middle septum, yellowish-brown, .0008 to .001 in. long, .00016 to .0002 broad.

Dead stems of *Corallorhiza multiflora*. Caroga. July.

Leptosphæria eutypoides, *n. sp.*

Perithecia numerous, closely gregarious, .01 to .011 in. broad, hemispherical or depressed, at first covered by the epidermis, then naked, black, ostiola papilliform; asci clavate or subcylindrical, .004 to .0045 in. long, .0005 to .00065 broad; spores ovate or oblong, straight or slightly curved, triseptate, usually constricted at the septa, yellowish-brown, .0008 to .0009 in. long, .0003 to .0004 broad, paraphyses filiform.

Dead stems of large herbs, as *Chenopodium album*. Albany. May.

The matrix becomes blackened, which, with the nearly uniform distribution of the numerous perithecia, is suggestive of the appearance of some species of Eutypa.

Leptosphæria lycopodiicola, *n. sp.*

Plate 2, figs. 16–19.

Perithecia small, .005 to .006 in. broad, sphæroid or elliptical, erumpent, black; asci subcylindrical, nearly sessile, .0025 to .003 in. long, .0003 to .0004 broad; spores oblong or subfusiform, slightly colored, three to five-septate, .0008 to .001 in. long, .00016 to .0002 broad.

Dead peduncles of *Lycopodium clavatum*. Adirondack mountains. June.

The perithecia are associated with a minutely tufted, blackish Cladosporium. Some of them are laterally compressed. The covering epidermis generally ruptures longitudinally. The spores are much more narrow in this than in *L. Crepini* and *L. Marcyensis*, both of which inhabit species of Lycopodium.

Metasphæria Myricæ, *n. sp.*

Plate 2, figs. 24–27.

Perithecia numerous, broadly conical, .016 to .021 in broad, covered by the thin closely-adhering epidermis, black, white within, ostiola pertuse; asci clavate, obtuse, .004 to .005 in. long, .0006 to .0008 broad; spores crowded or biseriate, oblong or subfusiform, straight or slightly curved, at first uniseptate, quadrinucleate, strongly constricted at the middle septum, finally triseptate, colorless, .0012 to .0016 in. long, .0004 to .0005 broad; the paraphyses numerous, conglutinate.

Dead branches of *Myrica Gale* lying partly in water. Caroga. July.

The epidermis is so closely adherent that the perithecia appear as if superficial or merely innate at the base. The nuclei of the spores are large. Spores with three septa are rare, but this may be due to the immature condition of the specimens.

Sphærulina sambucina, *n. sp.*

Perithecia minute, numerous, closely gregarious, unequal and irregular, orbicular, oblong or even flexuous, covered by the epidermis, erumpent, opening by a pore or a narrow chink, black; asci clavate or subcylindrical, .003 to .005 in. long, about .0005 broad, aparaphysate; spores crowded or biseriate, oblong-clavate, constricted at the middle septum, five to seven-septate, colorless, .0009 to .0012 in. long, .0003 to .00035 broad, the lower half more narrow than the upper.

Dead branches of elder, *Sambucus Canadensis*. West Albany. May.

This is apparently related to *S. intermixta*, and, like that species, it is remarkable for its anomalous and irregular perithecia, but it is distinguished from it by its longer asci and longer spores, strongly constricted in the middle, and with more numerous septa.

Cryptospora Caryæ, *n. sp.*

Plate 2, figs. 28–31.

Pustules scattered, covered by the epidermis, erumpent, circumscribed by a black line or at length covered by a black crust beneath the epidermis; perithecia four to twelve in a pustule, globose or angulated by mutual pressure; ostiola crowded, rather prominent, subglobose, even, black; asci subclavate, .004 to .005 in. long, .0005 to .0006 broad; spores crowded or biseriate, subcylindrical, slightly narrowed toward one or both ends, granular within, at length spuriously three to five-septate by the division of the endochrome, colorless, .0016 to .0024 in. long, .00025 to .00032 broad.

Dead branches of hickory, *Carya alba*. Knowersville. May.

The epidermis is loosened over the pustules and is generally ruptured in longitudinal chinks. When it is removed the blackened pustules are conspicuous. The spores are sometimes constricted in the middle.

Mazzantia sepium, *Sacc. & Penz.*

Dead stems of *Calystegia Sepium*. North Greenbush. May.

The spores in our specimens are a little larger than in the typical form and trinucleate.

D.

REMARKS AND OBSERVATIONS.

CAULOPHYLLUM THALICTROIDES, *L.*

A form occurs on the Helderberg mountains which bears two panicles, or clusters of flowers. One is much smaller than the other, and is usually about three flowered.

VIOLA CUCULLATA, *Ait.*

The variety with peduncles, much longer than the petioles (var. *longipes*), is common in wet places in the Adirondack region. It blossoms there about the middle of June.

HYPERICUM ELLIPTICUM, *Hook.*

A small form with stems eight to twelve inches high, and leaves erect and appressed, was found in wet places by the roadside in Caroga. This position of the leaves gives a peculiar aspect to the plants.

RHUS TYPHINA, *L.*

The form with laciniate leaves has been found near Nyack, Rockland county, by *Rev. J. L. Zabriskie.*

ROSA SETIGERA, *Mx.*

Low ground near West Albany. Introduced from the West.

RUBUS HISPIDUS, *L.*

Common in Caroga and not infrequent with five-foliate leaves on the young stems.

FEDIA RADIATA, *Mx.*

Wynantskill, Rensselaer county. *H. C. Gordinier.* This is a form with smooth fruit.

ARALIA NUDICAULIS, *L.*

A form with no leaf but with the scape bearing four to six umbels at the apex and a branch near or below the middle. This branch is terminated by a single umbel, and probably represents the usual leaf.

ARALIA HISPIDA, *Mx.*

This sometimes grows with great vigor in the Adirondack region. A specimen was found in Caroga, more than three feet high and bearing upwards of forty umbels, the large central and terminal one being two and a half inches in diameter.

CUPHEA VISCOSISSIMA, *Jacq.*

This plant appears to be gradually extending its range northward in the Hudson river valley. It has occurred in the vicinity of Pine Plains and at Salt Point, Dutchess county, and the past season it was detected near Catskill by Judge *Clinton.* On the authority of Drs. Stevenson and Knieskern it was reported in the State Flora as an inhabitant of the "northern part of the State," but I suspect this is a mistake.

TUSSILAGO FARFARA, *L.*

Abundant on clay banks about Albany and Troy. In rare instances the leaves appear while the plant is yet in flower. The rays assume a reddish hue with age and the scapes become elongated.

HIERACIUM AURANTIACUM, *L.*

This plant has become well established in many parts of the State and is still spreading. The past season it was observed in Fulton county, where it had evidently escaped from a flower garden to the roadside.

VACCINIUM PENNSYLVANICUM, *Lam.* var. NIGRUM.

Caroga, where it was growing sparingly with the ordinary form of the species.

CASTILLEIA COCCINEA, *Spreng.*

The usual habitat, ascribed to this species in the manuals, is wet meadows and sandy low grounds. In Springwater, Livingston county, and in Canadice, Ontario county, it was found by Mr. *D. Byron Waite* growing on the "tops and sides of bare dry and sterile hills, and where low shrubs and moss abound."

HYDRANGEA ARBORESCENS, *L.*

Wellsburg, Chemung county. *E. A. Burt.*

POTAMOGETON ROBBINSII, *Oakes.*

Hudson river near Rhinebeck. *H. Andrews.* The plants were sterile as usual.

HABENARIA ROTUNDIFOLIA, *Rich.*

Turin, Lewis county. July. *R. B. Hough.* This is the second locality in the State for this rare plant. Mr. Hough informs me that it is difficult to obtain perfect specimens of this plant, most of the flowers being injured, apparently by some insect.

TRILLIUM GRANDIFLORUM, *Salisb.* v. VARIEGATUM.

This interesting variety or form has the leaves petiolate and the petals variegated with green, which is usually in the form of a broad longitudinal stripe through the middle. It was discovered in dense woods near Jamesville, Onondaga county, by members of the Syracuse Botanical Club, and specimens were contributed to the Herbarium by Mrs. *L. L. Goodrich* and Mrs. *S. M. Rust.* It has also been found on Goat Island by Hon. *G. W. Clinton.* In the Jamesville locality it was associated with *Trillium erectum* and typical *T. grandiflorum.* In one specimen communicated by Mrs. Goodrich the petioles originate near the ground, the stem being very short. They are about three and a half inches long and the peduncle is five inches long. In other specimens these parts are less elongated and the form appears to be merged into the type. The specimens indicate a coincidence between the petioles, peduncles and green color of the petals. Generally the longer petioles are accompanied by longer peduncles and broader green stripes on the petals. This coincidence between form and color is remarkable.

JUNCUS TRIFIDUS, *L.*

Sam's Point, Shawangunk mountains. Prof. *N. L. Britton.* Probably this is the most southern station for this Juncus in our State. It occurs at Lake Mohunk and also on the high summits of the Adirondack mountains.

SCIRPUS POLYPHYLLUS, *Vahl.*

Catskill. *G. W. Clinton.* A rare species in our State.

SCIRPUS SYLVATICUS, *L.*

Wet places about half a mile south-east of Loudonville.

GLYCERIA FLUITANS, *L.*

Caroga lake. The form with long flat linear floating leaves, suggestive of the specific name, is not rare in the lakes of the Adirondack region, but it is not always fertile.

AIRA CÆSPITOSA, *L.*

Wet ground. Caroga. It was growing in company with *A. flexuosa* which usually inhabits dry, rocky, sterile hills.

MILLIUM EFFUSUM, *L.*

A tall glaucous-leaved form, is plentiful in woods in the Boreas river valley in Minerva, Essex county.

PELLÆA GRACILIS, *Hook.*

About the entrance of a limestone cavern, Minerva. The presence of limestone appears to be a necessity to this rare little fern. Although there are many localities in the Adirondack region which seem favorable to its growth, I have never observed it there except in the immediate vicinity of limestone, and as this is in limited quantity and scattered stations, this fern occupies there very isolated and limited localities. In the station mentioned it was in company with *Aspidium aculeatum* Sw. v. *Braunii.*

WOODWARDIA VIRGINICA, *Sm.*

Abundant in a marsh near Karner.

AGARICUS STIPITARIUS, *Fr.* V. SETIPES.

Stem elongated, straight, very slender, three to four inches long, scarcely as thick as a knitting needle. Caroga. July. Specimens of this species revive on the application of moisture, thus indicating a close relationship to species of Marasmius.

AGARICUS CLAVICULARIS, *Fr.*

This species is quite variable with us. Three or four forms or varieties were found growing under balsam trees in one locality in Caroga. Var. *albus* is wholly white. Var. *cinereus* has the pileus and stem pale cinereus; this is the most common. Var. *filipes* has the pileus small, two or three lines broad, and the stem very slender or filiform. When moist the stem is viscid, and in taking it from its place of growth the fingers are liable to slip from their grasp before the plant yields from its attachment to the ground, but when dry it is taken without difficulty. The pileus is not viscid, and by this character the species may be distinguished from *A. vulgaris.*

AGARICUS LEAIANUS, *Berk.*

This beautiful Agaric is common in the woods of all our hilly or mountainous districts, growing most frequently on dead trunks of beech, but often on those of other deciduous trees. In a single instance it was found growing on decaying wood of hemlock.

AGARICUS FIBULA V. CONICUS.

This singular variety has the pileus conical, not umbilicate, sometimes papillate. Mossy prostrate trunks in woods. Caroga. July.

AGARICUS ATROCÆRULEUS, *Fr.*

I have not yet found the plant with blue colors. It is brownish with us and villose with grayish densely tufted hairs, sometimes inclining to a cervine hue. On poplars. Karner. Sept.

AGARICUS RHODOPOLIUS, *Fr.* V. UMBILICATUS.

Pileus convex, umbilicate, 1 to 2 inches broad; lamellæ subdecurrent; stem elongated, slender, containing a small cavity. Karner. Sept. A slender variety growing with the ordinary form, but appearing quite unlike it.

TROGIA CRISPA, *Fr.* v. VARIEGATA.

Pileus and lamellæ variegated with bluish or greenish-blue stains. Sandlake. Sept.

BOLETUS VISCOSUS, *Frost.*

This name is antedated by *B. viscosus* Ventur., and if the Frostian species is a good one, it will be necessary to give it another name. It cannot be called *B. Frostii*, as there is already a species bearing that designation. Mr. Frost's plant is manifestly very near *B. granulatus* and may possibly be a variety of that species, although the two, as they occur with us, are readily distinguishable. They appear to have been united by European mycologists. The distinguishing characters are found in the color, glutinosity, glandular dots or sugary granules of the tubes and stem and in the comparative length of the stem. In Frost's plant the pileus is at first dark-chestnut color and covered with a thick tough gluten, appearing, as the author remarks, as if it "was enveloped in slime," but it becomes yellowish, tawny-yellow or reddish-yellow and less glutinous with age. The glandular dots are usually entirely absent from the mouths of the tubes and from the stem, but when present they are very minute and inconspicuous and occur chiefly at the top of the stem. This is very short, varying from one-half to one inch in length, so that "the pileus seems to rest upon the ground." In *B. granulatus*, the young pileus is much paler, though variable in color, and is less glutinous. It does not become conspicuously paler with age and the glandular dots or granulations, which suggest the name of the species, are readily seen on the tube mouths and stem. They usually dot the stem from top to base, though sometimes they are more conspicuous on the upper part. The stem is generally one to two inches long. This plant appears from midsummer to the end of the season, but I have only seen Frost's plant in late autumn. It is quite possible that the two plants run together, but from the character of the differences noted it seems to me to be best at present to keep them distinct, and for convenience of reference I would designate the Frostian species as *Boletus brevipes*, in allusion to its short stem. It grows in sandy soil under pine trees. Karner. Oct.

