TWENTY-THIRD ANNUAL REPORT

OF THE

Regents of the University of the State of New York,

ON THE CONDITION OF THE

STATE CABINET OF NATURAL HISTORY,

AND THE

HISTORICAL AND ANTIQUARIAN COLLECTION ANNEXED THERETO.

TRANSMITTED TO THE LEGISLATURE MARCH 10, 1870.

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IN ASSEMBLY,

March 10, 1870

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UNIVERSITY OF THE STATE OF NEW YORK:
OFFICE OF THE REGENTS,
ALBANY, *March* 10, 1870.

To the Hon. WILLIAM HITCHMAN,
Speaker of the Assembly:

Sir,—I have the honor to transmit the Twenty-third Annual Report of the Regents of the University on the State Cabinet of Natural History, and the Historical and Antiquarian Collection annexed thereto.

I remain, very respectfully,
Your obedient servant,
JOHN V. L. PRUYN,
Chancellor of the University.

REGENTS OF THE UNIVERSITY.

(Ex officio Trustees of the State Cabinet of Natural History.)

JOHN V. L. PRUYN, LL.D., CHANCELLOR.
GULIAN C. VERPLANCK, LL.D., VICE-CHANCELLOR.

EX OFFICIIS.

JOHN T. HOFFMAN, GOVERNOR.
ALLEN C. BEACH, LIEUTENANT-GOVERNOR.
HOMER A. NELSON, SECRETARY OF STATE.
ABRAM B. WEAVER, SUPERINTENDENT OF PUBLIC INSTRUCTION.

ERASTUS CORNING,
PROSPER M. WETMORE,
GIDEON HAWLEY, LL.D.,
ROBERT CAMPBELL,
ROBERT G. RANKIN,
ERASTUS C. BENEDICT, LL.D.,
GEORGE W. CLINTON, LL.D.,
ISAAC PARKS, D.D.,
JOHN A. GRISWOLD,
LORENZO BURROWS,
ROBERT S. HALE,
ELIAS W. LEAVENWORTH,
J. CARSON BREVOORT,
GEORGE R. PERKINS, LL.D.,
ALEXANDER S. JOHNSON, LL.D.,
GEORGE W. CURTIS, LL.D.,
WILLIAM H. GOODWIN, D.D.,
FRANCIS KERNAN.

SAMUEL B. WOOLWORTH, LL.D., SECRETARY
DANIEL J. PRATT, ASSISTANT SECRETARY.

STANDING COMMITTEE OF THE REGENTS

(For the Year 1870),

SPECIALLY CHARGED WITH THE CARE OF THE STATE CABINET:

(The GOVERNOR.) MR. HOFFMAN.
MR. CORNING, MR. WEAVER,
MR. CLINTON, MR. BREVOORT,
MR. HALE, MR. JOHNSON.

CURATOR OF THE STATE CABINET.

JAMES HALL, LL.D.

REPORT.

To the Hon. the Legislature of the State of New York:

The Regents of the University, as trustees of the State Cabinet of Natural History, submit this their Twenty-third Annual Report.

The Report of the Curator, herewith communicated, exhibits gratifying accessions to the Cabinet and improvements in its arrangement, and contains much new and interesting matter touching the Geology and Palæontology of the State.

The Report of the Botanist shows effective devotion to his duties. Three hundred and twelve species of plants, new to the State, and sixty-eight new to science, have been added to the collections. Regions little known to the botanist have been explored, and valuable additions to knowledge have been made. The reputation of the State as a liberal patron of science will be enhanced by continuing to sustain this department.

The Cabinet is deficient in collections in Entomology. Mr. Lintner, assistant in the Museum, has devoted such time as could be spared from other duties to this department. The "Entomological Contributions," herewith communicated by him, give proof of his powers of careful observation, and valuable results are expected from his labors.

The contributions of Prof. Hall to Palæontology are continued.

The Cabinet of Natural History was established for the exhibition of the natural productions of the State of New York. They cannot all be gathered within a short or prescribed time, nor can we hope to be able to say "the work is finished." The continued aid of all who may be able to contribute to it is invited.

Thus may the collections be augmented, and the citizens of the State look with pride on the Cabinet, as a repository of what nature has provided in her various departments for their use, as well as an exhibition of the revelations of science.

The Regents are of opinion that the addition of the geological and palæontological collections of Prof. James Hall to those of the State is very desirable, for the reasons that they would aid materially in completing the present chronological series of State fossils, and in forming a zoölogical series, and would enable the State to diffuse knowledge and enrich its Cabinet by exchanges, and to place full series of specimens of the rocks and fossils of New York in every one of the chief seats of learning.

The usual statement of receipts and expenditures is herewith communicated.

By order of the REGENTS:

JOHN V. L. PRUYN,
Chancellor of the University.

S. B. WOOLWORTH, *Secretary.*

ACCOUNT CURRENT, 1868-69

With Appropriation for the State Cabinet of Natural History

Dr.

To balance from 1867–8	$1,021 21
To appropriation for compensation of Botanist	1,500 00
To appropriation for special increase and preservation of zoölogical collection (Session Laws of 1868, p. 1941)	1,000 00
To interest on deposits	8 18
To balance of account (deficiency)	769 91
	$4,299 30

Cr.

By salary of Botanist (one year and one-fourth)	$1,875 00
By salary of Taxidermist	250 00
By additions to zoölogical collection	1,380 93
By expressage, freight, cartage and postage	132 14
By printing	6 50
By trays for shells	104 50
By glass ware, etc.	2 25
By chemicals	180 80
By stationery	11 53
By traveling expenses of Curator	44 40
By traveling expenses of Botanist	311 25
	$4,299 30

I have examined the accounts of the Regents of the University as trustees of the State Cabinet of Natural History, and the vouchers in support thereof, and find them correct.

ALEXANDER S. JOHNSON.

Albany, *January* 7, 1870.

APPENDIX.

CONTENTS.

(A.)

REPORT OF THE CURATOR.

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

GENTLEMEN:

I have the honor to present to you the following communications regarding the condition of the State Cabinet of Natural History, with a statement of the work done, and additions made to the Museum in the several departments, during the past year.

At the close of last year (1868) I reported to your Board the changes which had been made on the second and third floors of the Museum, by which we were enabled to make a better classification and more satisfactory exhibition of the collections of the several departments. The cases for the arrangement and exhibition of the Geological and Palæontological collections, then in progress, have been completed, and the greater part of them have been already occupied. The collection of Brachiopoda has been increased by a large number of specimens from those described in the fourth volume of the Palæontology of the State. I shall likewise soon be able to make considerable additions among the other classes of fossils.

A series of specimens from the Niagara group, at Waldron, Indiana, has been added to the collection, for the double purpose of affording means of comparison of the fauna of that locality with the fauna of the same horizon in New York, and of illustrating the species described some time since in the Transactions of the Albany Institute.

The work of arranging and labeling the duplicate specimens of fossils for distribution has progressed as rapidly as other

duties would permit. Although a large part of the fossils of the State had been properly described and named, there still remained an extensive class, the Lamellibranchiata, which had never been critically studied, and the names which they had received were, in many instances, quite unsatisfactory, or known to be erroneous in their generic reference. Indeed our knowledge of the genera and species was such that, without a thorough revision of the whole, it would at this time have been discreditable to the Museum to have distributed them to institutions of learning, or to individuals engaged in their study. The revision of these fossils has been progressing the past year, and, by the efficient aid of Mr. R. P. Whitfield, much valuable work has been accomplished and a satisfactory determination made of many of the genera and species. At the same time, the drawing of these shells, for illustrating the Palæontology of the State, has been rapidly progressing.*

Their study, moreover, developed the fact, that in many respects the museum was very deficient in proper representatives of this group of fossils, and it became imperative to increase the collections for the purpose of study and determination of the species.

With this object in view, Mr. Whitfield has visited several important localities of the Chemung group, in the southwestern counties of the State, and has obtained valuable collections from the neighborhood of Angelica, Rockville, Hobbieville, Philipsburg, and other places in Alleghany county. He has also made valuable and interesting collections from the coarse sandstones and conglomerates of Portville and Ceres, on the south of Olean, and also from near the village of Salamanca, in Cattaraugus county.

These collections have brought more vividly before us the imperative necessity of a careful study of these rocks along their lines of junction with succeeding groups of strata, before the limits of the newer geological formations of the State can be considered as well established. Six boxes of medium size, filled with specimens, have been collected from that portion of

* Mr. Conrad, formerly the palæontologist of the State survey, long since placed in my hands all his manuscripts and figures of the Lamellibranchiate fossils of the State. Although many of the figures were unfinished or but pen and ink sketches, yet, from having their names attached, they have been of great service in the identification of species where the short, published descriptions would have been insufficient. Mr. Conrad has also, on two occasions, visited Albany for the purpose of examining my collection, and giving me the benefit of his identification and determination of the species of this order previously described by him

the State, and part of them have been arranged and ticketed with the localities from which they were derived.

From the Hamilton group, in southeastern New York, Mr. J. W. Hall and George B. Simpson have collected six large boxes of specimens. These collections have been examined, ticketed and recorded. They prove to be mostly Lamellibranchiate shells, which were very much needed in the collections for study, and they have also added largely to the means of placing the fossils of this class in the duplicate collections for distribution, for which we have not heretofore had the materials.

Aside from the importance and necessity of possessing these collections for study, it has become very important to determine the limits of the geological formations to which the New York geologists have given names. The nomenclature was, after all the investigations, a compromise among those occupied in the work; for at that time no individual of the four persons engaged had traced these formations continuously from the eastern to the western extremity of the State.

We have long possessed evidence to show that the recognition of certain of the formations in some of the southern and southeastern counties had been based upon incorrect or insufficient information. The almost total absence of fossils from the higher strata in the eastern part of the State, and the coming in of red rock in the formation above the Hamilton group, had induced Mr. Mather to recognize the great accumulation of strata forming the Catskill Mountains, as the "Catskill group." Mr. Vanuxem, with a true knowledge of the succession in the central part of the State, nevertheless yielded to Mr. Mather's views in the more difficult and inaccessible portions of the country bordering the two districts, and the name "Catskill" superseded the "Montrose and Oneonta sandstone" of the Annual Reports. In conformity with this view, the geological map has been made to represent a thinning of the Chemung group in the eastern part of the State, without any recognition of the existence of the Portage group in that region. This discrepancy between the nomenclature, as recognized in the central and western parts of the State, and that of the southeastern counties, I had observed as early as the year 1844, while engaged in the collection of materials for the Palæontology of New York.

The adoption of Mr. Mather's views left little place for the Chemung group, and it was only by recognizing the higher

arenaceous beds of the Hamilton as the Chemung, by the geologists of these adjacent districts, that such a disposition of the strata could be harmonized. At a later period, investigations in strata, which are clearly above some of the red rocks, revealed the occurrence of characteristic fossils of the Chemung group; and, relying upon this evidence, we were compelled to the conclusion that the Catskill group, as recognized and described in the Reports of the eastern districts, was made up, in part at least, of rocks of the age of the Chemung group. Later examinations have confirmed this view, and it now appears that the term "Catskill group" cannot, with propriety, be applied to any other rocks than those of the higher part of the Catskill Mountains and hills adjacent upon the west. Even limiting the term in this manner, the evidence of its identity with the red sandstone of the Tioga valley, in Pennsylvania, rests upon the fact of its succession to the Chemung group, if that be regarded as demonstrated. It is true that, in the red sandstones of Delaware county, the remains of Holoptychius have been found, but of its identity with the western species, or its relative position to known beds, we have at present too little knowledge to form any satisfactory conclusion.

Notwithstanding that as early as 1839, I had recognized the red sandstone with fish remains, as a distinct formation succeeding the Chemung group in the Tioga valley, and had observed a series of essentially non-fossiliferous sandstones and conglomerates following it in regular succession, I afterwards became doubtful of the propriety of retaining the distinctive term of "groups" for these formations. This red sandstone soon thins out, or is essentially merged, so that its distinctive features cannot be traced far to the westward. In this condition of the rocks, and the obscurity regarding the line of demarkation, the entire series in southwestern New York and adjacent parts of Pennsylvania, to the base of the coal conglomerate, has been usually designated "Chemung group." At the same time a series of rocks in eastern Ohio, described in the original Ohio survey as the "Waverly sandstone series," had been supposed to represent the Chemung group; and the shaly formation below, usually considered non-fossiliferous, was regarded as the continuation of the Portage group. It was only when the fossils began to be more critically studied that doubts were entertained of this reference of the Ohio rocks. During the study of the Brachiopoda of the fourth volume of the Palæontology of New York, I became satisfied of the necessity of separating, upon palæontological grounds

alone, the Waverly series from the Chemung, notwithstanding there are some species common to the two formations.* This question, however, had never been set at rest until the explorations of Dr. Newberry, and his corps of assistants, in the geological survey of Ohio during the past year.