BOLETUS SCABER, *Fr.* v. NIVEUS.

Swamps. Karner. Oct. This is a beautiful variety, easily recognized by the white color of the pileus. This, however, becomes tinged with livid-blue or greenish-blue when old.

BOLETUS GRACILIS, *Pk.* v. LÆVIPES.

Stem destitute of reticulations. Otherwise like the tpyical form of the species. South Ballston. Sept.

POLYPORUS SULPHUREUS, *Fr.*

The young growing plant sometimes exudes a pale-yellow or sulphur-colored juice when cut or broken.

POLYPORUS VOLVATUS, *Pk.*

This is occasionally found on balsam trunks, *Abies balsamea.* Adirondack mountains. June.

POLYPORUS CONGLOMERATUS, *Pk.*

Prostrate trunks of beech. Osceola. Aug.

LYCOPERDON GIGANTEUM, *Batsch.*

A specimen of the obconic form mentioned by Fries was found near Coeymans, Albany county, by Mr. *John D. Parsons.*

MORTHIERA MESPILI, *Fckl.*

Living leaves of *Amelanchier Canadensis.* Caroga. July.

PUCCINIA CALTHÆ, *Lk.*

This species, which is rare in our State, was found in a wooded swamp in Caroga. July.

UROCYSTIS POMPHOLYGODES, *Schl.*

On *Thalictrum anemonoides.* Albany. *G. W. Clinton.*

CYSTOPUS CUBICUS, *De By.*

Radical leaves of *Senecio aureus.* Adirondack mountains. June. This species inhabits various species of compositæ, but does not appear to have been before found on Senecio.

GLOMERULARIA CORNI, *Pk.*

Hitherto found only on *Cornus Canadensis*, but now on *Lonicera ciliata* also. Adirondack mountains. June.

LOPHIOTREMA SPIRÆÆ, *Sacc.* V. ADULTUM.

This has the spores nine to eleven-septate. In the type they are seven-septate. West Albany. Apr.

DIAPORTHE SPICULOSA, *Nits.*

A form occurs on dead branches of *Spiræa opulifolia* without a limiting black line in the matrix. The perithecia are sunk in the wood, the surface of which becomes blackened.

HYPODERMA NERVISEQUUM, *Fr.*

Fertile specimens were found on balsam leaves in Caroga. July.

LOPHODERMIUM PETIOLICOLUM, *Fckl.* V. ACERINUM.

Perithecia narrowly elliptical or oblong; asci subclavate, .0025 to .003 in long, .0008 to .00035 broad; spores filiform, considerably shorter than the ascus. Fallen petioles of *Acer saccharinum.* Caroga. July.

E.

NEW YORK SPECIES OF LACTARIUS.

LACTARIUS, *Fr.*

[Galorrheus, Fr. Lactifluus, Hoffm.]

Hymenophorum fleshy, vesiculose, continuous with the fleshy stem; lamellæ unequal, adnate or decurrent, acute on the edge, exuding a milky or colored juice when wounded; volva and annulus none; spores globose or broadly elliptical, white or yellowish.

The peculiar character of this genus, and one which gives to it its name, is the milky juice which pervades the flesh and especially the lamellæ of the species. It is generally white, like milk, but in some species it quickly changes color on exposure to the air, and in a few it is always colored. In some instances it is colorless or watery, but such plants are regarded by Fries as degenerate or abnormal from growing in very wet places. In very old specimens, or in very dry weather, the milk is often more scant than usual, and it sometimes fails entirely. Its presence may generally be ascertained by cutting or breaking the pileus or the lamellæ. It is better to seek it in the latter, inasmuch as it generally flows more freely from them, especially in small species, than from the pileus and stem. In some species of Mycena a similar milky or colored juice exists, especially in the stem, but these are abundantly distinct from the Lactarii by their small size, campanulate pileus and slender, hollow, cartilaginous stem. In the genus Russula the size, shape and texture of the species is the same as in Lactarius, but the milky juice is wanting, though the acrid taste may be present, so that the presence of the milk and the fleshy stem is sufficient to distinguish these plants from all other Agaricini.

The pileus is fleshy in all the species, but in some it is thin. Even when thick and compact its texture is brittle, so that it is easily broken. It is variegated in many species by more highly-colored concentric bands or zones, a character always wanting in the allied species of Russula. The margin of the pileus is at first inflexed or involute, and the pileus itself more or less convex, but with advancing age the margin becomes spreading or elevated, and then the pileus, being depressed in the center, presents an obconic or funnel shape. Sometimes the pileus is convex, but umbilicate or centrally depressed with its earliest appearance, in other instances it is broadly convex or nearly plane, and furnished with a small umbo or papilla.

The lamellæ are at first adnate, but by the change in the shape of the pileus, which comes from its expansion and the elevation of the margin, they become more or less decurrent. It is not uncommon to find them branched or forked, especially near the inner extremity. In color they are generally white or whitish, but this is often varied by yellowish or reddish tints as they become mature. They often change color where cut or bruised, even when the milk remains unchangeable. In some species they become pruinose or dusted by the spores when old, in others they remain naked.

The stem in many species is short and comparatively thick, in others its length equals or exceeds the diameter of the pileus. It may be equal in diameter throughout its entire length, or become gradually narrower either toward the apex or toward the base. In some species it is always solid or merely becomes spongy within when old, in others it may be either spongy within or hollow, and that too in different individuals of the same species. When it is stuffed in the young plant it is likely to be hollow in the old. In many of the species individuals sometimes occur in which it is eccentric.

The spores are globose or broadly elliptical, and more or less rough or echinulate, and they vary but little in size in the different species. Still by their slight variations in size and color they sometimes afford good specific characters, and should by no means be neglected in the study of the species.

The taste of the milk and flesh in many species is very acrid, or hot and biting like that of Cayenne pepper; in others it is mild or but tardily and slightly acrid. This character is of great utility in distinguishing the species, and it is necessary to observe it by actually tasting, but not swallowing the milk or flesh, if we would satisfactorily identify our specimens.

Several of the species are edible, others are affirmed by authors to be poisonous. In some instances authors do not agree in respect to the quality of the species, for while one affirms, for example, that *L. insulsus* and *L. piperatus* are edible, another declares them to be poisonous. It is most prudent to avoid the use of such acrid species, for although their acridity is dispelled or destroyed by cooking, they are said by Gillet to be indigestible, and only acceptable to the strongest stomachs.

Most of the Lactarii grow on the ground, a few on decaying wood. They are found in deep woods and swamps and in grassy grounds and open places. They occur in Summer and Autumn, and are most abundant in warm, showery weather. The species have been arranged by Fries in groups, depending partly on the color and quality of the milk and partly on the naked or pruinose character of the lamellæ. This latter character does not appear to me to be sufficiently constant and obvious to be satisfactory. I have, therefore, made the color of the milk the only basis of the primary grouping of our species.

Synopsis of the Species.

Milk at first bright-colored, unchangeable 1
Milk at first white, changing color on exposure to the air...... 2
Milk white or whitish, unchangeable 7
1 Young lamellæ and milk indigo-blue .... Indigo.
1 Young lamellæ and milk dark-red .... subpurpureus.
1 Young lamellæ and milk orange-red .... deliciosus.
1 Young lamellæ and milk saffron-yellow .... Chelidonium.
2 Milk becoming pinkish-red 3
2 Milk becoming yellow 4
2 Milk becoming lilac-color .... uvidus.
3 Pileus dingy-gray or buff-gray (partly) .... fuliginosus.
3 Pileus dingy-brown (partly) .... lignyotus.
4 Margin of the mature pileus glabrous 5
4 Margin of the mature pileus tomentose-hairy 6
5 Pileus distinctly spotted, taste acrid .... chrysorheus.
5 Pileus not distinctly spotted, taste tardily acrid .... theiogalus.
6 Stem spotted .... scrobiculatus.
6 Stem not spotted .... cilicioides.
7 Pileus viscid when moist 8
7 Pileus not viscid 13
8 Margin of the pileus distinctly tomentose-hairy ...... torminosus.
8 Margin of the pileus glabrous or nearly so 9
9 Pileus greenish-brown or yellowish-brown, tinged with green..sordidus.
9 Pileus some other color, glabrous and viscid 10
10 Pileus some shade of red or yellow 11
10 Pileus some other color 12

11 Pileus reddish, generally zoneless........................hysginus.
11 Pileus ochraceous, zoneless.............................affinis.
11 Pileus yellow or yellowish-white, zonate.................insulsus.
12 Stem paler than the pileus..........................trivialis.
12 Stem colored like the pileus........................cinereus.
13 Pileus minutely tomentose,pubescent or squamulose.......... 14
13 Pileus glabrous or merely pruinose........................ 21
14 Pileus rugose-reticulated, velvety-pubescent.........corrugis.
14 Pileus not rugose-reticulated......................... 15
15 Pileus some shade of gray or brown......................... 16
15 Pileus some shade of red or yellow......................... 18
15 Pileus white or whitish.................................... 20
16 Plant inodorous...................................... 17
16 Plant odorous.................................glyciosmus.
17 Pileus about one inch broad, becoming paler with age......griseus.
17 Pileus more than one inch broad, not expallent (partly)..plumbeus.
18 Lamellæ distant (partly)......................hygrophoroides.
18 Lamellæ close.. 19
19 Pileus less than two inches broad, milk white.............alpinus.
19 Pileus two inches or more broad, milk watery (or white)......helvus.
20 Surface of the pileus persistently velvety-tomentose..vellereus.
20 Margin of the pileus cottony-tomentose when young (partly) deceptivus.
21 Pileus white or whitish.................................... 22
21 Pileus some other color.................................... 24
22 Lamellæ distant or subdistant........................ 23
22 Lamellæ crowded, dichotomous...................piperatus.
23 Stem more than four lines thick, young pileus umbilicate (partly) deceptivus.
23 Stem not more than four lines thick, pileus never umbilicate..albidus.
24 Pileus some shade of gray or brown................... 25
24 Pileus some shade of red or yellow................... 31
25 Wounds of the lamellæ becoming pinkish-red................ 26
25 Wounds of the lamellæ not becoming pinkish-red............ 27
26 Pileus dingy-gray or buff-gray (partly)............fuliginosus.
26 Pileus dingy-brown (partly)......................lignyotus.
27 Wounds of the lamellæ becoming sordid-greenish............ 28
27 Wounds of the lamellæ not becoming sordid-greenish........ 29
28 Plant growing on the ground..........................varius.
28 Plant growing on decaying wood......................parvus.
29 Taste mild...Gerardii.
29 Taste acrid.. 30
30 Pileus dry, zoneless (partly)......................plumbeus.
30 Pileus moist, generally zonate.....................pyrogalus.
31 Lamellæ distant (partly)............................hygrophoroides.
31 Lamellæ close or subdistant................................ 32
32 Taste acrid.. 33
32 Taste mild or slightly acrid......................... 34
33 Pileus bay-red, flesh pinkish.................................rufus.
33 Pileus yellowish-red, flesh white.....................platyphyllus.

34 Stem more than four lines thick........................volemus.
34 Stem less than four lines thick........................ 35
35 Plant odorous..........................camphoratus.
35 Plant inodorous........................ 36
36 Pileus some shade of red, not becoming paler with age...subdulcis.
36 Pileus brown or brownish, becoming paler with age...paludinellus.

*Milk at first bright-colored, unchangeable.**

This group corresponds to the tribe DAPETES of Fries. In Europe there are but two species belonging to it ; in our State there are four, one of which, *L. deliciosus,* is common to this country and Europe. There is much similarity in our species, their most obvious differences being in color. The pileus in all is glabrous, slightly viscid when moist, more or less zonate when young and moist, but becoming paler and less clearly zonate with age. The stem is hollow, at least when old, and often adorned with spots of the same color as the milk. The color of the milk pervades the whole plant, but it is less bright and clear except in the spots and the young lamellæ. Bruises or wounds of the lamellæ are apt to become greenish, and old plants are often stained with this hue. The spores in all are yellowish, and the taste is mild or slowly and moderately acrid. Probably all are edible, but only *L. deliciosus* has been tested.

Lactarius Indigo, *Schw.*

Blue Lactarius.

Pileus at first umbilicate with the margin involute, then depressed or infundibuliform, *indigo-blue with a silvery-gray lustre*, zonate, especially on the margin, sometimes spotted, becoming paler and less distinctly zonate with age or in drying ; lamellæ close, *indigo-blue*, becoming yellowish and sometimes greenish with age ; stem short, nearly equal, hollow, often spotted with blue, colored like the pileus ; spores subglobose, .0003 to .00035 in. long ; milk *dark blue.*

Pileus 2 to 5 inches broad, stem 1 to 2 inches long, 6 to 10 lines thick.

Dry places, especially under or near pine trees. Not rare but seldom abundant. July to September.

Lactarius subpurpureus, *Peck.*

Purplish Lactarius.

Pileus at first convex, then nearly plane or subinfundibuliform, more or less spotted and zonate when young and moist, *dark-red with a grayish lustre ;* lamellæ close, *dark-red*, becoming less clear and sometimes greenish-stained with age ; stem equal or slightly tapering upward, soon hollow, often spotted with red, colored like the pileus, sometimes hairy at the base; spores subglobose, .00035 to .0004 in., milk *dark-red.*

Pileus 2 to 3 in. broad, stem 1.5 to 3 in. long, 3 to 5 lines thick.

Damp or mossy ground in woods and swamps. July and August.

At once known by the peculiar dark-red or purplish hue of the milk, which color also appears in the spots of the stem and in a more subdued tone in the whole plant. The color of the pileus lamellæ and stem is

---

* Badham says that the milk of *L. deliciosus* changes to a green color, but I have not observed such a change.

modified by grayish and yellowish hues. In age and dryness the zones are less clear, and dried specimens can scarcely be distinguished from *L. deliciosus.*

Lactarius deliciosus, *Fr.*

Delicious Lactarius.

Agaricus deliciosus L.

Pileus at first convex and subumbilicate, then nearly plane or subinfundibuliform, *yellowish-orange or grayish-orange* varied by brighter spots and zones, fading to grayish-yellow when old or dry; lamellæ close, *orange-colored* with paler reflections, less clear and often greenish-stained with age; stem nearly equal, stuffed or hollow, often spotted, colored like the pileus, sometimes hairy at the base; spores subglobose, .0003 to .0004 in.; milk *orange-colored.*

Pileus 2 to 5 in. broad, stem 2 to 4 in long, 4 to 8 lines thick.

Woods and open places, but especially in mossy swamps. Common. July to September. Edible.

This is the most common species of its group. It grows both in wet and in dry places, and in acerose, frondose or mixed woods. It has an excellent reputation as an edible fungus. Badham says it is one of the best of fungi and that its flesh is firm, juicy, sapid and nutritious. One writer pronounces it the most delicious mushroom known. The best method of cooking is said to be, to bake three-fourths of an hour in a close covered dish, having seasoned it with pepper, salt and butter.

Badham states that the milk turns green on exposure to the air. Wounds of the flesh and lamellæ often do, but I have not observed this change in the color of the milk.

Lactarius Chelidonium, *Peck.*

Celandine Lactarius.

Pileus at first convex, then nearly plane and umbilicate or centrally depressed, *grayish-yellow or tawny,* at length varied with bluish and greenish stains, often with a few narrow zones on the margin, lamellæ *narrow,* close, sometimes forked, anastomosing or wavy at the base, *grayish-yellow;* stem short, subequal, hollow, colored like the pileus; spores globose, .0003 in.; milk sparse, *saffron-yellow;* taste mild.

Pileus 2 to 3 in. broad, stem 1 to 1.5 in. long, 4 to 6 lines thick.

Sandy soil, under or near pine trees. Saratoga and Bethlehem.

The milk of this species resembles in color the juice of celandine, *Chelidonium majus.* It is paler than that of *L. deliciosus.* By this character and by the dull color of the pileus, the narrow lamellæ, short stem and its fondness for dry situations, it may be separated from the other species. Wounds of the flesh are at first stained with the color of the milk, then with blue, finally with green. A saffron color is sometimes attributed to the milk of *L. deliciosus,* which may indicate that this species has been confused with that, or that the relationship of the two plants is a closer one than we have assigned to them.

Milk at first white, changing color on exposure to the air.

In this group, wounds of the lamellæ and flesh generally assume the changed color of the milk after a brief exposure to the air.

Lactarius uvidus, *Fr.*

Moist Lactarius.

Pileus at first convex, then nearly plane or centrally depressed, *glabrous, viscid*, whitish, grayish-brown or livid-brown, generally with a slight tinge of pink, sometimes obscurely zonate or marked with darker spots, either with or without a small umbo; lamellæ rather narrow, thin, close, white or yellowish, becoming *lilac where cut or bruised;* stem equal or slightly tapering upward, stuffed or hollow, glabrous, viscid, whitish or pallid ; spores globose or broadly elliptical, *yellowish*, 00035 to .00045 in.; milk white, *changing to lilac*, taste acrid.

Var. *magnus*. Plant large, pileus obscurely zonate or marked with darker spots more or less concentrically arranged.

Pileus 1 to 2 in. broad, stem 1.5 to 3 in. long, 3 to 6 lines thick.

Wet mossy places in woods and swamps. Adirondack mountains and Sandlake. July and August.

This species is not very common. It is readily recognized by the lilac color assumed by the milk and the wounds of the flesh and lamellæ. The variety occurs in Vermont where it was observed by Mr. A P. Morgan.

Lactarius chrysorheus, *Fr.*

Yellow-milk Lactarius.

Agaricus zonarius, Bolt.

Pileus convex, umbilicate or centrally depressed, becoming infundibuliform, glabrous, *yellowish*, sometimes tinged with flesh-color, *adorned with bright-colored zones and spots*, the margin at first involute and pruinose-tomentose · lamellæ thin, close, adnate or decurrent, yellowish, some of them forked; stem equal, glabrous, hollow, white or colored like the pileus, sometimes spotted ; spores subglobose, .0003 to .00035 in.; milk white, *becoming yellow*, taste acrid.

Pileus 1 to 3 in. broad, stem 8 to 15 lines long, 3 to 5 lines thick.

Thin woods or open places. Bethlehem and Sandlake. July and August. Not common.

Fries describes this species as having a dry pileus, but in our specimens it appeared to be slightly viscid when moist. The milk in the European plant is said to change color quickly, in ours the change takes place slowly. The spots of the pileus are usually small and numerous and sometimes concentrically arranged. They, as well as the zones, have a golden-yellow or pale-orange hue. They, together with the color of the pileus, distinguish this species from the next, and the change in the color of the milk separates it from *L. insulsus*. The plant described in the Twenty-third Report under this name belongs to the next species.

Lactarius theiogalus, *Fr.*

Sulphur-milk Lactarius.

Agaricus theiogalus, Bull.

Pileus fleshy, thin, convex, then depressed, even, *glabrous*, viscid, *tawny-reddish;* lamellæ adnate or decurrent, close, pallid or reddish :

stem stuffed or hollow, even, colored like the pileus; spores *yellowish, inclining to pale flesh-color,* subglobose, .0003 to .00035 in.; milk white, *changing to sulphur-yellow,* taste tardily acrid, bitterish.

Pileus 2 to 5 in. broad, stem 1 to 3 in. long, 4 to 10 lines thick.

Woods and groves. Common. July to October.

Our plant does not fully accord with the description of the species as given by Fries. The pileus is moderately thick and compact, varying from convex or nearly plane and umbilicate to depressed or infundibuliform, slightly viscid when moist, zoneless or obscurely zonate, varying in color from pale grayish-red to tawny-red or brick-red, there being a mixture of gray yellow and red not easily defined. Gillet describes the pileus as "tawny-red, clear brick-red, bistre-red or orange-yellow diversely shaded." It somewhat resembles *L. torminosus* in color, but the glabrous margin and changeable milk distinguish it. The surface of the pileus has a minutely uneven or unpolished appearance, but it is smooth to the touch. The lamellæ are sometimes forked near the stem, whitish tinged with creamy-yellow or flesh color, and they often become stained with reddish-brown when old or bruised. The stem is generally paler than the pileus. It is commonly hollow, though sometimes stuffed or spongy within. Rarely it is spotted or stained with reddish-brown. When the flesh is cut or broken it soon assumes the pale-yellow color of the exposed milk. The taste is tardily or moderately acrid, or somewhat woody and bitterish. Its less acrid taste, unspotted and more reddish pileus, distinguish it from the preceding species. According to Gillet it is pronounced edible by some authors, poisonous by others. Cordier says that the pileus is dry, that the stem is almost always stuffed, and that it passes for poisonous, but that Letellier has eaten it more than once without inconvenience.

Lactarius resimus, *Fr.*

Recurved Lactarius.

Pileus convex and umbilicate, then infundibuliform, even, glabrous, viscid, zoneless, *whitish or pallid*, the margin at first *involute, white-tomentose*, at length spreading, naked; lamellæ decurrent, whitish; stem even or obsoletely spotted, villose, hollow, thick; milk *quickly changing to sulphur-yellow*, taste acrid

Var. *regalis.* (*L. regalis,* Peck.) Pileus yellowish-white, the margin glabrous; stem glabrous; spores globose, .0003 in.

Pileus 4 to 6 in. broad, stem 2 to 3 in long, 8 to 12 lines thick.

Woods. Croghan. September. Rare.

Our plant, which has been observed but once, has the margin of the pileus and the stem glabrous, but it can scarcely be more than a variety of the species, and as such we have subjoined it.

Lactarius scrobiculatus, *Fr.*

Spotted-stemmed Lactarius.

Agaricus scrobiculatus, Scop. *Agaricus theiogalus,* A. & S.

Pileus convex, then nearly plane or centrally depressed, viscid when moist, zoneless or slightly zonate, *reddish-yellow or subochraceous,* the margin at first involute, then spreading, *tomentose hairy;* lamellæ thin, close, adnate or slightly decurrent, whitish or yellowish; stem equal, stout, hollow, colored like the pileus, adorned by *suborbicular depressed spots of a brighter color;* spores *white*, .0003 to .00035 in.; milk white, *changing to sulphur-yellow*, taste acrid.

Pileus 3 to 6 in. broad, stem 1.5 to 3 in. long, 6 to 12 lines thick.

Wet, mossy ground in woods. Caroga. July. Rare.

This Lactarius is similar to the preceding in size and shape, and like that, it sometimes has the margin naked when old, but it is distinguished by its distinctly-spotted stem and more highly-colored pileus. Its color approaches that of *L. theiogalus*, but its generally hairy margin, together with its spotted stem and more acrid taste, will distinguish it from that species. It is not deemed edible.

Lactarius cilicioides, *Fr.*

Tomentose Lactarius.

Agaricus tomentosus, Otto. *Agaricus crinitus*, Schæff.

Pileus broadly convex or nearly plane, umbilicate or centrally depressed, occasionally subinfundibuliform, soft, *covered with long matted hairs or tomentum*, the center sometimes becoming naked with age, *zoneless*, viscid when moist, white reddish-buff or dingy-incarnate; lamellæ rather narrow, thin, close, adnate or slightly decurrent, some of them forked, white, or tinged with yellow or incarnate; stem short, equal or tapering downward, pruinose, stuffed or hollow, *not spotted*, white or whitish; spores *white*, .00025 to .0003 in.; milk white, sparse, slowly changing to pale yellow, taste acrid.

Var. *albus*. Pileus at first white, flesh white, stem short, milk very sparse or almost none.

Pileus 1.5 to 4 in. broad, stem .5 to 1.5 in. long, 3 to 6 lines thick.

Woods and open places, especially under or near pine trees. Forestburgh, Karner, West Albany and Greig. September and October.

The tomentose Lactarius is distinguished from all our other species by its conspicuously woolly pileus. It is this character that gives name to the plant. The hairs or fibrils are long and intricately matted, and so viscid in wet weather that fragments of leaves, sticks and dirt are often found adhering to them. The variety, which is found especially on sandy soil near pine trees, is white when young, but with age it is apt to become stained with a dirty-yellow or rusty-yellow hue, especially in the center. The milk is very sparse and sometimes wanting. The stem is so short that the pileus appears to rest on the ground. In the form which grows in woods the stem is longer, and the pileus approaches the next species in color. Fries describes the stem as two to three inches long and one inch thick, but I have seen no specimens with stems so large. The plant occurs in autumn, and sometimes several successive crops appear in the same locality in one season. It is sometimes subcæspitose.

Milk white or whitish, unchangeable.

* Pileus viscid when moist.

Lactarius torminosus, *Fr.*

Colic Lactarius. Woolly Lactarius.

Agaricus torminosus, Schæff. *A. necator*, Bull. *A. piperatus*, L. *A. barbatus*, Retz.

Pileus convex, then depressed, viscid when young or moist, yellowish-red or pale-ochraceous tinged with red or flesh color, often varied with zones or spots, the at first involute *margin persistently tomentose-hairy;* lamellæ thin, close, narrow, whitish, often tinged with yellow or flesh color; stem equal or slightly tapering downward, hollow, sometimes spotted, whitish; spores subglobose or broadly elliptical, .00035 to .0004 in., milk white, taste acrid.

Pileus 2 to 4 in. broad, stem 1.5 to 3 in. long, 4 to 8 lines thick.

Woods. Adirondack mountains and Sandlake. August.

This species differs from all the preceding by its unchangeable milk, and from all the following by the coarse tomentum or hairs of the margin of the pileus. Badham says that it is acrid and poisonous, and Gillet declares it to be deleterious and even dangerous, and that in the raw state it is a very strong drastic purgative. On the other hand Cordier states that almost all authors agree in saying that it is eaten with impunity, and that Letellier has eaten it more than once without inconvenience.