Dr. Newberry has found the beds of shale, or shaly sandstone, containing *Spirifera disjuncta*, *Leiorhynchus quadricostata*, and other characteristic fossils of the Chemung group, passing entirely beneath those beds holding the characteristic fossils of the Waverly sandstone series, thus establishing the fact of superposition. This is a very gratifying result, inasmuch as the shaly rocks below had heretofore been regarded as non-fossiliferous, and there was, therefore, an entire absence of evidence of this kind from the lower rocks. During the investigations for the fourth volume of the Palæontology of New York, and the collection of specimens for the same, I instructed Mr. C. A. White, then an assistant in the work, to make careful sections of the strata at various points from Cuyahoga Falls, in Ohio, to the western line of New York. These sections, together with the collections made, did not reveal any facts of new interest, or furnish information for any satisfactory conclusion regarding the superposition of the formations.

Notwithstanding our present clear recognition of the order of succession among these formations, we have been greatly interested in observing, among the collections made from the upper part of the Hamilton group in eastern New York, some species which bear a much nearer resemblance to those of the Waverly group than they do to any known species in the Chemung, and which, upon cursory examination, may be regarded as identical with species from the Ohio formation.

In other parts of the State there are difficulties of equal magnitude in regard to harmonizing the old geological map with known facts regarding the geological structure. The statement is true of the country lying east of the Hudson river, and more especially of the area occupied by the older rocks in the northern part of the State, colored as primary. We have long had reason to believe that the geological formations of this region

* In volume iv, I have described species of Lingula and Discina from the Waverly sandstones and associated shales; but a comparison of the species of other genera satisfied me of the great difference in the faunæ of the two formations, and I therefore omitted from the volume others previously described by me from the rocks of Ohio.

belong to two distinct periods. The Gneissic and Granitoid rocks, with some intercalated limestones, characterized by the presence of extensive beds of magnetic iron ore in the counties of Essex, Clinton, Franklin, Hamilton, etc., seem to be quite distinct in character and age from the limestones and associated rocks containing the specular iron ores of St. Lawrence and Jefferson counties: the latter are apparently of newer age, but whether belonging to the Huronian system or otherwise, it may not be prudent with our present knowledge to express an opinion.

I have dwelt upon these points in order to show that we have yet much work to do before the limits of the formations, as described in the New York Reports, can be properly indicated upon the map. Furthermore, I regard it as an imperative duty to science and the State, that we should, by a careful examination of certain parts of the country, set these questions at rest, and thereby afford the means for a reliable and complete guide in the study of our own geological formations.

The collection of fossils from the Potsdam sandstone, mentioned in the report of 1867, has been prepared and added to the Museum in its proper order. This collection consists of the common *Lingula (Obolella?) prima*, a Lingulepis resembling *L. pinnaformis*, a new species of Metoptoma, or a very depressed form of Platyceras, and specimens of *Conocephalites minuta*,— the last three not previously in the cabinet.

A detailed account of the additions to the Geological and Mineralogical Departments will be found under the proper head.

A considerable addition has been made to the Collection of Economic materials, as will be seen by the list of specimens. I beg leave to call your attention again to the incommodious arrangement of these materials, and the absolute need of more room for so important a department. At the present time, the building stones and marbles are arranged on shelves upon two sides of the main hall of entrance, and so situated as to be exposed to the constant handling of visitors. The iron ores are in the second story, and the only available space is upon a platform so near the floor that they are exposed to the dust and dirt of sweeping, and liable to be used as seats by inappreciative visitors. This department is of sufficient importance to deserve a proper room for its exhibition; and, could all the materials be

put in a suitable place, and in proper relation to each other, they would not only be more impressive as a collection, but would afford much better means of examination and study.

A large accession to the Conchological Department has been received from Mr. P. P. Carpenter, through the Smithsonian Institution. The museum has long been without an inch of space under glass for such collections. The Gould collection is already too much crowded, and there are as many shells shut up in drawers as there are on exhibition. I can only repeat here what I said two years since: "I have heretofore called your attention to the large number of shells from the Smithsonian Institution and other sources still remaining in drawers. We are unable, at the present time, or even with any prospective arrangement in the room allotted to this department, to find space for arranging them beneath glass, or in any way that they may be seen by visitors."

Some addition has been made to the collection of Corals since my last report, and two beautiful specimens of branching sponges have been added to that department. (See list of additions.)

We have obtained from Dr. Nelson, of Berea, Ohio, in exchange for reports on the State Cabinet, a valuable collection of Echinoderms from the northeast coast. A list of these, embracing one hundred and three specimens, and thirteen species, will be found under the head of additions to the cabinet.

The alcoholic specimens of fishes and reptiles, noticed in the list of last year, have been properly cared for and arranged with the other similar collections.

The skeleton of a Moose, procured several years ago, has been mounted and placed in position by Mr. G. K. Gilbert. I reported last year progress in mounting skeletons of the mammals of the State. I am able to report four skeletons mounted, and some twenty others in various stages of preparation. The latter have been cared for as well as practicable since Mr. Kislingbury left the work.

In regard to the Historical and Antiquarian collections, I would repeat what I said last year. With increasing collections, we have no additional room in which to arrange the specimens,

and we can only pack them in boxes till space shall be appropriated and cases provided.

In the department of Botany, Mr. Peck is doing much good work, and in a direction which all lovers of science will be glad to recognize. The plan of work which he has marked out will, I think, commend itself to the Board of Regents, and should receive the support of every intelligent person in the State. This plan may be briefly stated as follows:

1. Investigations for the discovery of species not before known in the State, and collecting specimens, not only of these, but also of any new or interesting varieties of previously known species, provided that such are not already represented in the Herbarium; the ultimate object being the representation in the State Herbarium of every species and important variety of plant found growing uncultivated in the State.

2. Noting any new or interesting facts relative to the habits or economical relations of any plant, occasionally recommending for cultivation such as give especial promise of being useful.

3. Making a record of new localities of rare plants, the observed habitats of the Cryptogamia, and their time of occurrence in the season, or the time of maturation of the fruit of perennial species; the ultimate object being to make a complete catalogue of the plants of the State; such catalogue to give, if deemed desirable, the range of geographical distribution of local or rare species.

4. Giving descriptions of new or unpublished species, and, to some extent, of published ones, when such descriptions are inaccessible to the mass of students; the object being to increase and disseminate a knowledge of our plants, to correct errors and to aid and encourage students of natural history.

Mr. Peck has reported as additions to the Herbarium the past year four hundred and thirteen species of plants, of which three hundred and twelve are new to the State, and sixty-seven new to science. This fact, together with the evidence furnished by this report herewith presented, will show the progress being made toward the completion of the work in this department of the Museum.

While able to report excellent progress in cataloguing the Plants of the State, I would earnestly recommend the preparation of a catalogue of the Insects of the State. I would also suggest for the consideration of the Board the commencement of an Entomological collection for the Museum.

It is perhaps unnecessary to refer to the great importance of the study of insects. Wherever earnest attention has been given to this department of natural history, so abundant have been the practical benefits resulting therefrom, that no difficulty has been experienced in establishing its claim to popular favor, or of securing the requisite means for its proper investigation. In several of the museums of continental Europe, there are special departments of Entomology, often engaging the entire services of a corps of eminent professors, as in the *Jardin des Plantes de Paris*, where six professors, aided by several assistants, are constantly employed.

In our own country a decided impetus has been given to the study within the last few years; as evidence of this, reference may be made to the establishment of the American Entomological Society of Philadelphia, in 1859, now numbering a large membership, and issuing a quarterly publication of a high order of scientific value; to the appointment of State Entomologists in several States of the Union, and of an Entomologist in the Department of Agriculture at Washington; the publication of periodicals exclusively devoted to this branch; the preparation of text books upon the subject, adapted to the wants of our higher schools and colleges; the catalogues and treatises on the several orders of insects, now in process of publication by the Smithsonian Institution; the announcement by the trustees of the Cornell University of their intention of establishing a professorship of Economic Entomology at an early day; and to the number of private collections of insects now being made throughout the country. It is probable that in no one department of natural history has so much progress been made in the last ten years as in that of entomology.

Beyond the investigations of Dr. Fitch of our injurious insects, our own State has contributed but little to this department of knowledge. At the present time, for the best popular treatise on the insects of New York, we have to turn to *Harris' New England Insects*, a third edition of which, finely illustrated, has recently been issued by authority of the State of Massachusetts. As supplementary to this work, the curator of the Boston Society of Natural History is now preparing for publication a volume on the butterflies of New England, in which are to be given illustrations and descriptions, so far as known, of the several stages of transformation of each species. Not entirely confined to New England, it reaches even to our unoccupied territory, and gathers freely of our neglected fauna to

enhance the value of its pages. It is designed to embrace all the butterflies of New York.

During the past year Mr. J. A. Lintner, assistant in the Museum, who has been engaged for a number of years in the study of insects, has commenced the preparation of a synonymical catalogue of the insects of New York. Its prosecution, under circumstances favorable to its completeness, will depend upon the approbation and coöperation of your Board. A list of described species accredited to the State could readily be made, and prove of some service, as indicative of present progress; but, in order to impart to it a special value, it is desirable that collections should be made in different parts of the State, carefully studied, the species determined, and the new material named and described. It is thought that a properly prepared circular, issued by the Regents to the principal of each academy under their charge, would secure an amount of material which would prove of great service in the work of cataloguing, and aid much in our knowledge of geographical distribution.

The number of insects belonging to the State of New York will probably fall not far short of fifteen thousand species, of which a large number are yet unknown, and a still larger number undescribed.

Recognizing the value of field work in natural history, and regarding it as the basis of true progress, and also appreciating the importance of entomological investigations, I have authorized Mr. Lintner, when not specially required for the general business of the Museum, to prosecute his investigations in the field. He reports, in the vicinity of Albany, a locality of limited extent, peculiarly rich in its insect fauna — a very metropolis of butterflies — which it would be inexcusable not thoroughly to develop. It has already given him many species new to the State, some of which had heretofore been known only from southern States, and several species new to science.

A collection of larvæ, in alcohol, has been commenced, and it is proposed to extend the collection another season, probably by the aid of some other preservative fluid, which, by experiment, may be found best adapted to the preservation of these delicate organisms.

Descriptions of numbers of larvæ have been made by Mr. Lintner during the season, and in several instances, where the opportunity has presented itself to follow the development through all the stages of transformation, from the egg to the

perfect insect, entire biographies have been secured, which may be expected to appear in future reports of the State Cabinet.

A museum of natural history, without representation in a department more numerous in species than all the other departments combined, seems so unnatural that it is believed that your honorable Board will gladly avail themselves of the present favorable opportunity of supplying a deficiency referred to in former reports, and which has long been a cause of reproach to our Museum. If authorized by you, Mr. Lintner will, the ensuing season, commence a collection of insects for the State Cabinet. From proffers already made of contributions of both native and foreign insects,— from the exceedingly favorable localities for collecting in the immediate vicinity of Albany, and from specimens already in his possession, he confidently relies upon his ability to place in the rooms, in a short time, an entomological collection which will prove an attractive feature and a valuable acquisition to the Museum. The expenses for the necessary cases for the collection would be inconsiderable, and the space required for its display could readily be obtained.

The following collections of fossils have been distributed from the Museum during the year: To the Phipps Union Seminary, seventy species; to the Wood Library of Canandaigua, a collection of seventy-one species; to the Jamestown Academy, a collection of one hundred and nine species; to Wm. Valiant, of Rome, N. Y., in exchange, a collection of fifty-four species.

In conclusion, I would earnestly request that the Committee of the Board of Regents having charge of the State Cabinet visit the rooms and examine its several departments, with a view to a knowledge of its present condition and arrangement of materials, as well as to advise or direct any changes or increase of facilities which they may think proper.

I have the honor to be, very respectfully,

Your obedient servant,

JAMES HALL.

Albany, *January* 9, 1870.

(B.)

ADDITIONS TO THE STATE CABINET DURING THE YEAR 1869.

I. TO THE GEOLOGICAL AND MINERALOGICAL DEPARTMENTS.

I. By Donation.

From James Humphrey, Albany, N. Y.

Specimens of Lead Ore, from the Ancram Lead Mines, Columbia Co., N. Y.

From Dr. S. B. Woolworth, Albany, N. Y.

A specimen of *Modiomorpha concentrica* Hall, from the Hamilton group.

From Hon. Lewis H. Morgan, Rochester, N. Y.

A valuable collection of twenty-five specimens of Iron Ores and accompanying Rock-formation from the Lake Superior Mines, several of which are in large masses:

From the Champion Iron Mine, Marquette Co., Mich.:
- Two blocks of Granular Iron Ore (magnetic).
- Two blocks of Sulphuret of Iron accompanying Iron Ore.
- Specimen of Rock from sixty feet below top of ore-bed.
- Rock accompanying Iron Ore.
- Block of Slate Iron Ore (magnetic).
- Specimen of Slate Iron Ore.

From the Lake Superior Mine, Marquette Co., Mich.:
- Two blocks of Granular Iron Ore.
- Specimen of Micaceous Iron Ore.
- Seven specimens of Rock accompanying Iron Ore.
- A fine mass of Hematitic Iron Ore.
- A block of Polished Iron Ore (Slikensides).
- Two blocks of Slate Iron Ore.

From the Washington Mine:
- Specimen of Granular Iron Ore (magnetic).
- A mass of Specular Iron Ore.

From the Holyoke Mine, near Marquette:
- A mass of Silver Lead Ore.

From D. McELWAINE, Cohoes, N. Y.

CONGLOMERATE of silicious pebbles cemented with iron: A STALAGMITIC FORMATION; Tuscumbia, Alabama.

From H. A. HOMES, New York State Library.

A collection of MINERALS and ROCK SPECIMENS, from the shores of the Bosphorus.

A core of SERPENTINE MARBLE, taken out with the tubular drill; from Roxbury, Vt.

From G. W. DURANT, Rensselaerville, N. Y.

A curiously weather-worn mass of SILICIOUS LIMESTONE.

From JOHN MCARDLE, Albany, N. Y.

A specimen of CALCAREOUS SPAR, from the Hudson River group.

From E. C. BURTON, Gloversville, N. Y.

Black River Limestone, from Tribes Hill, N. Y., containing *Columnaria alveolata* Goldfuss.

From JOHN A. LAKIN, Albany, N. Y.

SHELL CONGLOMERATE, from the upper Carboniferous Limestone: Omaha, on Pacific railroad.

From SAMUEL GOLDEY, Swanton Falls, Vt.

A specimen of VARIEGATED MARBLE (polished), from Swanton Falls, Vt.

From FREDERICK H. CLUTE.

A pebble of BLACK JASPER, from the clay at the Harmony Mills, Cohoes, N. Y.

From F. VOGL, Boston, Mass.

CALCAREOUS SPAR with STRONTIANITE, from near Howe's Cave, Schoharie Co., N. Y.

From J. SCHOONMAKER, Kansas.

A specimen of LEAD ORE, from La Motte Mine, Madison Co., Mo.

From ENOCH CARTER, Newburgh, N. Y.

Two pieces of VARIEGATED MARBLE, from Snake Hill. A specimen of STILBITE from Bergen Hill, N. J.

From THOMAS SHEEHAN, DUNKIRK, N. Y.

A worn pebble, with stems of CYATHOCRINUS, from the Portage group, Dunkirk, N. Y.

From H. H. Ingolsbe, South Hartford, N. Y.

A specimen of Ophileta, from the Quebec group, South Hartford, Washington Co., N. Y.

From William Bacon.

Hematitic Iron Ore, from the Bacon Iron Mines, Richmond, Berkshire Co., Mass.

From G. W. Lewis, Albany, N. Y.

A specimen of Gypsum, from B. F. Smith's quarry, Alabaster Bay, Lake Huron, Mich.

From Capt. C. E. Dutton, U. S. Army.

Specimens of *Graptolithus amplexicaulis* Hall, from the Hudson River group, at West Troy, N. Y.

From Verplanck Colvin, Albany, N. Y.

Specimens of Albite (Soda Feldspar), occurring with mica and schorl, from Thurman, Warren Co., N. Y.

From Chauncey K. Williams, Rutland, Vt.

A specimen of Gypsum, from Grand Rapids, Mich. A polished piece of Statuary Marble, and another of Blue Marble, both from Rutland, Vt.

From Mr. Oram.

A mass of Magnetic Iron Ore, from the Forest-of-Dean Mine, Orange Co., N. Y.

II. By Purchase.

A slab of sandstone from the Chemung group, containing specimens of *Hippodophycus Cowlesi*, erroneously supposed to be imprints of horses' feet; from Salamanca, Cattaraugus Co., N. Y.

II. TO THE ECONOMIC DEPARTMENT.

By Donation.

From W. H. Fullerton, Manchester, Vt.

A dressed 12 inch cube of Light Gray Granite, from the Marble and Granite Works, Manchester Depot, Vt.—(No. 72 in collection.)

From Alanson Sweet, Milwaukee, Mich.

A dressed block (12x12x14) of Brown Sandstone (St. Peter's Sandstone), from Bass Island, Lake Superior.—(No. 75.)

From W. R. PERKINS, Agent of Penobscot Granite Co.

A block of COARSE-GRAINED GRANITE (11x11x22), showing different dressings, from Prospect, Me.—(No. 74.)

A dressed block of FINE-GRAINED GRANITE (11x12x28), from Clark's Island, Penobscot Bay, Me.—(No. 73.)

From E. N. RANSOM, Perryville, Madison Co., N. Y.

A partly dressed block of LIMESTONE, from quarries at Perryville—(No. 110.)

From E. W. HALL, Whitehall, N. Y.

A small block of SERPENTINE MARBLE, one face polished and the others dressed—(No. 112.)

From the Field Marble Company.

A 12 inch dressed cube of "VERMONT ITALIAN MARBLE," from the quarries of the company at East Dorset, Vt.—(No. 92.)

From B. & J. CARPENTER, Lockport, N. Y.

A 12 inch cube of Gray NIAGARA LIMESTONE, with one face of rock-fracture, and other faces in different styles of dressing—(No. 48.)

From the North Rutland Marble Company.

A block (18x14x9) of CLOUDED MARBLE, beveled and moulded.—(No. 93.)

From WM. J. MCALPINE, Albany, N. Y.

A block from the Hudson River group, Schenectady, N. Y., showing mud-marks.

From SAMUEL MORGAN, Albany, N. Y.

Specimens of ROOFING SLATE, from the Green Mountain Slate and Tile Co., Poultney, Vt.

III. TO THE ZOÖLOGICAL DEPARTMENT.

I. By Donation.

From ORSON HOUGHTALING, Coeymans, N. Y.

A great HORNED OWL (*Bubo Virginianus* Bonap.)

From FLETCHER P. KEEFER, Coeymans, N. Y.

TWO FLYING SQUIRRELS (*Pteromys volucella* Harl.)

From W. R. A. WOODRUFF, Albany, N. Y.

Raia diaphanes Mitch. ♀, taken off the coast of Rhode Island.

From Henry W. Coon, Poestenkill, N. Y.

A specimen of *Platysamia Cecropia* (Linn.) Grote, taken May 20.

From Albrecht Liebel, Bethlehem, N. Y.

Three specimens *Platysamia Cecropia* (Linn.) Grote, taken May 24.

From Barrington Lodge, Albany, N. Y.

A specimen of *Corydalis cornuta* (Linn.) Latr.

From Mrs. Levi Carpenter, Albany, N. Y.

A specimen of *Alaus oculatus* Linn.

From W. J. Bailey, Chatham Four Corners, N. Y.

Numerous specimens of *Xylocopa Virginica* (Drury) found hybernating in cells excavated in the arms of telegraph poles.

From Henry Gillman, Detroit, Mich.

Insects from Detroit, Mich., in alcohol; Insects from Kentucky, in alcohol; *Cambarus pellucidus* Tellk. from the Mammoth Cave, Kentucky.

From W. D. Melius, Albany, N. Y.

A Horned Toad (*Phrynosoma cornuta*) from Freestone Co., Texas (a live specimen).

From Robert Safely, Cohoes, N. Y.

Three living specimens of *Menobranchus lateralis* Harl. from the Mohawk River, at Crescent.

From P. P. Carpenter, through the Smithsonian Institution.

A collection of Foreign Shells, comprising about 590 species. A catalogue will be given in a future report.

II. By Collection.

By J. A. Lintner, N. Y. State Cabinet.

Twenty-five species of Larvæ of Lepidoptera, in alcohol, viz.:

	No. of spec.
Sphinx Kalmia Smith	1
Macrosila quinquemaculata (Steph.) Clem	1
Darapsa chœrilus (Cram.) Walker	1
Smerinthus geminatus Say: young	1
Smerinthus excœcatus (Smith) Harris	2
Philampelus achemon (Drury) Harris	1
Ellema Harrisii Clemens	2

	No. of spec.
Alypia octomaculata (Fabr.) Hübn	1
Eudryas grata (Fabr.) Harris	1
Pyrameis cardui (Linn.) Doubl	2
Eudamus Tityrus (Fabr.) Boisd. et Lec	3
Pyrrharctia isabella (Smith) Pack	1
Ecpantheria scribonia (Stoll) Hübn	1
Lagoa crispata Packard	4
Ichthyura inclusa Hübn	2
Datana ministra (Drury) Walker	3
Edema albifrons (Smith) Walker	3
Oedemasia concinna (Smith) Pack	1
Cœlodasys unicornis (Smith) Pack	1
Cerura borealis Harris	1
Callosamia Promethea (Drury) Pack	2
Hemileuca Maia (Drury) Walker: in five moltings	8
Hyperchiria Io (Fabr.) Hübn	3
Eacles imperialis (Drury) Hübn	3
Anisota senatoria (Smith) Hübn	3

By R. P. WHITFIELD and J. H. EMERTON, N. Y. State Cabinet.

Two fine specimens of SPONGE, taken from Beverly Bridge, Beverly, Mass.

By Mr. KISLINGBURY.

Four mounted skeletons, viz.:
Lynx borealis Temm. (Northern Lynx) male.
Vulpes fulvus Harl. (Red Fox) male.
Arctomys monax Gmel. (Woodchuck.)
Lutra canadensis Rich. (Otter.)

III. By Exchange.

From EDWARD T. NELSON, Berea, Ohio.

A collection of ECHINODERMATA, containing one hundred and three specimens and thirteen species, from Eastport, Me.

		No. of spec.
Solaster endeca Forbes	Alcoholic	2
Cropaster papposus Müll. et Tr.	"	1
Pteraster militaris Müll. et Tr.	"	1
Cribrella sanguinolenta Lütken.	"	20
Asterias vulgaris Stimpson.	"	6
Asterias littoralis Stimpson.	"	6
Stichaster albulus Verrill.	"	10
Ophiopholis bellis Lütken.	"	25
Ophioglypha Sarsii Lyman	"	5

		No. of spec.
Ophioglypha robusta Lyman.	Alcoholic	5
Astrophyton Agassizi Stimpson.	"	4
Astrophyton Agassizi Stimpson.	Dry	2
Ophiopholis bellis Lütken.	"	6
Echinarachnius parnia Gray.	"	5
Euryechinus Desbachiensis Verrill.	"	5

From W. S. VALIANT, Rome, N. Y.

An alcoholic collection of ZOÖLOGICAL SPECIMENS, consisting of Worms, Caterpillars, Insects, Spiders, Toads, Frogs, Frog-spawn, Lizards, Snakes, Fishes; principally from Rome and vicinity.

IV. TO THE BOTANICAL DEPARTMENT.

I. By Donation.

From Mrs. E. E. ATWATER, Chicago, Ill.

Six species of PLANTS, of which three are interesting varieties and new to the State Herbarium.

From Hon. G. W. CLINTON, Buffalo, N. Y.

Seventy species of PLANTS, most of which are new to the Herbarium, and four new to the State.

From Hon. A. S. JOHNSON, UTICA, N. Y.

Five species of FUNGI; one new to the State.

From Dr. E. C. HOWE, New Baltimore, N. Y.

Forty-one species of PLANTS, of which seventeen are new to the State, and one a new species.

From G. B. BRAINARD, Brooklyn, N. Y.

Nine species of ALGÆ; three new to the State.

From W. R. GERARD, Poughkeepsie, N. Y.

Six species of PLANTS, some of them interesting varieties.

From E. L. HANKENSON, Newark, N. Y.

Specimens of three species of PLANTS.

From D. F. DAY, Buffalo, N. Y.

Three species of PLANTS, one of which is new to the State.

From J. S. MERRIAM, New York.

Specimens of *Ascyrum Crux-Andreæ* and *Polygala lutea.*

From C. F. AUSTIN, Closter, N. J.