Lactarius sordidus, *Peck.*

Pileus thick, firm, convex and centrally depressed, then nearly plane or subinfundibuliform, *subglabrous*, slightly viscid when moist, *soon dry, pale yellowish-brown, tinged with sordid green*, often darker in the center; lamellæ narrow, close, white or yellowish; stem short, firm, equal or slightly tapering upward, hollow, colored like the pileus, generally spotted; spores .0003 to .00035 in.; milk white, taste acrid.

Pileus 2 to 4 in. broad, stem 1 to 2 in. long, 4 to 8 lines thick.

Woods and open places, especially under spruce and balsam trees. Adirondack mountains and Sandlake. August and September.

This species appears to resemble *L. turpis* Fr. in color, but that species differs, according to the description of Fries, in having the margin of the pileus at first villose or tomentose, the stem stuffed, attenuated downward, not spotted, and the pileus covered with a tenacious gluten. Like it, our plant has a sordid, forbidding appearance. It sometimes appears to be adorned with a few obscure fibrils or to be slightly scabrous or hairy.

Lactarius trivialis, *Fr.*

Common Lactarius.

Pileus convex, then nearly plane, umbilicate or centrally depressed, glabrous, viscid, sometimes zonate, leaden-gray, livid-cinereous or pale brown, often with a pink or lilac tint, the thin inflexed margin at first with a grayish pruinosity; lamellæ rather narrow, close, thin, adnate, sometimes forked, whitish, becoming pallid or creamy-yellow, with *dingy-greenish stains where wounded;* stem equal or slightly tapering upward, long or short, glabrous, rarely spotted, hollow, whitish, often tinged with yellow or gray, *paler than the pileus;* spores *yellowish*, .0003 to .0004 in.; milk *whitish or pale cream color*, taste acrid.

Var. *maculatus* Pileus zonate or spotted and zonate, stem sometimes spotted.

Var. *gracilis*. Pileus small, 1 to 2 in. broad, stem equal to or longer than the diameter of the pileus, often tapering upward.

Pileus 1 to 6 in. broad, stem 1 to 5 in. long, 3 to 10 lines thick.

Woods and open places Sandlake, Albany and Adirondack mountains. July to September.

A variable species. Some forms of our plant exhibit the characters attributed to the European fungus, others do not; but these forms all run together in such a way as to leave scarcely a doubt of their specific unity. I have therefore merely distinguished two of these forms as varieties. In all the forms the pileus is sometimes zonate, and in one it is spotted, though Fries describes the pileus as "azonate" and the stem as "immaculate." In the variety *maculatus* a zonate pileus and spotted stem are sometimes united in the same plant. This form occurred in low woods in Gansevoort. The plants were large and the stem long. The variety *gracilis* was found in woods in Greig, and is so small and slender that it appears like a distinct species, yet exhibits the essential specific characters. The thin pellicle of the pileus is separable and the whitish flesh has a dingy or grayish hue immediately beneath it. The plant is sometimes cæspitose.

Lactarius hysginus, *Fr.*

Reddish Lactarius.

Agaricus vietus, Krombh.

Pileus rigid, at first convex, then nearly plane, umbilicate or slightly depressed, even, viscid, zoneless or rarely obscurely zonate, *reddish-incarnate, tan-color* or *brownish-red,* becoming paler with age, the thin margin inflexed; lamellæ close, adnate or subdecurrent, whitish, becoming yellowish or cream colored; stem equal, glabrous, stuffed or hollow, colored like the pileus, or a little paler, sometimes spotted; spores subglobose, *whitish on black paper, yellowish on white paper*, .00035 to .0004 in.; milk white, taste acrid.

Pileus 2 to 3 in. broad, stem 1 to 2 in. long, 4 to 8 lines thick.

Woods. Sandlake and Caroga. July and August. Not common.

The reddish hue of the pileus distinguishes this species from its allies. The gluten or viscidity of the pileus in our specimens was rather tenacious and persistent.

Lactarius affinis, *Peck.*

Related Lactarius.

Pileus convex and centrally depressed, glabrous, viscid, *zoneless, ochraceous-yellow;* lamellæ rather broad, subdistant, whitish or creamy-yellow, some of them forked; stem equal, glabrous, stuffed or hollow, colored like the pileus, often spotted; spores .00035 to .00045 in.; milk white, taste acrid.

Pileus 2 to 4 in. broad, stem 1 to 2 in. long, 6 to 12 lines thick.

Pastures and copses. Catskill mountains. October. Rare.

I have observed this species but once. Mr. Morgan has found a stout form of it in Vermont. In his specimens the stem is conspicuously spotted, in the New York specimens sparingly. The species is closely related to *L. insulsus*, but apparently distinct by its darker color, broader, looser lamellæ and zoneless pileus. It appears to be intermediate between that species and *L. hysginus*.

Lactarius insulsus, *Fr.*

Unsavory Lactarius.

Agaricus flexuosus, Secr.

Pileus convex and umbilicate, then infundibuliform, glabrous, viscid, *more or less zonate, yellowish*, the margin naked; lamellæ thin, close adnate or decurrent, some of them forked at the base, whitish or pallid; stem equal or slightly tapering downward, stuffed or hollow, whitish or yellowish, generally spotted; spores .0003 to .00035 in.; milk white, taste acrid.

Pileus 2 to 4 in. broad, stem 1 to 2 in. long, 4 to 6 lines thick.

Thin woods and open, grassy places. Greenbush and Sandlake. July and August.

Our plant has the pileus pale yellow or straw color, and sometimes nearly white, but European forms have been described as having it orange-yellow and brick-red. It is generally, though often obscurely, zonate. The zones are ordinarily more distinct near the margin, where they are occasionally very narrow and close. The milk in the Greenbush specimens had a thin, somewhat watery appearance. Authors differ in their estimate of its qualities, some affirming that it is edible, others that it is poisonous. It is classed as edible in the Curtis Catalogue, and Cordier says that it appears to be edible.

Lactarius cinereus, *Peck.*

Cinereous Lactarius.

Pileus thin, nearly plane and *umbilicate or subinfundibuliform, glabrous, viscid, pale gray or cinereous*, the disk sometimes darker colored; lamellæ narrow, close, white; stem equal or slightly tapering upward, stuffed, sometimes tomentose at the base, *colored like the pileus*; spores *white*, .00028 to .0003 in.; milk white, taste acrid.

Pileus 1 to 2 in. broad, stem 1 to 3 in. long, 3 to 4 lines thick.

Woods. Sandlake and Greig. August and September.

The species is evidently closely allied to *L. vietus* Fr., but I have never seen the pileus umbonate or expallent, nor the milk become gray, characters attributed to that species. In our plant the viscid pellicle is separable. In shape and size it resembles *L. trivialis* v. *gracilis*, but its paler usually umbilicate pileus, concolorous stem and white spores separate it. Mr. Morgan finds, in Vermont, a somewhat larger form with the pileus sometimes zonate.

** Pileus not viscid.

† *Pileus minutely tomentose or squamulose.*

Lactarius griseus, *Peck.*

Gray Lactarius.

Pileus thin, nearly plane, broadly umbilicate or centrally depressed, sometimes infundibuliform, generally with a small umbo or papilla, *minutely squamulose tomentose*, gray or brownish-gray, becoming paler with age; lamellæ thin, close, adnate or slightly decurrent, whitish or yellowish; stem slender, equal or slightly tapering upward, rather fragile, stuffed or hollow, generally villose or tomentose at the base, paler than or colored like the pileus; spores .0003 to .00035 in.; milk white, taste subacrid.

Pileus 6 to 18 lines broad, stem 1 to 2 in. long, 1 to 3 lines thick.

Woods and swamps on much decayed wood and mossy ground. Common. July to September.

The relationship of this species is with *L. mammosus* Fr., from which it differs in its lamellæ, which do not become ferruginous, and in its stem which is not pubescent, though it generally has long coarse tomentose hairs at its base. Its habitat also is peculiar, being much decayed mossy prostrate trunks or damp mossy vegetable mold in woods and swamps. It bears some resemblance to *L. cinereus* in form and color, but it is generally smaller, and easily distinguished by its dry tomentulose pileus.

Lactarius glyciosmus,

Fragrant Lactarius. Scented Lactarius.

Pileus thin, convex nearly plane or depressed, often with a small umbo or papilla, *minutely squamulose*, cinereous, grayish-brown or smoky-brown, sometimes tinged with pink, the margin even or slightly and distinctly striate; lamellæ narrow, close, adnate or decurrent, whitish or yellowish; stem equal, glabrous or obsoletely pubescent, stuffed, rarely hollow, whitish or colored like the pileus; spores .0003 to .00035 in.; milk white, taste acrid and unpleasant, sometimes bitterish, odor *aromatic*.

Pileus 6 to 18 lines broad, stem 6 to 18 lines long, 1 to 3 lines thick.

Woods and open places on the ground and on decaying wood Adirondack mountains, West Albany and Karner. September and October.

The distinctive characters of the species are its small size, squamulose pileus and agreeable odor. This is described by European authors as spirituous or like that of alcohol, but to me it resembles rather that of dry melilot and is not much unlike that of *L. camphoratus*. The American plant, so far as observed, does not have the red hues ascribed to the European.

Lactarius alpinus, *Peck.*

Alpine Lactarius.

Pileus thin, convex or nearly plane, sometimes centrally depressed, occasionally with a small umbo or papilla, tomentose or squamulose, *tawny-ochraceous;* lamellæ close, adnate or decurrent, yellowish; stem equal or slightly tapering upward, glabrous, solid or stuffed, paler than or colored like the pileus; spores .0003 to .00035 in.; milk *white*, taste acrid.

Pileus 8 to 18 lines broad, stem 12 to 18 lines long, 2 to 3 lines thick

Summit of Haystack mountain and Karner. August. Rare.

Apparently allied to *L. helvus* Fr., but so much smaller that I can scarcely think it the same species and have for the present kept it distinct. The plants resemble *L. subdulcis* in size and somewhat in color, but differ in their squamulose pileus. The specific name proves to be inappropriate, as the species has been found in a much lower region than that of its original discovery.

Lactarius helvus, *Fr.*

Pale-red Lactarius.

Pileus fleshy, *fragile*, convex, then plane or depressed, subumbonate, dry, *silky or floccose-squamulose* and rivulose, *pale-testaceous*, becoming paler; lamellæ decurrent, thin, close, whitish-ochraceous; stem stuffed or hollow, *pruinose-pubescent;* milk sparse, subacrid, white.

Var. *aquifluus*. *L. aquifluus* Peck. Milk sparse, *watery*, taste mild or subacrid, spores .0003 to .00035 in.; odor weak in the fresh plant, more decided in the dried specimens, aromatic and agreeable.

Pileus 2 to 6 in. broad, stem 3 to 6 in. long, 4 to 10 lines thick.

Mossy ground in swamps and marshes. Adirondack mountains, Sandlake and Karner. July and August.

Our specimens agree so closely with the description of *L. helvus*, as given by Fries, and of which a translation is here given, that we have referred them to that species, distinguishing them merely as a variety on account of the watery milk. Fries regards such a milk as belonging to a degenerate or abnormal state of the species, and the result of too much moisture. But unless *L. alpinus*, shall prove to be a dwarf form of *L. helvus*, only this form of the species has been detected within our limits and indeed in this country. It scarcely seems probable that a species would occur constantly and repeatedly, in various widely separated localities, in a degenerate condition only. It would seem probable that occasionally, in a dry time or in a more dry locality, it would revert to its normal condition. But this has not yet been observed to happen in our plant, therefore we have preferred to consider it a variety. The milk sometimes presents a slightly turbid appearance, less clear than water. The pileus becomes quite fragile when old, and the thin margin is then spreading and sometimes flexuous. The color is a grayish-red or pale tawny-red. The stem is nearly equal, but in young plants it is often narrowed toward the apex. It is glabrous or pruinose and soon hollow, often a little paler than the pileus and slightly striate at the apex from the decurrent lamellæ. The flesh is tinged with pink or a pale pinkish-gray. The plant is sometimes cæspitose.

Lactarius vellerius, *Fr.*

Fleecy Lactarius.

Agaricus Listeri Sow. *A. piperatus* Poll.

Pileus compact, at first convex and umbilicate, then expanded and centrally depressed or subinfundibuliform, the *whole surface minutely velvety-tomentose, soft to the touch*, white or whitish, the margin at first involute, then reflexed; lamellæ *distant or subdistant*, adnate or decurrent, sometimes forked, whitish becoming yellowish or cream-colored; stem firm, solid, equal or tapering downward, *pruinose-pubescent*, white; spores white, *nearly smooth*, .0003 to .00035 in.; milk white, taste acrid.

Pileus 2 to 5 in. broad, stem .5 to 2 in. long, 6 to 16 lines thick.

Woods and open places. Common. July to September.