Five species of PLANTS, of which two are new to the State.

From H. GILLMAN, Detroit, Mich.

Specimens of *Goodyera Menziesii* and *Fragaria Gillmani*, from Michigan.

From Rev. J. FOWLER, Rechibucto, N. B.

Two hundred and eighty-six species of PLANTS, from New Brunswick.

From VERPLANCK COLVIN, Albany, N. Y.

PEAT, with vegetable growth, sometimes taken for Mastodon hair, from Nassau, Rensselaer Co., N. Y.

II. By Collection.

Of the Botanist.

Four hundred and thirteen species of PLANTS, of which three hundred and twelve are new to the State, and sixty-seven new to science.

V. TO THE ANTIQUARIAN DEPARTMENT.

From Hon. SAMUEL MITCHELL, Cameron Mills, N. Y.

A STONE HATCHET.

From CHARLES L. MEIGS, Albany, N. Y.

NATIVE PIPE OF BRASS, from the Island of Borneo.

From WILLIAM WEBB, Albany, N. Y.

A STEEL HOOK five inches long, found by the side of a double spring trap, three feet in length, exposed by the washing of the Kinderhook Creek, at a depth of eleven and a half feet below the surface of the bank.

From GILBERT A. SHARP, Guilderland, N. Y.

A cast-iron LAMP, made 140 years ago, such as used in the mines of Germany.

VI. TO THE LIBRARY.

I. By Donation.

From Prof. JAMES HALL.

Geological Survey of Canada: Sir W. E. Logan, F. R. S., Director. Figures and Descriptions of Canadian Organic

Remains: Decade II. — Graptolites of the Quebec group, by James Hall.

Report on Building Stones: By Prof. James Hall, Albany, 1868, Pamph., 8vo.

From the ROYAL PHYSICAL SOCIETY, Edinburgh.

Proceedings of the Royal Physical Society of Edinburgh. Vol. I., 1854–58: vol. II., 1859–62; vol. III., 1862–66.

From the NORSKE UNIVERSITY, of Christiania.

Bidrag til Kundskab om Christiania-fjordens Fauna af Dr. Michael Sars. Christiania, 1868. Pamph. 104 pages, 8vo.

Mémoirs pour servir à la connaissance des Crinoids vivantes: par Dr. Michael Sars. Christiania, 1868. Quarto Pamph.

From FELIX FLUGEL, Dr. Ph., Leipzig.

Württembergische naturwissenchaftliche Jarheshefte. Stuttgart, 1868. Pamph., 8vo.

From Dr. H. B. GEINITZ, Dresden.

Sitzungs Berichte der naturwissenchaftlichen Gesellchaft Isis in Dresden. Nos. 7–12 for July–Dec., 1868.

From ———, per Smithsonian Institution.

Vegetationsverhaältnisse von Croatien: von Dr. August Neilreich. Wien, 1868. Pamph., 8vo.

Neunter Bericht des Offenbacher Vereins für Naturkunde. Offenbach am Main. Pamph., 8vo. May, 1867 — May, 1868.

Die Zoöphyten und Echinodermen des Adriatischen Meeres: von Prof. Cam. Heller. Wien, 1868. Pamph., 8vo.

From the NATURFORSCHENDE GESELLSCHAFT ZU BAMBERG.

Bericht der Naturforschenden Gesellschaft zu Bamberg, 1860–1868. Four parts.

Zweiter, Dritter, Vierter Bericht das Bestehen und Wirken des Naturforschenden Vereins zu Bamberg, 1854, 1856, 1859.

From the TRUSTEES OF THE N. Y. STATE LIBRARY.

Catalogue of the New York State Library, 1861. General Library: first supplement. Albany, 1861. 8vo.

Forty-fifth Annual Report of the Trustees of the New York State Library. Albany, 1863. 8vo.

Forty-sixth Annual Report of the Trustees of the New York State Library. Albany, 1864. 8vo.

Fiftieth Annual Report of the Trustees of the New York State Library. Albany, 1868. Pamph., 8vo.

Fifty-first Annual Report of the Trustees of the New York State Library. Albany, 1869. Pamph., 8vo.

II. By Purchase.

Illustrations Conchyliologiques ou Description et Figures de toutes les Coquilles Connues Vivantes et Fossiles, Classées suivant le Système de Lamarck: Par. J. C. Chenu. Paris. —— tomes. Folio.

An American Dictionary of the English Language: by Noah Webster, LL.D. Springfield, Mass., 1870. Quarto.

A Latin-English Lexicon, founded on the larger Latin-German Lexicon of Dr. William Freund: by E. A. Andrews, LL.D. New York, 1868. 8vo.

III. By Subscription.

The American Naturalist. A popular magazine of Natural History. Salem, Mass., 1869. Vol. II, Nos. 11, 12. Vol. III, Nos. 1–10.

The American Entomologist. St. Louis, 1869. Vol. I, Nos. 5–12. Vol. II, Nos. 1, 2.

The American Journal of Science and Arts. New Haven, 1869. Vol. XLVII, Nos. 139 (140 wanting) 141. Vol. XLVIII, Nos. 142, 143, 144.

(C.)

REPORT OF THE BOTANIST.

S. B. Woolworth, LL.D.,

Secretary of the Regents:

Sir — The number of species of plants of which specimens have been poisoned, mounted, labeled and placed in the State Herbarium, since the date of my last report, is seven hundred and forty-six. A list of them is given in a paper marked (1).

Seeds of one hundred and sixty-four species have been placed in small paper pockets with mica covers, and attached to their respective species sheets. A list of the species is marked (2).

The number of species of which specimens have been collected, is four hundred and thirteen, of which three hundred and twelve are new to the State, and sixty-eight new or unpublished. A tabular statement and classification is given below. A list of the species is marked (3).

Species Collected.

	Number of species.	New to the State.	New to science.
Fungi	345	290	67
Algæ	8	8	1
Lichenes	6	6	..
Musci	2	1	..
Filices	3	1	..
Cryptogamia	364	306	68
Phænogamia	49	6	..
Total	413	312	68

It will be seen that the greatest number of additions, as well as of new species, is of the fungi. This is due to the facts that there are very many species of them, that they have hitherto been less thoroughly studied and carefully collected than the others, and that special attention has been given to them the past season.

In consequence of the great changes in color and shape that most of the fleshy putrescent fungi undergo in drying, it has been thought best to make colored drawings of them while in the fresh state. The number of species and varieties thus illustrated is two hundred and fifteen. These illustrations will be placed on the species sheets with the dried specimens, and will with the spores, which have been saved from nearly all the species, give a very fair exhibition of the scientific characters of the plant. Selections might be made from these illustrations for publication if deemed desirable.

Descriptions have also been written of most of these fungi while in the fresh state. This was thought best, because of the large number of new species, and the difficulty in getting descriptions of such as may have already been described. It is to be hoped that these descriptions will greatly aid those who may desire to study these singular but really useful and interesting plants. Artificial synopses of the species have been introduced to facilitate their study.

Believing that it would be of interest to many to know what plants grow on the bleak and exposed summit of Mt. Marcy, the most elevated land in the State, a list of such as have been seen by myself on that almost alpine spot has been made. It is marked (4). The distribution of these plants in their several classes and orders is thus: Flowering plants, fifty; Club Mosses, three; Mosses, thirty-two; Liverworts, ten; Lichens, twenty-three; Fungi, two species. The whole number is one hundred and twenty species. Among the flowering plants there are three trees, but they are mere shrubs in size, and not numerous. They are the balsam (*Abies balsamea*), the mountain ash (*Pyrus Americana*) and the paper birch (*Betula papyracea*). The first one, in sunken places, attains the height of two or three feet and bears cones. There are eleven shrubs, five sedges and seven grasses; of the latter, two are now first reported as belonging to our flora. The number of marsh plants growing at this high altitude is remarkable. *Cassandra calyculata*, *Kalmia glauca*, *Ledum latifolium*, *Veratrum viride*, *Habenaria dilatata*, *Sphagnum cymbifolium*, and *S. acutifolium* are examples. The necessary conditions for the growth of marsh plants are afforded by the clouds and fogs that so frequently envelop the top of the mountain.

The number of species represented by specimens contributed by botanists, is four hundred and thirty-eight; of these, however, only one hundred and forty-six are from this State. Of

the latter number, twenty-eight have not been before reported, and are not among my own collections of the past season. These will make the number of species added to our flora by myself and others, three hundred and forty. The names of the contributors and lists of the contributions are given in a paper marked (5).

The number of edible species of fungi found is fifteen. The list is marked (6). One of these so far surpasses most of the others in size and general good qualities, that it is earnestly recommended for cultivation. It is *Lycoperdon giganteum.*

The unusual abundance of fruits, not only cultivated, but also wild, the past season, is perhaps worthy of remark. Berries, of various kinds, have been plentiful. The low-bush Vaccinia, commonly known as *Blue berries*, have been gathered, in some localities, not by quarts, but by bushels. Scores of wagon loads, ranging from eight to fifteen bushels each, were taken from the waste lands lying between North Elba and Saranac lake, during my visit to that region. It appears to me evident that, in other localities less favored in this respect by nature, these fruits might be profitably cultivated on light soils that are of but little value for ordinary crops. The experiment, at least, should be tried. It has been tried in wet soils, with the high-bush blue berry (*Vaccinium corymbosum*), with considerable success.

The species new to our flora, with habitat, locality etc., also descriptions of fleshy fungi, and new species, will be found in a paper marked (7).

(1.)

LIST OF SPECIES OF WHICH SPECIMENS HAVE BEEN MOUNTED.

Clematis verticillaris *DC.*
Anemone cylindrica *Gray.*
A. Pennsylvanica *L.*
Hepatica triloba *Chaix.*
H. acutiloba *DC.*
Thalictrum anemonoides *Michx*
T. purpurascens *L.*
T. cornuti *L.*
Ranunculus acris *L.*
R. fascicularis *Muhl.*
Trollius laxus *Salisb.*
Coptis trifolia *Salisb.*
Brasenia peltata *Pursh.*
Nymphæa tuberosa *Paine.*
N. minor *DC.*
Sarracenia purpurea *L.*
Sanguinaria Canadensis *L.*
Dicentra Canadensis *DC.*
Nasturtium officinale *R. Br.*
N. Armoracia *Fries.*
Dentaria laciniata *Muhl.*
Arabis hirsuta *Scop.*
A. Canadensis *L.*
Barbarea vulgaris *R. Br.*
Lepidium campestre *L.*
Viola rotundifolia *Michx.*
V. blanda *Willd.*
V. cucullata *Ait.*
V. c. *var.* cordata *Gray.*
V. c. *var.* longipes *Peck.*
V. pedata *L.*
V. Canadensis *L.*

Viola pubescens *Ait.*
V. p. *var.* eriocarpa *Nutt.*
V. p. *var.* scabriuscula *T. & G.*
V. tricolor *var.* arvensis *DC.*
Drosera longifolia *L.*
Hypericum Canadense *L.*
H. C. *var.* major *Gr.*
Elatine Clintoniana *Peck.*
Vaccaria vulgaris *Host.*
Silene stellata *Ait.*
Cerastium oblongifolium *Torr.*
Sagina procumbens *L.*
Malva moschata *L.*
Hibiscus Moscheutos *L.*
Flœrkea proserpinacoides *Wd.*
Rhus aromatica *Ait.*
Vitis æstivalis *Michx.*
V. cordifolia *Michx*
Rhamnus alnifolius *L'Her.*
Acer spicatum *Lam.*
Polygala polygama *Walt.*
P. paucifolia *Willd.*
Lupinus perennis *L.*
Trifolium pratense *L.*
Robinia Pseudacacia *L.*
Lespedeza Stuvei *Nutt.*
Vicia Cracca *L.*
V. tetrasperma *L.*
Lathyrus palustris *L.*
Apios tuberosa *Mœnch.*
Cassia Chamæcrista *L.*
C. nictitans *L.*
Prunus maritima *Wang.*
P. pumila *L.*
Spiræa tomentosa *L.*
Potentilla paradoxa *Nutt.*
P. fruticosa *L.*
Fragaria vesca *L.*
Rubus strigosus *Michx.*
R. neglectus *Peck.*
R. occidentalis *L.*
R. hispidus *L.*
Rosa setigera *Michx.*
R. lucida *Ehrh.*
R. rubiginosa *L.*
Cratægus tomentosa *L.*
C. Crus-galli *L.*
Amelanchier Canadensis *T. & G.*
Ribes Cynosbati *L.*
R. hirtellum *Michx.*
Ribes lacustre *Poir.*
Saxifraga Pennsylvanica *L.*
Mitella nuda *L.*
Sedum telephioides *Michx.*
Epilobium hirsutum *L.*
E. palustre *var.* lineare *Gr.*
Œnothera pumila *L.*
Lythrum Salicaria *L.*
Sanicula Canadensis *L.*
S. Marilandica *L.*
Zizia integerrima *D C.*
Apium graveolens *L.*
Cornus Canadensis *L.*
Lonicera oblongifolia *Muhl.*
Viburnum nudum *L.*
V. pubescens *Pursh.*
V. Opulus *L.*
Galium trif. *var.* pusillum *Gr.*
Mitchella repens *L.*
Houstonia purp. *v.* ciliolata *Gr.*
Valeriana sylvatica *Richards.*
Eupatorium teucrifolium *Willd.*
E. hyssopifolium *L.*
Sericocarpus conyzoides *Nees.*
Aster spectabilis *Ait.*
A. concolor *L.*
A. patens *Ait.*
A. miser *L.*
A. flexuosus *Nutt.*
Erigeron annuum *Pers.*
E. Philadelphicum *L.*
E. Canadense *L.*
Diplopappus cornifolius *Darl.*
Solidago bic. *var.* concolor *Gr.*
S. cæsia *L.*
S. Virga-aurea *L.*
S. thyrsoidea *Meyer.*
S. sempervirens *L.*
S. Muhlenbergii *T. & G.*
S. ulmifolia *Muhl.*
Baccharis halimifolia *L.*
Polymnia Uvedalia *L.*
Rudbeckia hirta *L.*
Helianthus annuus *L.*
Bidens frondosa *L.*
B. cernuus *L.*
Leucanthemum vulgare *var.* tubuliflorum *Tenney.*
Gnaphalium polycephalum *Mx.*
Cichorium Intybus *L.*
Krigia Virginica *Willd.*