The soft downy tomentum which is characteristic of this species and which covers the whole pileus gives it a pruinose appearance when viewed from a little distance. The stem is generally short and is sometimes broader than long. The lamellæ vary in width from two to four lines and are generally about equal in width to the thickness of the pileus. They become stained where bruised. The milk, which is sometimes quite abundant in wet weather, exudes from wounds and dries into cream-colored gummy granules. The taste is very acrid. Cordier states that it is poisonous according to some authors, edible according to Leveille.

Lactarius deceptivus, *Peck.*

Deceptive Lactarius.

Pileus compact, at first convex and umbilicate, then expanded and centrally depressed or subinfundibuliform, *obsoletely tomentose or glabrous* except on the margin, white or whitish, often varied with yellowish or sordid stains, the margin at first involute and *clothed with a dense, soft or cottony tomentum*, then spreading or elevated and more or less fibrillose ; lamellæ rather broad, distant or subdistant, adnate or decurrent, some of them forked, whitish, becoming cream colored ; stem equal or narrowed downward, solid, pruinose-pubescent, white; spores white, .00035 to .0005 in.; milk white, taste acrid.

Pileus 3 to 5 in. broad, stem 1 to 3 in. long, 8 to 18 lines thick.

Woods and open places, especially under hemlock trees. Common. July to September.

This plant appears to have been confused with *L. vellereus*, which it closely resembles, but from which it appears to me to be quite distinct, both in the character of the tomentum of the pileus and in its decidedly larger and rougher spores. The young pileus is clothed with a thin, silky tomentum, which, on the involute margin, is quite thick, but very soft and cottony, and sometimes striated with parallel impressions, produced by previous pressure against the edges of the lamellæ. In the mature plant the pileus appears nearly or quite glabrous, or is merely shaggy fibrillose on the margin. Sometimes the cuticle seems to be slightly rimose, and the surface then has a kind of scaly appearance. The lamellæ are as broad and distant as in *L. vellereus*, but the stem is generally a little longer in the present species than it is in that. The glabrous form of this species was referred to *L. piperatus* in the Twenty-third Report. An experiment of its edible qualities was made without any evil consequences. The acridity was destroyed by cooking.

†† *Pileus glabrous or merely pruinose or pruinose-pubescent, not squamulose.*

Lactarius piperatus, *Fr.*

Peppery Lactarius.

Agaricus piperatus, Scop. *A. acris*, Bull. *A. Listeri*, Krombh.

Pileus compact, at first convex and umbilicate, then expanded and centrally depressed or infundibuliform, even, *glabrous*, white ; lamellæ *narrow, crowded, dichotomous*, adnate or decurrent, white or cream colored ; stem equal or slightly tapering downward, solid, glabrous, white; spores white, nearly smooth, .00025 to .0003 in.; milk white, abundant, taste very acrid.

Pileus 1.5 to 4 in. broad, stem .5 to 2 in. long, 5 to 10 lines thick.

Thin woods, pastures and grassy places. Common. July to September.

The glabrous or sometimes merely pruinose pileus, the crowded and frequently forked narrow lamellæ separate this species from the other white ones. The lamellæ are one to two lines broad, their width being less than the thickness of the flesh of the pileus. The stem is either very short or quite long, according to the place of growth, it being longer when growing in woods among fallen leaves than when growing in open grassy places. In the summer of 1883 this and the two preceding species were abundant in the town of Sandlake, and all grew in the same locality. By a little practice they were readily distinguishable, even without a close inspection.

Most authors agree in attributing edible qualities to this species, notwithstanding its intense acridity. Badham says that he has frequently eaten it, and that according to Berkeley it is preserved for winter use by pickling in salt and vinegar. Cordier says that it is an agreeable aliment and is eaten in many countries, and that cows eat it with avidity, but that it renders their milk and butter nauseous. Fries says it is edible, and it is so classed in Curtis' Catalogue. Gillet states that although it does not constitute an agreeable article of food, it is eaten in some parts of France, and that the Russians make frequent use of it.

Lactarius albidus, *Peck.*

White Lactarius.

Pileus *thin*, plane or slightly depressed, glabrous, dry, white; lamellæ *subdistant*, adnate or slightly decurrent, white, the *interspaces venose;* stem equal, solid, glabrous, white; spores white, .0003 to .00035 in.; milk white, taste acrid.

Pileus 1.5 to 3 in. broad, stem 1 to 2 in. long, 3 to 5 lines thick.

Thin woods. Karner. September. Very rare.

This Lactarius has been observed but once, and then but few specimens were seen, yet it appears to be distinct from all our other white species in its thin pileus, subdistant lamellæ, venose interspaces and rather slender stem. Except in color, it has some similarity to the next species.

Lactarius varius, *n. sp.*

Variable Lactarius.

Pileus thin, convex or nearly plane, umbilicate or centrally depressed, sometimes with a minute umbo or papilla, *glabrous*, even or obscurely roughened, submoist, zoneless or rarely narrowly zonate on the margin, *gray or brown, often tinged with lilac,* lamellæ close, adnate or subdecurrent, whitish or cream colored, becoming dingy-greenish where wounded; stem equal, elastic, glabrous, solid or spongy within, paler than or colored like the pileus; spores white, .0003 to .00035 in.; milk white, taste tardily acrid, *odor none*, flesh white.

Pileus 1 to 2.5 in. broad, stem 1 to 2.5 in. long, 2 to 4 lines thick.

Thin woods and moist places. West Albany and Karner. September.

A very variable species. The prevailing color of the pileus is gray or lead-gray, but it is often lilac-brown. Its surface has a moist and shining appearance, but it is sometimes seen under a lens to be roughened by minute pits or depressions, in which case it presents silvery or sparkling reflections as if micaceously atomate. It often grows with *L. glyciosmus* from which it is distinguished by its glabrous pileus and lack of odor. It also approaches *L. plumbeus*, but differs from it in its smaller size, paler color, moist appearance and larger spores. Wounds of the lamellæ assume a hue similar to that seen under similar circumstances in *L. trivialis*.

Lactarius parvus, *Peck.*

Small Lactarius.

Pileus nearly plane or depressed, *even*, glabrous, *zoneless*, reddish-brown or lilac-brown, *becoming paler with age*, lamellæ narrow, crowded, white or yellowish, becoming dingy-greenish where wounded; stem equal or slightly tapering upward, often curved, stuffed, whitish; spores globose, white, .0003 to .0004 in.; milk white, taste acrid.

Pileus 6 to 12 lines broad, stem 6 to 12 lines long, 1 to 2 thick.

Old stumps and prostrate trunks in woods. Sandlake, Osceola and Greig. August and September.

This small species is closely allied to *L. varius*, of which it might be considered a mere variety. It differs in being smaller, in having the pileus constantly even, zoneless, destitute of an umbo or central papilla and in growing paler with age. I have only found it growing on decaying wood. When growing on the sides of stumps and prostrate trunks, the stem is often curved and sometimes eccentric.

Lactarius plumbeus, *Fr.*

Lead-colored Lactarius.

Agaricus plumbeus, Bull.

"Pileus compact, convex, then infundibuliform, dry, unpolished *fuliginous or brownish-black;* lamellæ crowded, white or yellowish; stem solid, equal, thick; milk white, acrid, *unchangeable*," spores .00025 to .0003 in.

Pileus 2 to 5 in. broad, stem 1.5 to 3 in. long, 3 to 6 lines thick.

The specimens which I have referred to this species were found in the Catskill mountains several years ago, growing in hemlock woods, under spruce and balsam trees. I have not met with the species since. The pileus in the larger specimens had a minutely tomentose appearance, but in the dried specimens this has disappeared. They also varied in color from blackish-brown to pinkish-brown and grayish-brown, but they can scarcely be more than a mere form or variety of the species the description of which, as given by Fries, I have quoted. In the Handbook the pileus is described as dark fuliginous gray or brown, and Gillet describes it as black-brown, dark fuliginous or lead-color, and adds that the plant is poisonous and the milk very acrid and burning. Cordier says that the flesh is white and the taste bitter and disagreeable.

Lactarius pyrogalus, *Fr.*

Caustic Lactarius.

Agaricus pyrogalus, Bull. *A. rusticanus*, Scop.

Pileus broadly convex, plane or slightly depressed, sometimes umbilicate, glabrous, even, *submoist*, *generally zonate*, livid-cinereous, grayish-brown or lilac-brown; lamellæ thin, *distant or subdistant*, adnate or subdecurrent, *yellowish*; stem equal or slightly tapering downward, glabrous, stuffed or hollow, paler than or colored like the pileus; spores globose, *yellowish*, .0003 to .00035 in.; milk white, taste acrid.

Pileus 1.5 to 2.5 in. broad, stem 1 to 1.5 in. long, 2 to 4 lines thick.

Thin woods and open places. Sandlake, Greenbush and Karner. August to October.

The zonate pileus, distant lamellæ and yellowish spores separate this species from its allies. The milk is copious and very acrid and the species is regarded as poisonous. Cordier states that the milk is mild in young plants, acrid in mature ones.

Lactarius fuliginosus, *Fr.*

Dingy Lactarius.

Agaricus azonites, Bull. *A. plinthogalus*, Otto. *L. fumosus*, Pk.

Pileus firm becoming soft, convex plane or slightly depressed, even, *dry*, zoneless, *dingy-cinereous or buff-gray*, appearing as if covered with a dingy pruinosity, the margin sometimes wavy or lobed; lamellæ adnate or subdecurrent, subdistant, whitish, then yellowish, becoming *stained with pink-red or salmon color where wounded;* stem equal or slightly tapering downwards, firm, stuffed, colored like the pileus; spores globose, *yellowish*, .0003 to .0004 in.; milk white, taste tardily and sometimes slightly acrid.

Pileus 1 to 2.5 in. broad, stem 1 to 2 in. long, 3 to 5 lines thick.

Thin woods and open grassy places. Greenbush and Sandlake. July and August.

The pileus, in this species, has a peculiar dingy or smoky hue which is suggestive of the specific name. The color is a pale-cinereous or yellowish-gray compared by some authors to the color of coffee and milk. This and the yellowish color of the spores, the tardily acrid taste and the pinkish hue of the wounds of the lamellæ and flesh characterize the species. Both Fries and Gillet state that the milk, as well as wounds of the flesh, changes to a pinkish or saffron hue on exposure to the air. This would transfer the place of the species to our second group, for which we have made provision in the synoptical table. But we have failed to verify this character in our plant, and consequently it was formerly supposed to be distinct from the European, and was published under the name *Lactarius fumosus*. But inasmuch as the European plant has also been described as having white unchangeable milk, and since our plant agrees in every other respect with the description given by Fries, it is quite probable that the species may vary in this respect and we have therefore referred our plant to it. Cordier states that according to Barla and Reveil this species is poisonous.

Lactarius lignyotus, *Fr.*

Sooty Lactarius.

Pileus broadly convex plane or slightly depressed, dry, with or without a small umbo, generally rugose-wrinkled, *dark-brown, appearing subpulverulent or as if suffused with a dingy pruinosity*, the margin sometimes crenately lobed and distinctly plicate; lamellæ moderately close or subdistant, adnate, white or yellowish, *slowly changing to pinkish-red or salmon color where wounded;* stem equal or abruptly narrowed at the apex, even, glabrous, stuffed, colored like the pileus, sometimes plicate at the top; spores globose, *yellowish*, .00035 to .00045 in.; milk white, taste mild or tardily and slightly acrid.

Var. *tenuipes*. Pileus about 1 inch broad, stem slender, 2 to 3 in. long and about two lines thick.

Pileus 1 to 4 in. broad, stem 1 to 3 in. long, 2 to 6 lines thick.

Wet or mossy ground in woods and swamps. Adirondack mountains and Sandlake. July and August. Not rare in hilly and mountainous districts.

The sooty Lactarius is closely related to the preceding species with which it was formly united by Fries as a variety, but from which it may be distinguished by its larger size. darker color and generally rugose-wrinkled pileus. Wounds of the flesh and lamellæ slowly change color as in that species, and, according to the description given by Fries, the milk also undergoes a similar change, but I have not been able to verify this in the American plant. According to the description of *L. subtomentosus*, B. & R., the milk in that plant changes from white to yellowish and the taste is acrid. In the Twenty-third Report our plant was erroneousl-- referred to that species.

Lactarius Gerardii, *Peck.*

Gerard's Lactarius.

Pileus broadly convex plane or slightly depressed, dry, generally rugose-wrinkled, with or without a small umbo or papilla, *dingy-brown*, the thin spreading margin sometimes flexuous lobed or irregular; lamellæ *distant*, adnate or decurrent, *white or whitish*, the interspaces generally uneven; stem subequal, stuffed or hollow, colored like the pileus; spores globose, *white*, .00035 to .00045 in.; milk white, *unchangeable*, taste *mild*.

Pileus 1.5 to 4 in. broad, stem 1 to 2 in. long, 3 to 6 lines thick.

Woods and open places. Poughkeepsie. *W. R. Gerard.* Greenbush, Sandlake and Croghan. July to September.

This Lactarius closely resembles the sooty Lactarius in color, but differs from it in its more distant lamellæ, white spores and constantly mild taste. Wounds of the flesh and lamellæ do not become pinkish-red as in that plant. From the next species its darker color, hollow stem and more globose rougher spores separate it.

Lactarius hygrophoroides, *B. & C.*

Hygrophorus-like Lactarius. Distant-gilled Lactarius.

Lactarius distans, Pk.

Pileus firm, convex or nearly plane, umbilicate or slightly depressed, rarely infundibuliform, glabrous or sometimes with a minute velvety pubescence or tomentum, dry, sometimes rugose-wrinkled and often becoming rimose-areolate, *yellowish-tawny or brownish-orange;* lamellæ *distant,* adnate or subdecurrent, white or cream-color, the interspaces uneven or venose; stem short, equal or tapering downward, *solid,* glabrous or merely pruinose, colored like the pileus; spores subglobose or broadly elliptical, *nearly smooth,* .00035 to .00045 in.; milk white, taste mild.

Pileus 1 to 4 in. broad, stem .5 to 1 in. long, 4 to 8 lines thick.

Grassy ground and borders of woods. Albany, Greenbush and Sandlake. July and August.

This plant has almost exactly the color of *L. volemus,* but differs from it in its distant lamellæ, short stem, less copious milk and less globose spores. Its flesh is white, with a thickness about equal to the breadth of the lamellæ. It is probably edible, but has not yet been tested. The typical *L. hygrophoroides* is described as having the pileus yellowish-red and pulverulent, and the lamellæ luteous. It is also represented as a small plant; but our specimens, while not fully agreeing with this description, approach so closely to it in some of their forms that they doubtless belong to the same species. We have therefore extended the description so that it may include our plant. In wet weather the pileus sometimes becomes funnel-form by the elevation of the margin.

Lactarius volemus, *Fr.*

Orange Lactarius. Orange-brown Lactarius.

Agaricus testaceus, A. & S. *A. ruber,* Secr.

Pileus firm, convex nearly plane or centrally depressed, rarely infundibuliform, sometimes with a small umbo, generally even, *glabrous,* dry, *golden-tawny or brownish-orange,* sometimes darker in the center, often becoming rimose-areolate; lamellæ *close,* adnate or subdecurrent, white or yellowish, becoming sordid or brownish where bruised or wounded; stem subequal, variable in length, firm, solid, glabrous or merely pruinose, colored like the pileus, sometimes a little paler; spores *globose,* white, .00035 to .00045 in.; milk *copious,* white, taste acrid.

Var. *subrugosus.* Pileus rugose-reticulated on the margin.

Pileus 2 to 5 in. broad, stem 1 to 4 in. long, 4 to 10 lines thick.

Thin woods and open places. Common. July to September. Edible.

The color of the pileus is a peculiar mixture of red and yellow, sometimes shaded with brown. It is generally free from the attacks of insects, and this, with its beautiful and nearly uniform color, makes it an attractive species. It is nearly as celebrated as *L. deliciosus* for its edible qualities. Cordier says "it is one of the most agreeable fungi to eat." Its flesh is firm but brittle, white or yellowish. Its milk is very abundant and its taste mild or slightly astringent. In drying, the specimens sometimes emit a disagreeable odor. We have followed Fries and other continental mycologists in writing the specific name "volemus." Some English authors have it "volemum." The variety connects this species with the next.

Lactarius corrugis, *Peck.*

Corrugated Lactarius.

Pileus firm, convex, then nearly plane or centrally depressed, *rugose reticulated,* covered with a *velvety pruinosity or pubescence, dark* *reddish-brown or chestnut color*, fading with age to tawny-brown; lamellæ close, dark cream color or subcinnamon, *becoming paler* when old, sordid or brownish where bruised or wounded, stem equal, solid, glabrous or merely pruinose, paler than but similar in color to the pileus; spores subglobose, .0004 to .0005 in., milk copious, white, taste mild.

Pileus 3 to 5 in. broad, stem 3 to 5 in. long, 6 to 12 lines thick.

Thin woods. Sandlake, Gansevoort and Brewerton. August and September.

This curious Lactarius is related to *L. volemus*, from which it may be separated by its darker colors and its corrugated pileus. The flexuous reticulated rugæ present an appearance similar to that of the hymenium of a Merulius. The pileus is everywhere pruinose-pubescent and the lamellæ bear numerous spine-like or acicular cystidia or spicules, .0016 to .002 in. long. These are so numerous on and near the edges of the lamellæ that they give them a pubescent appearance.

Lactarius platyphyllus, *Peck.*

Broad-gilled Lactarius.

Pileus depressed or subinfundibuliform, glabrous, zoneless, *yellowish-incarnate or yellowish-red*, the decurved or spreading margin sometimes wavy or flexuous; lamellæ *broad*, subdistant, yellowish; stem equal, stout, *hollow*, paler than or colored like the pileus; spores subglobose or broadly elliptical, .00035 to .00045 in.; milk white, taste acrid.

Pileus 4 to 8 in. broad, stem 3 to 5 in. long, 6 to 12 lines thick. Woods. North Elba. August.

This large species is apparently very rare. It has been observed but once, and then in dry weather, so that it was not positively ascertained whether the pileus may not be viscid when moist. Its real position is, therefore, uncertain. The lamellæ are four or five lines broad and the flesh is white or whitish.

Lactarius rufus, *Fr.*

Red Lactarius.

Agaricus rufus, Scop.

Pileus convex and centrally depressed, then infundibuliform, generally with a small umbo, glabrous, sometimes slightly floccose or pubescent when young, especially on the margin, zoneless, *bay-red or brownish-red*, shining; lamellæ narrow or moderately broad, sometimes forked, close, subdecurrent, yellowish or reddish: stem nearly equal, firm, stuffed, paler than or colored like the pileus; spores white, .0003 to 0004 in.; milk white, taste very acrid.

Pileus 2 to 4 in. broad, stem 2 to 4 in. long, 3 to 5 lines thick.

Low woods and swamps. North Elba. August. Rare.

The red Lactarius is known by its rather large size, dark-red pileus and intensely acrid taste. It has been found but once in our State. The flesh is pinkish and the stem sometimes pruinose. It is designated by authors as very poisonous and extremely poisonous. Cordier even says that worms never attack it.

Lactarius camphoratus, *Fr.*

Camphor Lactarius.

Agaricus camphoratus, Bull.

Pileus thin, convex, then nearly plane or depressed, generally with a small umbo or papilla, glabrous, *bay-red or brownish-red*, sometimes zonate, the spreading margin occasionally wavy or flexuous; lamellæ narrow, thin, close, yellowish or dull reddish; stem subequal, glabrous, stuffed or hollow, colored like the pileus; spores globose, white, .0003 to .00035 in.; milk white, taste *mild*, odor *agreeable, aromatic*.

Pileus .5 to 1.5 in. broad, stem 1 to 2 in. long, 2 to 3 lines thick.

Swamps and wet places, also in woods. Sandlake and Adirondack mountains. July to September.

This plant resembles the preceding species in color, but it differs from it decidedly in size and in taste. The European plant is described as subzonate, but I have seen no zonate specimens. The color of the lamellæ, when old, resembles that of the pileus, though they are paler. The odor is not like that of camphor, as the name would seem to imply. To me it resembles that of dried *Cyperus inflexus* or dried melilot. It is often weak in the fresh plant, but becomes more distinct in the dried specimens, which retain it a long time. Gillet gives the species as edible.

Lactarius subdulcis, *Fr.*

Sweet Lactarius. Sweetish Lactarius.

Agaricus subdulcis, Bull.

Pileus thin, convex, then plane or subinfundibuliform, with or without a small umbo or papilla, glabrous, even, zoneless, moist or dry, tawny-red, cinnamon-red or brownish-red, the margin sometimes wavy or flexuous; lamellæ rather narrow, thin, close, whitish, sometimes tinged with red; stem equal or slightly tapering upward, slender, glabrous, sometimes villous at the base, stuffed or hollow, paler than or colored like the pileus; spores globose, white, .0003 to .00035 in.: milk white, taste mild or tardily and slightly acrid, sometimes woody or bitterish and unpleasant, flesh whitish, pinkish or reddish-gray, odor *none*.

Pileus .5 to 2 in. broad, stem 1 to 2.5 in long 1 to 3 lines thick.

Fields, copses, woods, swamps and wet places. July to October. Very common.

This species grows in almost every variety of soil and locality. It may be found in showery weather on dry, rocky soil, on bare ground or among mosses or fallen leaves. In drier weather it is still plentiful in swamps and wet, shaded places, and in sphagnous marshes. It sometimes grows on decaying wood. It is also as variable as it is common. Gillet has described the following varieties.

Var. *cinnamomeus*. Pileus cinnamon-red, subshining; stem stuffed, then hollow; taste mild, becoming slightly acrid or bitter.

Var. *rufus*. Pileus dull chestnut-red, becoming more concave; stem spongy; taste mild.

Var. *badius*. Pileus bay-red, shining as if varnished, with an obtuse disk and an inflexed, elegently crenulate margin, stem very glabrous, hollow.

The first and second varieties have occurred within our limits. The first also has the stem elastic and furnished with a whitish or grayish tomentum or strigose villosity at the base, when growing among moss in swamps. A form occurred in Sandlake, in which some of the specimens were proliferous. The umbo had developed into a minute pileus. With us the prevailing color of the pileus is yellowish-red or cinnamon-red. Sometimes the color is almost the same as that of *L. volemus* and *L. hygrophoroides*, and again it is a tan color or a bay-red, as in *L. camphoratus*, from which such specimens are scarcely separable, except by their lack of odor. In young plants the pileus usually has a moist appearance, which is sometimes retained in maturity. Cordier pronounces the species edible, and says that he has tested it several times without inconvenience.

Lactarius paludinellus, *n. sp.*

Little marsh Lactarius.

Pileus thin, plane or slightly depressed, striatulate on the margin, glabrous, generally with a small blackish umbo or papilla, at first *dingy brown, becoming paler with age*; lamellæ moderately close, adnate or slightly decurrent, cream colored; stem nearly equal, stuffed or hollow, glabrous, with a white strigose-villosity at the base, paler than or colored like the pileus; spores .0003 to .00035 in.; milk white, taste mild.

Pileus 6 to 12 lines broad, stem 10 to 18 lines long, 1.5 to 2 thick.

Among sphagnum, in shaded marshes. Sandlake. August.

A small and rare species, related to but distinct from *L. sublucis* by its brownish expellent pileus and striatulate margin.

NEW YORK SPECIES OF PLUTEUS.

PLUTEUS, *Fr.*

Hymenophorum distinct from the fleshy or fleshy-fibrous stem, lamellæ rounded behind, free, at first crowded, white or yellowish, then flesh-colored; annulus and volva none.

The Plutei, in the pink-spored series of Agarics, correspond very nearly in structure to the Lepiotæ in the white-spored series. They differ from the Lepiotæ in having no annulus; and by its absence they are distinguished from the Annulariæ of their own series, and by the absence of a volva, from the Volvariæ. By their free lamellæ they are readily separated from all other pink-spored Agarics. The species are generally of medium or moderately small size. Nearly all inhabit decaying wood in groves or in the shades of forests, but the common Fawn Agaric, *P. cervinus*, is often found on old stumps in open situations where it is exposed to the full light of the sun. The pileus may be floccose-fibrillose, pruinose-pulverulent or glabrous, and by these characters Fries has separated the species into three groups. In some species the central part of the pileus is more or less rugose-wrinkled or uneven. The lamellæ are at first compactly crowded (cohærent) very much as in some species of Coprini, and in some species they are apt to become moist or almost deliquescent, especially in damp weather. Their color is generally white or yellowish-white when young, but they soon asssume the salmon hue of the spores. They generally yield these readily and in great abundance. The spores, in our species, are even, with a single exception, and generally subglobose or broadly elliptical.

None of the species are very abundant with us and none are classed as edible.

Synopsis of the Species.

	Pileus glabrous	1
	Pileus not glabrous	2
2	Pileus white	3
2	Pileus not white	5
3	The margin not surpassing the lamellæ	4
3	The thin margin surpassing the lamellæ	sterilomarginatus.
4	Stem glabrous or merely fibrillose (partly)	cervinus.
4	Stem pubescent or subtomentose	tomentosulus.
5	Pileus even or rarely with short marginal striations	6
5	Pileus with long marginal striations	longistriatus.
6	Pileus fibrillose or villose on the disk	7
6	Pileus pulverulent pruinose or granulose	8
7	Lamellæ concolorous on the edge (partly)	cervinus.
7	Lamellæ darker-colored on the edge	umbrosus.
8	Stem velvety-pubescent	granularis.
8	Stem glabrous	nanus.
1	Pileus even (partly)	cervinus.
1	Pileus striate on the margin	leoninus.
1	Pileus rugose-reticulate on the disk	admirabilis.

Pluteus cervinus, *Schœff.*

Fawn-colored Agaric. Fawn Pluteus.

Pileus fleshy, at first campanulate, then convex or expanded, *even, glabrous, generally becoming fibrillose or slightly floccose-villose* on the disk, occasionally rimose, variable in color; lamellæ broad, somewhat ventricose, at first whitish, then flesh-colored; stem equal or slightly tapering upward, firm. solid, fibrillose or subglabrous, variable in color; spores broadly elliptical, .00025 to. 00032 in. long, .0002 to .00025 broad.

Plant 2 to 6 inches high, pileus 2 to 4 broad, stem 3 to 6 lines thick.