Hieracium scabrum *Michx.*
Calendula officinalis *L.*
Nabalus albus *Hook.*
N. altissimus *Hook.*
N. Frazeri *D C.*
Tragopogon pratensis *L.*
Lactuca Canadensis *L.*
Sonchus arvensis *L.*
Lobelia Kalmii *L.*
L. Dortmanna *L.*
Campanula aparinoides *Pursh.*
Vaccinium stamineum *L.*
V. Canadense *Kalm.*
V. Pennsylvanicum *Lam.*
V. cæspitosum *Michx.*
Chiogenes hispidula *T. & G.*
Gaultheria procumbens *L.*
Kalmia latifolia *L.*
K. angustifolia *L.*
Azalea nudiflora *L.*
Ledum latifolium *Ait.*
Pyrola rotund. *v.* uliginosa *Gr.*
P. chlorantha *Swartz.*
P. secunda *L.*
P. s. *var.* pumila *Paine.*
Lysimachia thyrsiflora *L.*
L. stricta *Ait.*
Utricularia intermedia *Hayne.*
Epiphegus Virginiana *Bart.*
Linaria vulgaris *Mill.*
Castilleia coccinea *Spreng.*
Pedicularis Canadensis *L.*
Mentha piperita *L.*
M. Canadensis *L.*
Collinsonia Canadensis *L.*
Monarda didyma *L.*
Physostegia Virginiana *Benth.*
Lamium album *L.*
Lithospermum officinale *L.*
L. latifolium *Michx.*
Cynoglossum Morisoni *DC.*
Hydrophyllum Virginicum *L.*
Polemonium cæruleum *L.*
Gentiana Sap. *var.* linearis *Gr.*
Menyanthes trifoliata *L.*
Limnanthemum lacunosum *Gri.*
Asclepias quadrifolia *Jacq.*
A. verticillata *L.*
Asarum Canadense *L.*
Chenopodium hybridum *L.*
C. murale *L.*
C. ambrosioides *L.*
Chenopodium anthelminticum *L.*
Atriplex patula *v.* littoralis *Gr.*
A. arenaria *Nutt.*
Salicornia herbacea *L.*
S. Virginica *L.*
S. ambigua *Michx.*
Suæda maritima *Dumort.*
Salsola Kali *L.*
Amarantus retroflexus *L.*
Polygonum aviculare *L.*
P. articulatum *L.*
Fagopyrum Tartaricum *Gært.*
Rumex orbiculatus *Gray.*
R. obtusifolius *L.*
Euphorbia polygonifolia *L.*
E. platyphylla *L.*
Empetrum nigrum *L.*
Juglans cinerea *L.*
J. regia *Willd.*
Quercus macrocarpa *Michx.*
Q. ilicifolia *Wang.*
Corylus rostrata *Ait.*
Carpinus Americana *Michx.*
Myrica cerifera *L.*
Betula lenta *L.*
B. alba *var.* populifolia *Spa.*
B. papyracea *Ait.*
Alnus serrulata *Ait.*
Populus balsamifera *L.*
Salix tristis *Ait.*
S. humilis *Marshall.*
S. nigra *Marshall.*
S. Babylonica *Tourn.*
S. longifolia *Muhl.*
S. myrtilloides *L.*
Pinus rigida *Miller.*
P. inops *Ait.*
P. resinosa *Ait.*
P. Strobus *L.*
Abies nigra *Poir.*
A. alba *Michx.*
Larix Americana *Michx.*
Arisæma triphyllum *Torr.*
Acorus Calamus *L.*
Wolffia Columbiana *Karsten.*
Sparganium simplex *Hudson.*
Naias flexilis *Rostk.*
Potamogeton Oakesianus *Robb*
P. Claytonii *Tuck.*
P. hybridus *Michx.*
P. amplifolius *Tuck.*

Potamogeton lucens *L.*
P. perfoliatus *L.*
P. pectinatus *L.*
Sagittaria variabilis *Engelm.*
S. heterophylla *Gray.*
S. graminea *Michx.*
Vallisneria spiralis *L.*
Habenaria dilatata *Gray.*
H. rotundifolia *Rich.*
H Hookeri *Torr.*
H. blephariglottis *Hook.*
H. psycodes *Gray.*
Goodyera Menziesii *Lindl.*
Spiranthes Romanzoviana *Ch.*
S. gracilis *Bigel.*
Pogonia ophioglossoides *Nutt.*
Calopogon pulchellus *R. Br.*
Calypso borealis *Salisb.*
Corallorhiza multiflora *Nutt.*
Cypripedium parviflorum *Sal.*
Sisyrinchium Bermudiana *L.*
Smilax glauca *Walt.*
Trillium cernuum *L.*
T. erythrocarpum *Michx.*
Trillium erectum *L.*
Uvularia grandiflora *Smith.*
Streptopus amplexifolius *DC.*
Clintonia borealis *Raf.*
Smilacina stellata *Desf.*
Polygonatum biflorum *Ell.*
Asparagus officinalis *L.*
Juncus maritimus *Lam.*
J. pelocarpus *Meyer.*
J. articulatus *L.*
J. alpinus *Villars.*
J. nodosus *L.*
J. n. *v.* megacephalus *Torr.*
J. Canadensis *Gay.*
Xyris flexuosa *v.* pusilla *Gray.*
Eriocaulon septangulare *With.*
Cyperus phymatodes *Muhl.*
C Grayii *Torr.*
Scirpus pauciflorus *Lightf.*
S. Smithii *Gray.*
Fimbristylis capillaris *Gray.*
Rhynchospora capillacea *Torr.*
Cladium mariscoides *Torr.*
Carex gynocrates *Worms.*
C. scirpoidea *Michx.*
C. siccata *Dew.*
C. teretiuscula *Good.*
C. rosea *Schk.*
Carex retroflexa *Muhl.*
C. stellulata *L.*
C. scoparia *Schk.*
C. lagopodioides *Schk.*
C. straminea *Schk.*
C. alata *Torr.*
C. aquatilis *Wahl.*
C. stricta *Lam.*
C. gynandra *Schw.*
C. laxiflora *Lam.*
C. Emmonsii *Dew.*
C. Pennsylvanica *Lam.*
C. varia *Muhl.*
C. extensa *Good.*
C. Œderi *Ehrh.*
C. trichocarpa *Muhl.*
C. pseudo-cyperus *L.*
C. tentaculata *Muhl.*
C. lupuliformis *Sartwell.*
C. Hartii *Dew.*
C. Tuckermani *Boott.*
Agrostis canina *L.*
Calamagrostis Canadensis *Beauv.*
Aristida purpurascens *Poir.*
Brizopyrum spicatum *Hook.*
Eragrostis reptans *Nees.*
E. pectinacea *Gray.*
Triticum repens *L.*
Danthonia compressa *Aust.*
Hierochloa alpina *R. & S.*
Panicum clandestinum *L.*
Cynosurus cristatus *L.*
Pellæa gracilis *Hook.*
P. atropurpurea *Link.*
Woodwardia Virginica *Smith.*
W. angustifolia *Smith.*
Asplenium ebeneum *Ait.*
Scolopendrium vulgare *Smith.*
Camptosorus rhizophyllus *Link.*
Phegopteris hexagonoptera *Fee.*
Onoclea sensibilis *L.*
Botrychium Virginicum *Swartz*
B. simplex *Hitchcock.*
Isoetes Engelmanni *Braun.*
I. echinospora *Durien.*
Nitella acuminata *Braun.*
N. mucronata *Braun.*
N. flexilis *Ag.*
Chara coronata *Ziz.*
C. fragilis *Desv.*

Chara fœtida *Braun.*
C. contraria *Braun.*
Sphagnum subsecundum *Nees.*
S. cuspidatum *Ehrh.*
S. recurvum *Beauv.*
S. laricinum *Lindbg.*
S. Girgensohnii *Russow.*
S. acutifolium *Ehrh.*
S. Wulfianum *Girgen.*
S. Lindbergii *Schp.*
S. cymbifolium *Ehrh.*
S. squarrosum *Pers.*
Andræa crassinervia *Bruch.*
Anodus Donianus *Bryol. Eur.*
Dicranum Schreberi *Hedw.*
D. spurium *Hedw.*
Paludella squarrosa *L.*
Astomum Sullivantii *Schp.*
Barbula fragilis *Wils.*
Amphoridium Mougeoti *B. E.*
A. Peckii *Sulliv.*
Encalypta ciliata *Hedw.*
Amblyodon dealbatus *Beauv.*
Mnium stellare *Hedw.*
M. medium *Schp.*
Coscinodon pulvinatus *B. E.*
Homalia trichomanoides *Schp.*
Hypnum gracile *Br. & Sch.*
H. populeum *Hedw.*
H. scorpioides *L.*
Plagiothecium turfaceum *Lind.*
P. Mullerianum *Schp.*
Riccia Sullivantii *Aust.*
Lunularia vulgaris *Mich.*
Marchantia polymorpha *L.*
Fegatella conica *Corda.*
Grimaldia barbifrons *Bisch.*
Metzgeria pubescens *Raddi.*
M. furcata *Nees.*
Aneura palmata *Nees.*
Lophocolea heterophylla *Nees.*
Jungermannia bicuspidata *L.*
J. divaricata *Eng. Bot.*
J. setiformis *Ehrh.*
Plagiochila spinulosa *N. & M.*
P. asplenioides *N. & M.*
Frullania Hutchinsiæ *Nees.*
Radula pallens *Nees.*
Lepidozia reptans *Nees.*
Usnea barbata *L.*
U. longissima *Ach.*
Alectoria jubata *L.*
Evernia prunastri *L.*
E. furfuracea *Mann.*
Ramalina calicaris *Fr.*
Solorina saccata *Ach.*
Peltigera canina *Hoff'm.*
P. polydactyla *Hoff'm.*
P. aphthosa *Hoff'm.*
P. horizontalis *Hoff'm.*
Nephroma lævigatum *Ach.*
N. papyraceum *Schaer.*
N. tomentosum *Koerb.*
N. arcticum *Fr.*
N. Helveticum *Ach.*
Sticta sylvatica *Ach.*
S. quercizans *Ach.*
S. glomerulifera *Delise.*
S. pulmonaria *Ach.*
Cetraria cucullata *Ach.*
C. Islandica *Ach.*
C. aculeata *Fr.*
C. ciliaris *Ach.*
C. lacunosa *Ach.*
C. Oakesiana *Tuck.*
Parmelia olivacea *Ach.*
P. stygia *Ach.*
P. conspersa *Ach.*
P. tiliacea *Ach.*
P. perlata *Ach.*
P. crinita *Ach.*
P. saxatilis *Ach.*
P. caperata *Ach.*
P. pertusa *Schaer.*
P. physodes *Ach.*
Pyxine coc. *var.* sorediata *Tuck.*
Theloschistes parietinus *Norm.*
T. chrysophthalmus *Th. Fr.*
Physcia aq. *var.* detonsa *Tuck.*
P. pulverulenta *Fr.*
P. speciosa *Ach.*
P. obscura *Nyl.*
P. stellaris *Wallr.*
P. cæsia *Ach.*
Placodium aurantiacum *Lightf.*
P. cerinum *Ach.*
Lecanora tartarea *Ach.*
L. atra *Ach.*
L. cinerea *Fr.*
L. pallida *Schaer.*
L. pallescens *Schaer.*
L. varia *Ach.*
L. subfusca *Ach.*
L. el. *var.* ochrophæa *Tuck.*

Lecanora muralis *Schaer.*
Lecidea enteroleuca *Ach.*
L. sanguinaria *L.*
L. contigua *Fr.*
Gyalecta lutea *Tuck.*
Urceolaria scruposa *L.*
Bæomyces æruginosus *DC.*
B Ericetorum *DC.*
Pilophoron Fibula *Tuck.*
Stereocaulon tomentosum *Fr.*
S. paschale *L.*
Cladonia Mitrula *Tuck.*
C. degenerans *Fl.*
C. gracilis *Fr.*
C. amaurocræa *Fl.*
C. furcata *Fl.*
C. pyxidata *Fr.*
C. fimbriata *Fr.*
C. squamosa *Hoffm.*
C. rangiferina *Hoffm.*
C. uncialis *Fr.*
C. cornucopioides *L.*
C. cristatella *Tuck.*
Biatora atropurpurea *Tuck.*
B. chlorantha *Tuck.*
B. vernalis *Fr.*
B. rufonigra *Tuck.*
B. sanguineoatra *Fr.*
B. viridescens *Fr.*
Buellia petræa *Tuck.*
B. lactea *Kærb.*
B. parasema *Kærb.*
B. myriocarpa *Tuck.*
Umbilicaria Dillenii *Tuck.*
U. hirsuata *Ach.*
U. proboscidea *L.*
U. Muhlenbergii *Ach.*
U. pust. *var.* papulosa *Tuck*
Pannaria lanuginosa *Ach.*
P. microphylla *Mass.*
Conotrema urceolatum *Tuck.*
Pyrenula nitida *Ach.*
Trypethelium virens *Tuck.*
Graphis scripta *Ach.*
Collema nigrescens *Ach.*
C. flaccidum *Ach.*
C. ryssoleum *Tuck.*
Leptogium lacerum *Fr.*
L. chloromelum *Nyl.*
L. tremelloides *L.*
L. saturninum *Dicks.*
Pertusaria pertusa *L.*
Pertusaria Wulfenii *DC.*
P. velata *Nyl.*
P. globularis *Ach.*
Agaricus muscarius *Fr.*
A. procerus *Scop.*
A. Americanus *Pk.*
A. cristatus *Bolt.*
A. melleus *Vahl.*
A. laccatus *Scop.*
A. ochropurpureus *Berk.*
A. radicatus *Bull.*
A. velutipes *Curt.*
A. ostreatus *Jacq.*
A. salignus *Pers.*
A. petaloides *Bull.*
A. atrocœruleus *Fr.*
A. applicatus *Batsch.*
A. semi-captus *B. & C.*
A. Curtisii *Berk.*
A. polychrous *Berk.*
A. campestris *L.*
A. arvensis *Schaeff.*
A. cretaceus *Fr.*
A. sublateritius *Schaeff.*
A. Sphagnorum *Pers.*
Coprinus comatus *Fr.*
Paxillus atro-tomentosus *Fr.*
Hygrophorus ceraceus *Fr.*
H. conicus *Fr.*
Lactarius Indigo *Schw.*
L. volemus *Fr.*
L. subtomentosus *B. & R.*
L. angustissimus *Lasch.*
Russula emetica *Fr.*
Cantharellus crispus *Fr.*
Marasmius plancus *Fr.*
M. androsaceus *Fr.*
M. Rotula *Fr.*
M. velutipes *B. & C.*
Lentinus Lecomtei *Fr.*
Panus stypticus *Fr.*
P. dorsalis *Fr.*
Schizophyllum commune *Fr*
Lenzites betulina *Fr.*
L. sepiaria *Fr.*
L. Cratægi *Berk.*
Polyporus ovinus *Schæff.*
P. luridus *B. & C.*
P. tomentosus *Fr.*
P. perennis *Fr.*
P. Boucheanus *Fr.*
P. elegans *Fr.*

Polyporus giganteus *Fr.*
P. sulfureus *Fr.*
P. lacteus *Fr.*
P. adustus *Fr.*
P. cerifluus *B. & C.*
P. scutellatus *Schw.*
P. carneus *Nees.*
P. cinnabarinus *Fr.*
P. hirsutus *Fr.*
P. versicolor *Fr.*
P. abietinus *Fr.*
P. Sullivantii *Mont.*
P. Virgineus *Schw.*
P. medulla-panis *Fr.*
P. laceratus *Berk.*
Dædalea cinerea *Fr.*
D. confragosa *Bolt.*
Glœoporus nigropurpurascens *S*
Merulius tremellosus *Schrad.*
Fistulina hepatica *Fr.*
Hydnum repandum *L.*
H. suaveolens *Scop.*
H. coralloides *Scop.*
H. Erinaceus *Bull.*
H. gelatinosum *Scop.*
H. cirrhatum *Pers.*
Irpex Tulipiferæ *Schw.*
I. deformis *Fr.*
I. cinnamomeus *Fr.*
Craterellus cornucopioides *P.*
Thelephora pallida *Schw.*
T. palmata *Fr.*
Stereum fasciatum *Fr.*
S. striatum *Fr.*
S. complicatum *Fr.*
S. purpureum *Pers.*
S. spadiceum *Fr.*
S. ochraceo-flavum *Schw.*
S. bicolor *Fr.*
S. rubiginosum *Schrad.*
S. tabacinum *Fr.*
Corticium Oakesii *B. & C.*
Clavaria stricta *Pers.*
C. inæqualis *Fr.*
C. juncea *Fr.*
Pistillaria Muscicola *Fr.*
Spathularia flavida *Pers.*
Tremella aurantia *Schw.*
T. mesenterica *Retz.*
Exidia Auricula-Judæ *Fr.*
E. glandulosa *Fr.*
E. cinnabarina *B. & C.*
Dacrymyces stillatus *Fr.*
Lycoperdon pyriforme *Schæff.*
L. gemmatum *Batsch.*
L. calvescens *B. & C.*
L. Wrightii *B. & C.*
Bovista plumbea *Pers.*
Geaster hygrometricus *Pers.*
Scleroderma vulgare *Fr.*
Mycrothyrium microscopicum *D.*
Sphæronema consors *B. & C.*
Diplodia Viticola *Desm.*
Sphæropsis insignis *B. & C.*
Vermicularia Liliaceorum *Schw.*
Septoria herbarum *B. & C.*
Stilbospora ovata *Pers.*
S. pyriforme *Hoffm.*
Cytispora rubescens *Fr.*
C. leucosperma *Fr.*
Nemaspora crocea *Pers.*
Myxosporium nitidum *B.& C.*
Torula herbarum *Pers.*
Septonema spilomeum *Berk.*
Argema speciosum *Fr.*
Puccinia aculeata *Schw.*
P. solida *Schw.*
P. graminis *DC.*
P. Waldsteiniæ *Curt.*
P. Junci *Schw.*
P. investita *Schw.*
Uredo Rubigo *DC.*
U. caricina *DC.*
U. epitea *Kz.*
U. Polygonorum *DC.*
U. Solidaginis *Schw.*
U. Potentillæ *DC.*
U. Ruborum *DC.*
U. luminata *Schw.*
U. effusa *Strauss.*
U. Leguminosarum *Lk.*
U. Violarum *DC.*
Uromyces Hyperici *Schw.*
U. apiculosa *Lev.*
U. Lespedezæ-violaceæ.
U. Lesp.-procumbentis.
Ustilago Maydis *Corda.*
U. Junci *Schw.*
U. urceolorum *DC.*
U. utriculosa *Nees.*
Rœstelia lacerata *Sow.*
Æcidium Grossulariæ *DC.*
Æ. Houstoniatum *Schw.*

Æcidium Sambuci *Schw.*
Æ. Hydnoideum *B. & C.*
Æ. Compositarum *Mart.*
Æ. aroidatum *Schw.*
Æ. Gnaphaliatum *Schw.*
Cystopus candidus *Lev.*
Tubercularia vulgaris *Tode.*
T. granulata *Pers.*
Sporocybe calicioides *Fr.*
Polythrincium Trifolii *Kz.*
Cladosporium herbarum *Lk.*
Podosporium rigidum *Schw.*
Penicillium crustaceum *Fr.*
Morchella esculenta *Pers.*
Helvella esculenta *L.*
Geoglossum hirsutum *Pers.*
Peziza macropus *Pers.*
P. scutellata *L.*
P. calycina *Schum.*
P. Agassizii *B. & C.*
P. citrina *Batsch.*
P. lenticularis *Fr.*
P. sanguinea *Pers.*
P. Viticola *Pers.*
P. translucida *B. & C.*
P. herbarum *Pers.*
P. compressa *A. & S.*
Ascobolus conglomeratus *Schw.*
Bulgaria sarcoides *Fr.*
Solenia candida *Pers.*
Sphinctrina turbinata *Fr.*
Eustilbum Rehmianum *Rab.*
Patellaria discolor *Mont.*
P. rhabarbarina *Berk.*
Urnula Craterium *Fr.*
Dermatea fascicularis *Fr.*
Cenangium Pinastri *Fr.*
C. populinum *Schw.*
C. Ribis *Fr.*
Dichæna faginea *Fr.*
Rhytisma Solidaginis *Schw.*
R. acerinum *Fr.*
R. decolorans *Fr.*
R. Vaccinii *Fr.*
R. Prini *Fr.*
R. punctatum *Fr.*
R. salicinum *Fr.*
R. Blakei *Curt.*
Phacidium crustaceum *B. & C.*
Hysterium hiascens *B. & C.*
H. lineare *Fr.*
H. Pinastri *Schrad.*
Xylaria polymorpha *Pers.*
X. Hypoxylon *Ehrh.*
Hypocrea citrina *Fr.*
H. Lactifluorum *Schw.*
Hypoxylon fuscum *Pers.*
H. ustulatum *Bull.*
H. fragiforme *Pers.*
H. cohærens *Pers.*
Diatrype stigma *Fr.*
D. disciformis *Fr.*
Nectria cinnabarina *Fr.*
N. sanguinea *Fr.*
N. cucurbitula *Fr.*
Valsa nivea *Fr.*
V. Americana *B. & C.*
V. constellata *B. & C.*
V. stilbostoma *Fr.*
Sphæria ovina *Pers.*
S. pulvis-pyrius *Pers.*
S. pertusa *Pers.*
S. fissurarum *B. & C.*
S. Saubineti *Mont.*
S. picea *Pers.*
S. Ulmea *Schw.*
S. Lespedezæ *Schw.*
S. rostrata *Fr.*
S. limæformis *Schw.*
S. aculeata *Schw.*
S. acuminata *Sow.*
S. nigrella *Fr.*
S. Verbascicola *Schw.*
S. punctiformis *Pers.*
S. Coryli *Batsch.*
S. fimbriata *Pers.*
S. quercina *Pers.*
S. Desmazierii *B. & Br.*
S. sordaria *Fr.*
Dothidea ornans *Schw.*
Erysiphe Ceanothi *Schw.*
E. Vaccinii *Schw.*
E. communis *Schlecht.*
Phyllactinia guttata *Lev.*
Depazea brunnea *B. & C.*
D. cruenta *Fr.*
Erineum fagineum *Pers.*
E. luteolum *Kz.*
E. alnigerum *Kz.*
E. aureum *Pers.*
E. Vitis *DC.*
Sclerotium Orobanches *Schw.*
S. varium *Pers.*
S. populinum *Pers.*

(2.)

SPECIES OF WHICH SEEDS HAVE BEEN MOUNTED.