Decaying wood in groves, borders of woods and open places.

This species, with us, is very common and very variable, yet it is not abundant. Usually but one or two specimens are found at a time. It grows especially on or about old stumps and prostrate trunks and may be found in wet weather from May to October.

The typical form has the pileus and stem of a dingy or brown color and adorned with blackish fibrils, but specimens occur with the pileus white, yellowish, cinereous, grayish-brown or blackish-brown. I have never seen it of a true cervine color. It is sometimes quite glabrous and smooth to the touch and in wet weather it is even slightly viscid. It also occurs somewhat floccose-villose on the disk, and the disk, though usually plane or obtuse, is occasionally slightly prominent or subumbonate. The form with the surface of the pileus longitudinally rimose or chinky is probably due to meteorological conditions. The lamellæ, though at first crowded, become more lax with the expansion of the pileus. They are generally a little broader toward the marginal than toward the inner extremity. Their tendency to deliquesce is often shown by their wetting the paper on which the pileus has been placed for the purpose of catching the spores. The stem is usually somewhat fibrous and striated but forms occur in which it is even and glabrous. When growing from the sides of stumps and prostrate trunks it is apt to be curved. Two forms deserve varietal distinction.

Var. *albus*. Pileus and stem white or whitish.

Var. *albipes*. Pileus cinereous yellowish or brown; stem white or whitish, destitute of blackish fibrils.

In Europe there are three or four forms which have been designated as species under the names *A. rigens*, *A. patricius*, *A. eximius* and *A. petasatus*, but Fries gives them as varieties or subspecies of *A. cervinus*, though admitting that they are easily distinguished. None of these have occurred in our State. *A. atricapillus*, Batsch., *A. latus*, Bolt., *A. Pluteus*, Pers., and *A. Neesii*, Kl., are given as synonyms of *A. cervinus*.

Pluteus umbrosus, *Pers.*

Shade-loving Agaric. Brown Pluteus.

Pileus fleshy, at first campanulate, then convex or expanded, *rugose wrinkled* and more or less villose on the disk, fimbriate on the margin, *blackish-brown;* lamellæ broad, somewhat ventricose, at first whitish, then flesh-colored, *blackish-brown and fimbriate or denticulate on the edge;* stem solid, colored like or paler than the pileus, fibrillose or villose-squamose; spores elliptical, .0003 in. long, .0002 broad.

Decaying wood and stumps, especially of pine, both in shaded and open places. Not rare.

This is similar in size and general appearance to the preceding species, from which it is readily distinguished by the rugose-villose disk of ths pileus and the dark brown edge of the lamellæ. The color of the pileue is usually darker than in that species. I have not seen it with the margin fimbriate, though this is a prominent character of the species in Europe.

Pluteus granularis, *Peck.*

Granular Pluteus.

Pileus convex or nearly plane, subumbonate, *rugose-wrinkled, granulose or granulose-villose*, varying in color from yellow to brown; lamellæ rather broad, crowded, ventricose, whitish, then flesh-colored; stem equal, solid, colored like the pileus, often paler at the top, *velvety-pubescent*, rarely squamulose; spores subglobose or broadly elliptical, .00025 to .0003 in. long, .0002 to .00025 broad.

Plant 1.5 to 3 inches high, pileus 1 to 2 inches broad, stem 1 to 2 lines thick.

Decaying wood and prostrate trunks in woods. Hilly and mountainous districts. June to September.

The species is closely related to the two preceding, but is readily distinguished from them by the peculiar vesture of the pileus and stem.

The granules are so minute and so close that they form a sort of plush on the pileus, more dense on the disk and radiating wrinkles than elsewhere. The clothing of the stem is finer, and has a velvety-pubescent appearance, but in some instances it breaks up into small scales or squamules. The color of the pileus and stem is usually some shade of yellow or brown, but occasionally a grayish hue predominates. The darker color of the granules imparts a dingy or smoky tinge to the general color. The disk is often darker than the rest of the pileus.

Pluteus nanus, *Pers.*

Dwarf Agaric. Mealy Pluteus.

Pileus somewhat fleshy, thin, convex or nearly plane, obtuse, rugulose, *pulverulent or dingy-pruinose, brown;* lamellæ close, ventricose, white or yellowish, then flesh-colored; stem equal, solid, firm, striate, *glabrous*, white or yellowish; spores subglobose, .0002 to .00025 in. long.

Plant about 1 inch high, pileus 6 to 12 lines broad, stem 1 line thick.

Decaying wood and sticks. Not common nor abundant when it does occur. July to September.

The small size, dingy-mealy or pulverulent pileus and small subglobose spores are characteristic of this species. Small specimens sometimes have the margin of the pileus slightly striate. Large specimens may be distinguished from small forms of the preceding species by the glabrous stem. The European variety *lutescens*, which has the stem and lamellæ yellowish, has not yet been observed in our State. *Agaricus pyrrhospermus*, Bull. is given as a synonym.

Pluteus tomentosulus, *Peck.*

Woolly Agaric.

Pileus thin, convex or nearly plane, subumbonate, *minutely villose or squamulose-tomentose*, white; lamellæ rather broad, rounded behind, crowded, white then flesh-colored; stem equal, solid, striate, *slightly pubescent or subtomentose*, white; spores subglobose or broadly elliptical, .00025 to .00032 in. long, .00025 broad, generally containing a single large nucleus.

Plant 2 to 5 inches high, pileus 1 to 3 inches broad, stem 2 to 4 lines thick.

Decaying wood and prostrate trunks. Catskill mountains and Gansevoort. July and August.

This rare but beautiful species appears to be the American analogue of the European. *P. pellitus*, Pers., which differs in its silky pileus and glabrous stem. The entire plant, when young, is pure white, but with advancing age the lamellæ assume the usual pinkish hue and the margin of the pileus is sometimes tinged with the same color.

Pluteus sterilomarginatus, *Peck.*

Sterile-margined Agaric.

Pileus thin, broadly convex or expanded, with a minute close-pressed tomentum, pinkish-white, the thin *margin extending beyond the lamellæ;* lamellæ close, subventricose, minutely eroded on the edge, tapering toward the outer extremity, pale flesh-colored; stem short, equal, solid, glabrous, straight or curved, whitish; spores *subglobose, angular*, .00025 in. broad, usually containing a single central nucleus.

Plant about 1 inch high, pileus 6 to 12 lines broad, stem .5 to 1 line thick.

Decaying trunks and sticks in woods. Portville. September.

This rare species has been found but once. It is much smaller and more delicate than the preceding, and easily distinguished by its thin margin projecting beyond the lamellæ and by the character of the spores. The pileus sometimes cracks in areas, and then it has the appearance of being coated with a thin, scaly paste.

Pluteus longistriatus, *Peck.*

Striated Pluteus.

Pileus thin, convex or expanded, dry, *striate to the disk, cinereous or whitish*, the disk often darker than the margin and minutely squamulose or hairy; lamellæ broad, ventricose, white, then flesh-colored; stem equal, glabrous, white; spores globose, .0003 in. broad.

Plant about 2 inches high, pileus 1 to 1.5 broad, stem about 1 line thick.

Decaying wood. Albany. July.

This species is well marked by the long striations of the pileus. It was discovered in one of the streets of Albany in 1876, but has not been observed since that time. The spores at first sight appear globose, but there is a depression on one side that gives them an orbicular or saucer shape.

Pluteus leoninus, *Schæff.*

Lion-colored Agaric. Yellow Pluteus.

Pileus thin, campanulate, then convex or expanded, *even*, glabrous, moist or subhygrophanous, striate on the margin, yellow or reddish-yellow; lamellæ rather broad, rounded behind, yellowish or yellowish on the edge, then flesh-colored; stem equal, *solid*, slightly striate, white or yellowish, spores broadly elliptical, .00028 to .00032 in. long, .00025 broad.

Plant about 2 inches high, pileus 1 to 2 inches broad, stem 2 to 3 lines thick.

Decaying wood in forests. Adirondack mountains. August.

This is a very rare species in our State. Its glabrous pileus and yellowish color distinguish it from all the foregoing species, its even pileus and solid stem, from the next following species.

Pluteus admirabilis, *Peck.*

Admirable Pluteus.

Pileus thin, convex or expanded, generally broadly umbonate, glabrous, *rugose-reticulated*, moist or hygrophanous, striatulate on the margin when moist, often obscurely striate when dry, yellow or brown; lamellæ close, broad, rounded behind, ventricose, whitish or yellowish, then flesh-colored; stem slender, glabrous, *hollow*, equal or slightly

18

thickened at the base, yellow or yellowish-white, with a white mycelium; spores subglobose or broadly elliptical, .00025 to .0003 in. long, .00025 broad.

Var. *fuscus*. Pileus brown or yellowish-brown.

Plant 1 to 2 inches high, pileus 6 to 10 lines broad, stem .5 o t 1 line thick.

Decaying wood and prostrate trunks in forests. Common in hilly and mountainous districts. July to September.

This beautiful Pluteus is closely related to *P. chrysophlebius*, B. & R., a southern species, which, according to the description, has the veins of the pileus darker colored than the rest of the surface and the stem enlarged above and hairy at the base, characters not shown by our plant. It is also similar to the European *P. chrysophæus*, Schæff., but according to Fries that species is larger and has a more even pileus, which is constantly cinnamon-colored. The variety, which grows with the typical form, sometimes on the same prostrate trunk with it, differs only in color, and forms a connecting link between this species and the European, *P. phlebophorus*, Ditm., from which it is scarcely distinguishable, except by its smaller size, hygrophanous character and striatulate margin. Indeed all the species, together with *P. leoninus*, Schæff., differ from each other by such slight characters that their separation is unsatisfactory. It is quite possible that when the range of their variations is more fully investigated they will be found to constitute a single comprehensive and very variable species. In our plant small young specimens sometimes have the stem solid, but when fully developed it is hollow, though the cavity is small. This character, with its small size, distinguishes it from *P. leoninus*.

EXPLANATION OF PLATE I.

CERCOSPORA COMARI, *Peck.*

Fig. 1. A leaflet spotted by the fungus.
Fig. 2. A tuft of four flocci, two of them bearing spores, x 400.
Fig. 3. Two spores, x 400.

HADROTRICHUM LINEARE, *Peck.*

Fig. 4. Upper part of a leaf bearing linear patches of the fungus.
Fig. 5. A tuft of five flocci, two of them bearing spores, x 400.
Fig. 6. Five spores, x 400.

ENTYLOMA SANICULÆ, *Peck.*

Fig. 7. A leaflet spotted by the fungus.
Fig. 8. Five spores, x 400.
Fig. 9. Four conidia, x 400.

CYLINDROSPORIUM VERATRINUM, *S. & W.*

Fig. 10. Upper part of a leaf bearing linear patches of the fungus.
Fig. 11. A tuft of four flocci, two of them bearing spores, x 400.
Fig. 12. Two spores, x 400.

RAMULARIA OXALIDIS, *Farl.*

Fig. 13. A leaflet spotted by the fungus.
Fig. 14. A tuft of four flocci, two of them bearing spores, x 400.
Fig. 15. Five spores, x 400.

RAMULARIA DIERVILLÆ, *Peck.*

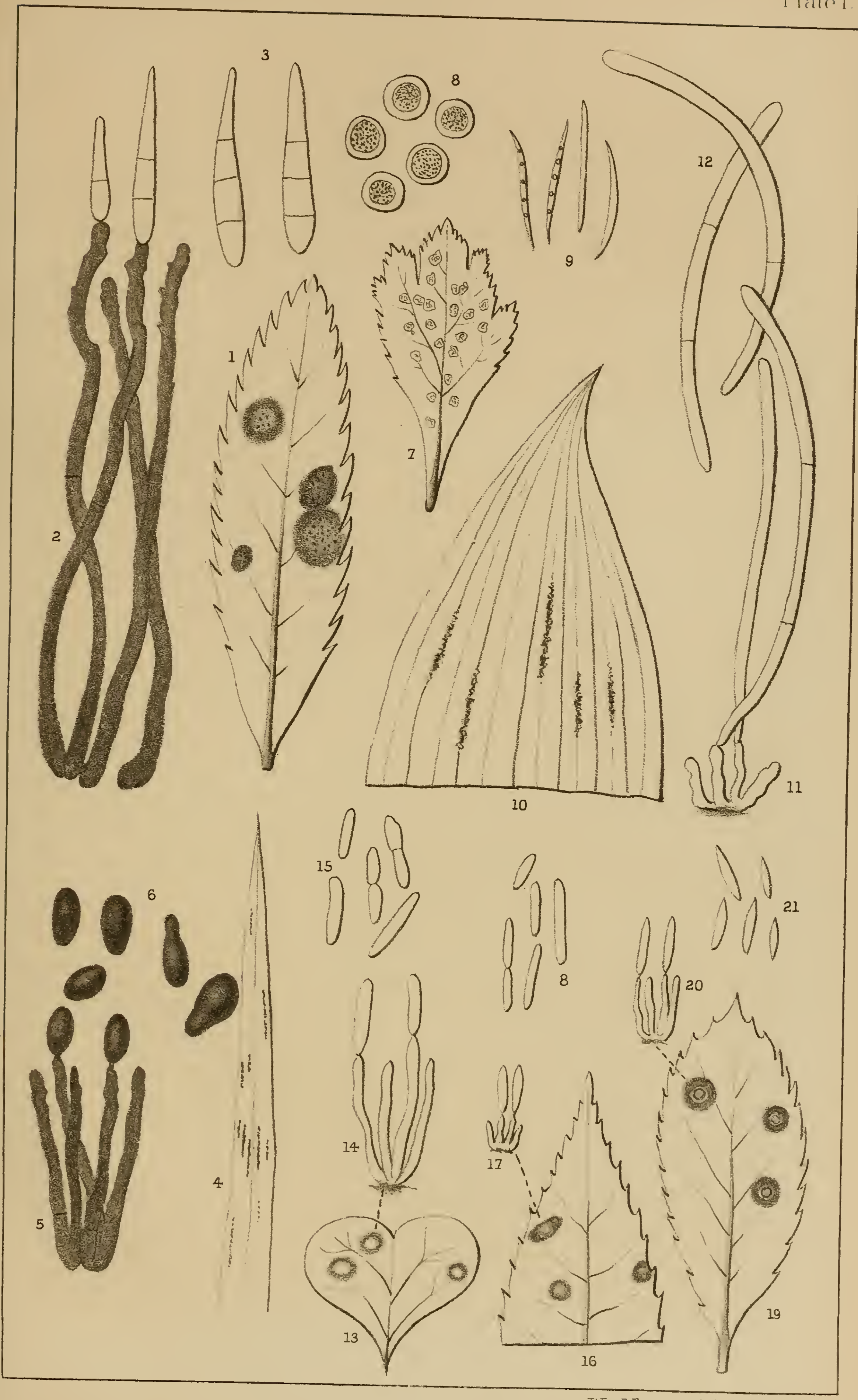
Fig. 16. Upper part of a leaf spotted by the fungus.
Fig. 17. A tuft of four flocci, two of them bearing spores, x 400.
Fig. 18. Six spores, two of them united end to end, x 400.