Clematis Virginiana *L.*
Thalictrum Cornuti *L.*
Caltha palustris *L.*
Trollius laxus *Salisb.*
Actæa alba *Bigel.*
Ranunculus recurvatus *Poir.*
R. abortivus *L.*
Aquilegia Canadensis *L.*
Corydalis glauca *Pursh.*
Polanisia graveolens *Raf.*
Arabis Canadensis *L.*
A. hirsuta *Scop.*
Cardamine hirsuta *L.*
Viola pedata *L.*
V. pubescens *Ait.*
Drosera rotundifolia *L.*
Hypericum ellipticum *Hook.*
H. Sarothra *Michx.*
Helianthemum Canadense *Mx.*
Lechea minor *Lam.*
L. major *Michx.*
L. thymifolia *Pursh.*
Elodea Virginica *Nutt.*
Mollugo verticillata *L.*
Silene stellata *Ait.*
S. noctiflora *L.*
Lychnis Githago *Lam.*
Malva rotundifolia *L.*
Abutilon Avicennæ *Gærtn.*
Lupinus perennis *L.*
Robinia Pseudacacia *L.*
Amphicarpæa monoica *Nutt.*
Lespedeza violacea *Pers.*
Medicago lupulina *L.*
Baptisia tinctoria *R. Br.*
Melilotus officinalis *Willd.*
M. alba *Lam.*
Rhamnus alnifolius *L'Her.*
Vitis cordifolia *Michx.*
Rhus Toxicodendron *L.*
Geranium maculatum *L.*
Portulaca oleracea *L.*
Prunus Virginiana *L.*
Geum Virginianum *L.*
Agrimonia Eupatoria *L.*
Rubus villosus *Ait.*
R. Canadensis *L.*
Rubus strigosus *Michx.*
R. occidentalis *L.*
Rosa rubiginosa *L.*
R. micrantha *Smith.*
Epilobium hirsutum *L.*
Œnothera biennis *L.*
Penthorum sedoides *L.*
Saxifraga Virginiensis *Michx.*
Mitella diphylla *L.*
M. nuda *L.*
Hamamelis Virginica *L.*
Aralia nudicaulis *L.*
Pastinaca sativa *L.*
Cornus florida *L.*
C. Canadensis *L.*
Lonicera oblongifolia *Muhl.*
Viburnum acerifolium *L.*
V. Opulus *L.*
Mitchella repens *L.*
Valeriana sylvatica *Richards.*
Vernonia Noveboracensis *Willd*
Eupatorium ageratoides *L.*
E. perfoliatum *L.*
Hieracium venosum *L.*
H. scabrum *Michx.*
H. Gronovii *L.*
H. paniculatum *L.*
Bidens bipinnata *L.*
Ambrosia artemisiæfolia *L.*
A. trifida *L.*
Xanthium Strumarium *L.*
Cirsium muticum *Michx.*
C. lanceolatum *Scop.*
C. discolor *Spreng.*
Helianthus strumosus *L.*
H. giganteus *L.*
H. divaricatus *L.*
H. decapetalus *L.*
Iva frutescens *L.*
Taraxacum Dens-leonis *Desf.*
Mulgedium leucophæum *DC.*
Nabalus altissimus *Hook.*
Sonchus oleraceus *L.*
S. asper *Vill.*
Campanula rotundifolia *L.*
Vaccinium cæspitosum *Michx.*
Kalmia latifolia *L.*

Azalea nudiflora *L.*
Chiogenes hispidula *T. & G.*
Gaultheria procumbens *L.*
Epiphegus Virginiana *Bart.*
Gerardia flava *L.*
Verbascum Thapsus *L.*
Collinsonia Canadensis *L.*
Isanthus cæruleus *Michx.*
Trichostema dichotomum *L.*
Solanum Dulcamara *L.*
Physalis viscosa *L.*
Cuscuta Gronovii *Willd.*
Phytolacca decandra *L.*
Polygonum dumetorum *L.*
P. sagittatum *L.*
P. Persicaria *L.*
P. aviculare *L.*
P. Hydropiper *L.*
Lindera Benzoin *Meisner.*
Asclepias Cornuti *Decaisne.*
A. obtusifolia *Michx.*
Chenopodium glaucum *L.*
C. album *L.*
C. hybridum *L.*
Atriplex arenaria *Nutt.*
Euphorbia polygonifolia *L.*
E. platyphylla *L.*
Urtica urens *L.*
Bœhmeria cylindrica *Willd.*
Betula lenta *L.*
B. alba *var.* populifolia *Sp.*
B. papyracea *Ait.*
Abies nigra *Poir.*
Naias flexilis *Rostk.*
Empetrum nigrum *L.*
Scheuchzeria palustris *L.*
Sagittaria variabilis *Engelm.*
Corallorhiza multiflora *Nutt.*
Sisyrinchium Bermudiana *L.*
Smilax tamnoides *L.*
Trillium erectum *L.*
T. erythrocarpum *Michx.*
Clintonia borealis *Raf.*
Smilacina racemosa *Desf.*
Asparagus officinalis *L.*
Lilium Canadense *L.*
Juncus marginatus *Rostk.*
J. maritimus *Lam.*
J. bufonius *L.*
J. tenuis *Willd.*
J. alpinus *Vill.*
J. Canadensis *Gay.*
Cyperus Grayii *Torr.*
C. filiculmis *Vahl.*
Eleocharis obtusa *Schultes.*
Scirpus pauciflorus *Lightf.*
S. planifolius *Muhl.*
S. pungens *Vahl.*
Eriophorum alpinum *L.*
Rhynchospora glomerata *Vahl*
Carex pauciflora *Lightf.*
C. siccata *Dew.*
C. teretiuscula *Good.*
C. vulpinoidea *Michx.*
C. stellulata *L.*
C. scoparia *Schk.*
C. irrigua *Smith.*
C. Emmonsii *Dew.*
C. arctata *Boott.*
C. filiformis *L.*

(3.)

PLANTS COLLECTED.

Anemone nemorosa *L.*
Aquilegia vulgaris *L.*
Dicentra cucullaria *DC.*
Menispermum Canadense *L.*
Liriodendron Tulipifera *L.*
Dianthus Armeria *L.*
Spergularia media *Presl.*
Althæa rosea *Cav.*
Rhus venenata *DC.*
Trifolium procumbens *L.*
Lathyrus maritimus *Bigel.*
Thaspium aureum *Nutt.*
Aralia nudicaulis *L.*
Nabalus nanus *DC.*
N. Boottii *DC.*
Specularia perfoliata *Lam.*
Campanula rotundifolia *L.*
Lobelia Nuttallii *DC.*

Œnothera fruticosa *L.*
Vaccinium vacillans *Solan.*
V. Pennsylvanicum *Lam.*
Azalea viscosa *L.*
Rhinanthus Crista-galli *L.*
Apocynum cannabinum *L.*
Vincetoxicum nigrum *Mœnch.*
Nemopanthes Canadensis *DC.*
Polygonum maritimum *L.*
Parietaria Pennsylvanica *Muhl.*
Quercus obtusiloba *Michx.*
Betula glandulosa *Michx.*
Salix sericea *Marshall.*
Lemna Torreyi *Aust.*
Cypripedium pubescens *Willd.*
Habenaria bracteata *R. Br.*
Goodyera Menziesii *Lindl.*
Spiranthes gracilis *Bigel.*
Erythronium Americanum *Sm.*
Allium tricoccum *Ait.*
Uvularia sessilifolia *L.*
Eleocharis tenuis *Schultes.*
Carex pubescens *Muhl.*
C. fœnea *Willd.*
C. alata *Torr.*
Calamagrostis Pickeringii *Gray*
Stipa Richardsonii *Lk.*
Phleum pratense *L.*
Bromus racemosus *L.*
B. sterilis *Torr.*
Triticum vulgare *Vill.*
Pellæa gracilis *Hook.*
Woodsia glabella *R. Br.*
Aspidium fragrans *Swartz.*
Bruchia flexuosa *Schwœgr.*
Schistidium confertum *Funk.*
Placodium cerinum *Ach.*
Buellia geographica *Schær.*
Calicium subtile *Pers.*
C. Curtisii *Tuck.*
Mycoporum pycnocarpum *Tuck.*
Biatora Hypnophila *Tuck.*
Chorda lomentaria *Lb.*
Nemalion multifidum *J. Ag.*
Polysiphonia subcontorta *Peck.*
Callithamnion virgatulum *Har.*
Elachista Fucicola *Fr.*
Cladophora uncialis *Fl. Dan.*
Calothrix Confervicola *Ag.*
Hydrodictyon utriculatum *Rot.*
Agaricus vernus *Fr.*
Agaricus Phalloides *Fr.*
A. muscarius *L.*
A. vaginatus *Bull.*
A. Ceciliæ *B. & Br.*
A. farinosa *Schw.*
A. cristatus *Bolt.*
A. clypeolarius *Bull.*
A. naucinus *Fr.*
A. granulosus *Batsch.*
A. melleus *Vahl.*
A. vaccinus *Pers.*
A. variegatus *Scop.*
A. terreus *Schæff.*
A. personatus *Fr.*
A. albo-flavidus *Peck.*
A. nebularis *Batsch.*
A. carnosior *Peck.*
A. infundibuliformis *Schæff.*
A. Adirondackensis *Peck.*
A. Poculum *Peck.*
A. illudens *Schw.*
A. ditopus *Fr.*
A. brumalis *Fr.*
A. metachrous *Fr.*
A. ochropurpureus *B.*
A. laccatus *Scop.*
A. radicatus *Bull.*
A. dryophilus *Bull.*
A. velutipes *Curt.*
A. stipitarius *Fr.*
A. cirrhatus *Pers.*
A. Familia *Peck.*
A. purus *Pers.*
A. galericulatus *Scop.*
A. collariatus *Fr.*
A. prælongus *Peck.*
A. paluster *Peck.*
A. latifolius *Peck.*
A. epipterygius *Scop.*
A. vulgaris *Pers.*
A. sanguinolentus *A. & S.*
A. subincarnatus *Peck.*
A. pulcherrimus *Peck.*
A. Corticola *Pers.*
A. Oculus *Peck.*
A. chryseus *Peck.*
A. scabriusculus *Peck.*
A. umbelliferus *L.*
A. Campanella *Batsch.*
A. Fibula *Bull.*
A. cervinus *Schæff.*
A. nanus *Pers.*

Agaricus leoninus *Schæff.*
A. rhodopolius *Fr.*
A. strictior *Peck.*
A. serrulatus *Fr.*
A. Prunulus *Scop.*
A. Noveboracensis *Peck.*
A. adiposus *Batsch.*
A. temnophyllus *Peck.*
A. polychrous *Berk.*
A. Hallianus *Peck.*
A. autumnalis *Peck.*
A. vernalis *Peck.*
A. Lignicola *Peck.*
A. scorpioides *Fr.*
A. curvo-marginatus *Peck*
A. semiorbicularis *Bull.*
A. fulvus *Peck.*
A. lateritius *Fr.*
A. tener *Schæff.*
A. ovalis *Fr.*
A. Hypnorum *Batsch.*
A. Sphagnorum *Pers.*
A. rimosus *Bull.*
A. lacerus *Fr.*
A. geophyllus *Sow.*
A. sarcophyllus *Peck.*
A. flocculosus *Berk.*
A. subochraceus *Peck.*
A. campestris *L.*
A. Silvicola *Vitt.*
A. Johnsonianus *Peck.*
A. Hornemanni *Fr.*
A. stercorarius *Fr.*
A. semiglobatus *Batsch.*
A. perplexus *Peck.*
A. velutinus *Pers.*
A. cernuus *Mull.*
A. spadiceus *Schæff.*
A. semilanceolatus *Fr.*
A. solidipes *Peck.*
A. campanulatus *L.*
A. papilionaceus *Bull.*
A. retirugis *Batsch.*
A. Fimicola *Fr.*
A. gracilis *Fr.*
A. atomatus *Fr.*
A. disseminatus *Pers.*
A. sulfureoides *Peck.*
A. serotinoides *Peck.*
Coprinus tomentosus *Fr.*
C. niveus *Fr.*
C. micaceus *Fr.*
C. ephemerus *Fr.*
Coprinus plicatilis *Fr.*
Cortinarius caperatus *Fr.*
C. communis *Peck.*
C. luteo-fuscus *Peck.*
C. coloratus *Peck.*
C. collinitus *Fr.*
C. tricolor *Peck.*
C. autumnalis *Peck.*
C. Catskillensis *Peck.*
C. ochraceus *Peck.*
C. squamulosus *Peck.*
C. violaceus *Fr.*
C. albo-violaceus *Fr.*
C. argentatus *Fr.*
C. cinnamomeus *Fr.*
C. sanguineus *Fr.*
C. armillatus *Fr.*
C. distans *Peck.*
C. biformis *Fr.*
C. castaneoides *Peck.*
C. castaneus *Bull.*
C. vernalis *Peck.*
Hygrophorus chrysodon *Bat.*
H. pratensis *Pers.*
H. conicus *Scop.*
H. congelatus *Peck.*
H. Cantharellus *Schw.*
H. nitidus *B. & C.*
Russula fœtens *Fr.*
R. nitida *Fr.*
R. decolorans *Fr.*
Cantharellus cibarius *Fr.*
C. minor *Peck.*
C. lutescens *Fr.*
C. infundibuliformis *Fr.*
C. aurantiacus *Fr.*
C. floccosus *Schw.*
C. dichotomus *Peck.*
Lactarius torminosus *Fr.*
L. affinis *Peck.*
L. uvidus *Fr.*
L. pyrogalus *Fr.*
L. plumbeus *Fr.*
L. piperatus *Fr.*
L. sordidus *Peck.*
L. platyphyllus *Peck.*
L. chrysorheus *Fr.*
L. deliciosus *Fr.*
L. volemus *Fr.*
L. subtomentosus *B. & R.*
L. distans *Peck.*
L. subdulcis *Fr.*
L. camphoratus *Fr.*