RAMULARIA PRINI, *Peck.*

Fig. 19. A leaf spotted by the fungus.
Fig. 20. A tuft of four flocci, two of them bearing spores, x 400.
Fig. 21. Five spores, x 400.

FUNGI.

Plate 1.



Weed, Parsons & Co Albany, N.Y.

EXPLANATION OF PLATE II.

Ovularia moniloides, *E. & M.*

Fig. 1. A leaf spotted by the fungus.
Fig. 2. A branchlet with the central part frosted by the fungus.
Fig. 3. A tuft of four flocci, two of them bearing spores, x 400.
Fig. 4. Seven spores, x 400.

Agaricus (Inocybe) comatellus, *Peck.*

Fig. 5. Four plants of usual size.
Fig. 6. Vertical section of a pileus and the upper part of its stem.
Fig. 7. A cystidium, x 400.
Fig. 8. Five spores, x 400.

Ascochyta colorata, *Peck.*

Fig. 9. A leaflet spotted by the fungus.
Fig. 10. Five spores, x 400.

Asterina nuda, *Peck.*

Fig. 11. Tip of a branchlet with three fungus bearing leaves.
Fig. 12. A leaf showing the fungus on the lower surface, magnified.
Fig. 13. A leaf showing the fungus on the upper surface, magnified.
Fig. 14. An ascus containing spores, x 400.
Fig. 15. Four spores, x 400.

Leptosphæria lycopodiicola, *Peck.*

Fig. 16. Piece of a branch bearing the fungus.
Fig. 17. A perithecium and its matrix, magnified.
Fig. 18. Two paraphyses and an ascus containing spores, x 400.
Fig. 19. Four spores, x 400.

Leptosphæria Corallorhizæ, *Peck.*

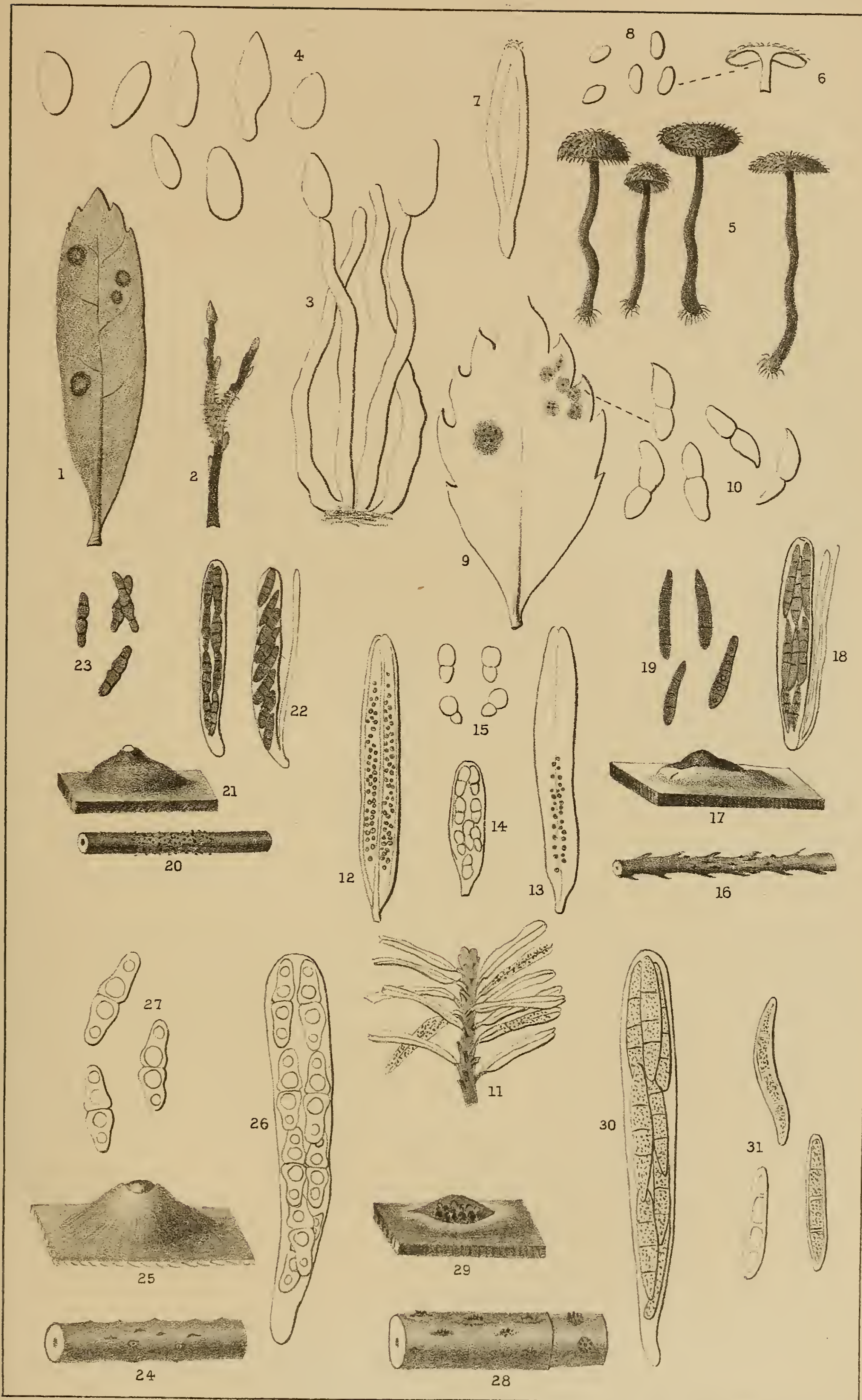
Fig. 20. Piece of a stem, bearing the fungus.
Fig. 21. A perithecium and its matrix, magnified.
Fig. 22. A paraphysis and two asci containing spores, x 400.
Fig. 23. Four spores, x 400.

Metasphæria Myricæ, *Peck.*

Fig. 24. Piece of a branch bearing the fungus.
Fig. 25. A perithecium and its matrix, magnified.
Fig. 26. An ascus containing spores, x 400.
Fig. 27. Three spores, x 400.

Cryptospora Caryæ, *Peck.*

Fig. 28. Piece of a branch bearing the fungus.
Fig. 29. A pustule and its matrix, magnified.
Fig. 30. An ascus containing spores, x 400.
Fig. 31. Three spores, x 400.


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31

EXPLANATION OF PLATE III.

APPENDICULARIA ENTOMOPHILA, *Peck*.

Fig. 1. Leg of a fly bearing the fungus, magnified.
Fig. 2. A perithecium and its appendages more highly magnified.
Fig. 3. Tip of the perithecial rostrum with spores escaping from its apex, x 400.
Fig. 4. Three spores, x 400.

SPHÆROGRAPHIUM HYSTRICINUM, *Sacc.*

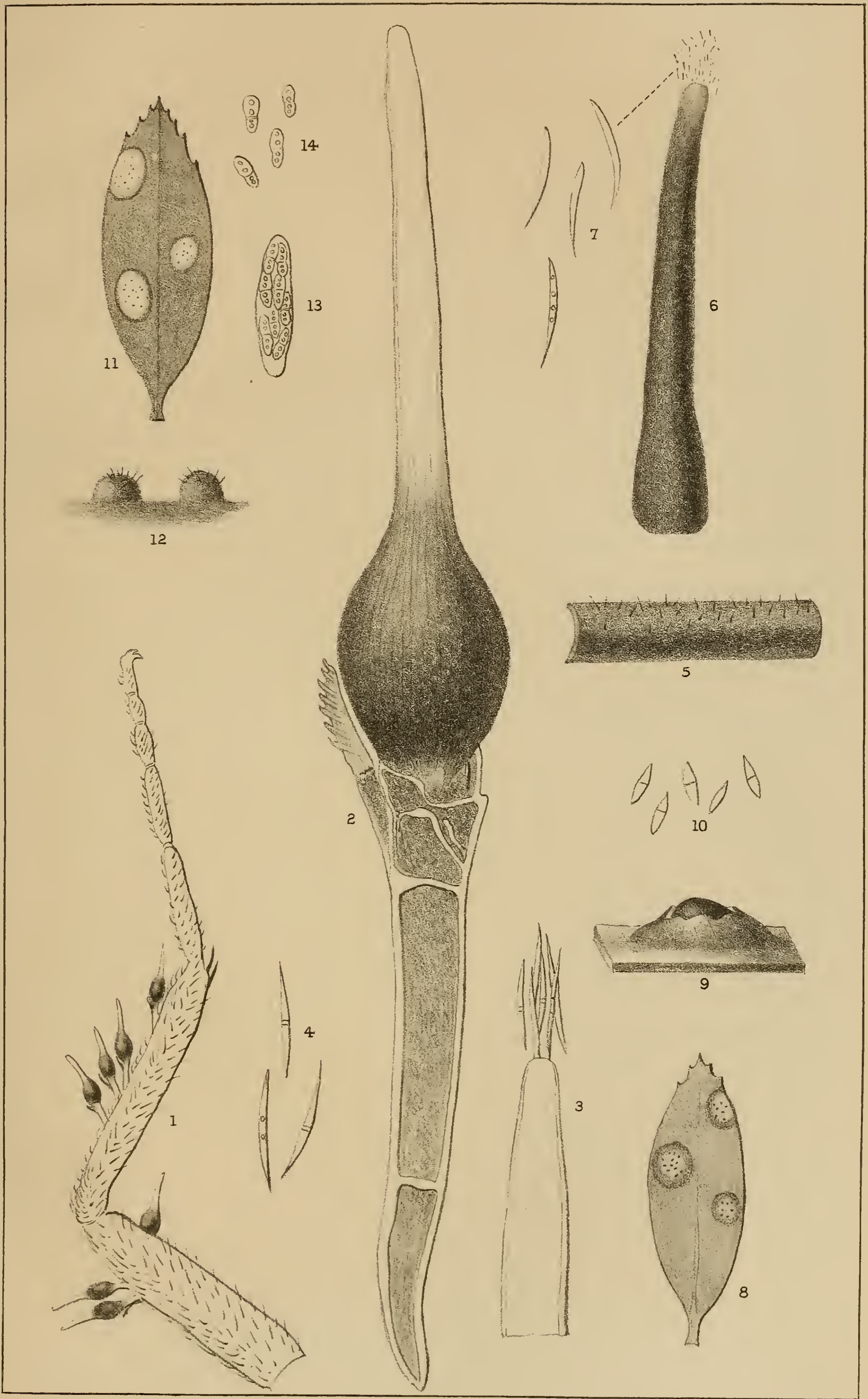
Fig. 5. Piece of bark bearing the fungus.
Fig. 6. A perithecium with spores escaping from its apex, magnified.
Fig. 7. Four spores, x 400.

ASCOCHYTA CASSANDRÆ, *Peck*.

Fig. 8. A leaf spotted by the fungus.
Fig. 9. A perithecium and its matrix, magnified.
Fig. 10. Five spores, x 400.

VENTURIA CASSANDRÆ, *Peck*.

Fig. 11. A leaf spotted by the fungus.
Fig. 12. Two perithecia, magnified.
Fig. 13. An ascus containing spores, x 400.
Fig. 14. Four spores, x 400.



Weed, Parsons & Co Albany, N.Y.