Lactarius rufus *Fr.*
L. griseus *Peck.*
L. glyciosmus *Fr.*
Marasmius oreades *Fr.*
M. plancus *Fr.*
M. velutipes *B. & C.*
M. Rotula *Fr.*
M. androsaceus *Fr.*
M. scorodonius *Fr.*
M. campanulatus *Peck.*
M. subvenosus *Peck.*
Lentinus lepideus *Fr.*
L. cochleatus *Fr.*
Boletus edulis *Bull.*
B. luteus *Fr.*
B. flavidus *Fr.*
B. collinitus *Fr.*
B. albus *Peck.*
B. Clintonianus *Peck.*
B. Elbensis *Peck.*
B. pictus *Peck.*
B. spectabilis *Peck.*
B. scaber *Bull.*
B. auriporus *Peck.*
B. retipes *B. & C.*
B. subtomentosus *L.*
B. paluster *Peck.*
B. vermiculosus *Peck.*
B. strobilaceus *Scop.*
B. Sistotrema *Fr.*
Dædalea confragosa *Bolt.*
Favolus Europæus *Fr.*
Polyporus salicinus *Fr.*
P. ulmarius *Fr.*
Hydnum imbricatum *L.*
H. repandum *L.*
Lenzites Cratægi *Berk.*
Thelephora pallida *Schw.*
T. laciniata *Fr.*
Stereum corrugatum *Berk.*
Exidia cinnabarina *B. & C.*
Tulostoma fimbriatum *Fr.*
Lycoperdon cælatum *Bull.*
L. giganteum *Batsch.*
Geaster saccatus *Fr.*
Æthalium septicum *Fr.*
Leocarpus vernicosus *Lk.*
Didymium cinereum *Fr.*
Stemonitis oblonga *Fr.*
Diachea elegans *Fr.*
Arcyria digitata *Schw.*
Trichia clavata *Pers.*
Leptostroma litigiosum *Desm.*
L. filicinum *Fr.*
Diplodia Mori *Berk.*
Sphæronema Spina *B. & C.*
Sphæropsis insignis *B. & C.*
Septoria Liriodendri *B. & C.*
S. Rubi *B. & C.*
S. *Vitis B. & C.*
S. Ænotheræ *B. & C.*
S. destruens *Desm.*
S. sanguinea *Desm.*
S. viride-tingens *Curt.*
Stilbospora magna *Berk.*
S. pyriformis *Hoffm.*
Septonema spilomeum *Berk.*
Spilocæa Pomi *Fr.*
Coniothecium toruloideum.
Aregma mucronatum *Fr.*
Puccinia Cryptotæniæ *Peck.*
P. Circææ *Pers.*
P. aculeata *Schw.*
P. Helianthi *Schw.*
P. Xanthii *Schw.*
P. solida *Schw.*
P. Graminis *DC.*
P. coronata *Cd.*
P. Violarum *Lk.*
P. Compositarum *Schl.*
P. Tiarellæ *B. & C.*
P. Asteris *Schw.*
P. mesomajalis *B. & C.*
P. Umbelliferarum *DC.*
P. Anemones *Pers.*
P. acuminata *Pk.*
Podisoma macropus *Schw.*
Uredo Rubigo vera *Lev.*
U. caricina *DC.*
U. Azaleæ *Schw.*
U. epitea *Kz.*
U. Vacciniorum *Pers.*
U. Potentillarum *DC.*
U. Filicum *Desm.*
U. pustulata *Pers.*
U. Chærophylli *Schw.*
U. Cichoracearum *Lev.*
Trichobasis Howei *Peck.*
Lecythea ovata *Strauss.*
L. cylindrica *Strauss.*
L. gyrosa *Berk.*
Uromyces apiculosa *Lev.*
U. macrospora *B. & C.*
U. Limonii *Lev.*

Polycystis Ranunculacearum.
Ravenelia glanduliformis.
Triphragmium clavellosum *Bk.*
Æcidium Podophylli *Schw.*
Æ. Epilobii *DC.*
Æ. Ænotheræ *Peck.*
Æ. Ranunculi *Schw.*
Æ. Geranii *DC.*
Æ. Impatientis *Schw.*
Æ. Violæ *DC.*
Æ. Aroidatum *Schw.*
Æ. quadrifidum *DC.*
Æ. Claytoniatum *Schw.*
Æ. Compositarum *Mart.*
Æ. pustulatum *Curt.*
Æ. Fraxini *Schw.*
Æ. Orobi *DC.*
Æ. Limonii *Peck.*
Æ. Myricatum *Schw.*
Æ. macrosporum *Peck.*
Cystopus candidus *Lev.*
Illosporium carneum *Fr.*
Sporocybe Persicæ *Fr.*
Helminthosporium Tiara.
H. macrocarpon *Grev.*
Cladosporium herbarum *Lk.*
Macrosporium Cheiranthi *Fr.*
Botrytis Viticola *B. & C.*
Streptothrix atra *B. & C.*
Fusisporium miniatum *B. & C.*
Helvella esculenta *L.*
H. Infula *Schæff.*
Mitrula paludosa *Fr.*
Leotia lubrica *Pers.*
Peziza cochleata *L.*
P. coccinea *Jacq.*
P. nigrella *Pers.*
P. floccosa *Schw.*
P. anomala *Pers.*
P. virginea *Batsch.*
P. aurantia *Fr.*
P. cyathoidea *Bull.*
Ascobolus conglomeratus *Schw.*
Sphinctrina turbinata *Fr.*
Tympanis picastra *B. & C.*
Glonium stellatum *Muhl.*
Hysterium vulvatum *Schw.*
H. Fraxini *Pers.*
H. Rubi *Pers.*
Cordyceps militaris *Fr.*
C. purpurea *Fr.*
Hypocrea lateritia *Fr.*
Rhizina undulata *Fr.*
Hypoxylon multiforme *Fr.*
H. Clypeus *Schw.*
Diatrype virescens *Schw.*
D. Duriæi *Mont.*
D. haustellata *Fr.*
Bulgaria rufa *Schw.*
Melogramma Quercuum *Fr.*
Nectria cucurbitula *Fr.*
Sphæria aquila *Fr.*
S. elongata *Fr.*
S. confluens *Fr.*
S. doliolum *Pers.*
S. Spraguei *B. & C.*
S. pertusa *Pers.*
S. fimbriata *Pers.*
S. morbosa *Schw.*
S. Graminis *Pers.*
Depazea Kalmicola *Schw.*
D. Pyrolæ *Fr.*
D. Fraxinicola *Curt.*
D. Smilacicola *Schw.*
Dothidea Robertiani *Fr.*
Massaria vomitoria *B. & C.*
Ascospora Podophylli *Curt.*
Erysiphe fuscata *B. & C.*
E. lamprocarpa *Lev.*
E. communis *Schl.*
Microsphæria Syringæ *Fr.*
M. Vaccinii *Peck.*
Uncinula adunca *Lev.*
Phyllactinia guttata *Lev.*
Eurotium herbariorum *Lk.*

(4.)

LIST OF PLANTS FOUND ON THE EXPOSED SUMMIT OF MT. MARCY.

Coptis trifolia *Salisb.*
Arenaria Grænlandica *Spreng.*
Oxalis Acetosella *L.*
Potentilla tridentata *Ait.*
Rubus strigosus *Michx.*
Pyrus Americana *DC.*
Spiræa salicifolia *L.*
Epilobium angustifolium *L.*
Cornus Canadensis *L.*
Linnæa borealis *Gronov.*
Houstonia cærulea *L.*
Solidago thyrsoidea *Meyer.*
S. Virga-aurea *L.*
Nabalus nanus *DC.*
Vaccinium uliginosum *L.*
V. Pennsylvanicum *Lam.*
Chiogenes hispidula *T. & G.*
Cassandra calyculata *L.*
Kalmia glauca *Ait.*
Rhododendron Lapponicum *W.*
Ledum latifolium *Ait.*
Rhinanthus Crista-galli *L.*
Melampyrum Americanum *Mx.*
Diapensia Lapponica *L.*
Gentiana Sap. *var.* linearis *Gr.*
Empetrum nigrum *L.*
Betula glandulosa *Michx.*
B. papyracea *Ait.*
Alnus viridis *DC.*
Salix Cutleri *Tuck.*
Abies balsamea *Marshall.*
Juniperus communis *L.*
Habenaria dilatata *Gray.*
Veratrum viride *Ait.*
Streptopus amplexifolius *DC.*
Clintonia borealis *Raf.*
Luzula parviflora *Desv.*
Juncus trifidus *L.*
Scirpus cæspitosus *L.*
Eriophorum vaginatum *L.*
Carex scirpoidea *Michx.*
C. vitilis *Fr.*
C. Bigelovii *Torr.*
Agrostis canina *L.*
Calamagrostis Canadensis *Bv.*
C. Pickeringii *Gray.*
Stipa Richardsonii *Lk.*
Poa laxa *Hænke.*
Aira flexuosa *L.*
Hierochloa alpina *R. & S.*
Lycopodium Selago *L.*
L. annotinum *L.*
L. clavatum *L.*
Sphagnum cymbifolium *Ehrh.*
S. acutifolium *Ehrh.*
S. sedoides *Brid.*
S. Pylæsii *Brid.*
Andræa petrophila *Ehrh.*
Arctoa fulvella *Bry. Eur.*
Dicranum polycarpum *Ehrh.*
D. Blyttii *Bry. Eur.*
D. scoparium *L.*
D. elongatum *Schwaegr.*
D. congestum *Brid.*
Fissidens osmundioides *Hedw.*
Ceratodon purpureus *Brid.*
Barbula tortuosa *W. & M.*
Grimmia ovata *W. & M.*
Schistidium confertum *Br.& Sch.*
Racomitrium fasciculare *Brid.*
R. microcarpum *Brid.*
Conostomum boreale *Swartz.*
Bryum nutans *Schreb.*
Aulacomnion turgidum *Schgr.*
Pogonatum alpinum *Brid.*
Polytrichum juniperinum *Hed.*
P. jun.*var.*alpestre *Bry.Eur*
Myurella julacea *Bry. Eur.*
Hypnum splendens *Hedw.*
H. umbratum *Ehrh.*
H. recurvans *Schwaegr.*
H. Schreberi *Willd.*
H. sarmentosum *Wahl.*
H. Crista-castrensis *L.*
H. rugosum *Ehrh.*
Jungermannia trichophylla *L.*
J. connivens *Dicks.*
J. barb. *var.*attenuata *Mart.*
J. scutata *Web.*
J. Taylori *Hook.*
J. obtusifolia *Hook.*
Scapania nemorosa *Nees.*
Sarcoscyphus Ehrharti *Corda.*
Ptilidium ciliare *Nees.*

Mastigobryum deflexum *Nees.*
Alectoria jubata *Ach.*
Evernia furf. *var.* Cladoniæ *Tk.*
Cetraria islandica *Ach.*
C. ciliaris *Ach.*
C. nivalis *Fr.*
Parmelia conspersa *Ach.*
P. saxatilis *Ach.*
P. stygia *Ach.*
P. physodes *Ach.*
Lecanora tart. *var.* frigida *Ach.*
Bæomyces æruginosus *DC.*
Stereocaulon paschale *Ach.*
Cladonia pyxidata *Fr.*
Cladonia gracilis *Fr.*
Cladonia g. *var.* elongata *Fr.*
C. g. *var.* taurica *Fr.*
C. amaurocræa *Fl.*
C. uncialis *Fr.*
C. rangiferina *Hoffm.*
C. r. *var.* alpestre *Fl.*
C. cornucopioides *L.*
C. cristatella *Tuck.*
Buellia geographica *Schær.*
B. lactea *Kœrb.*
B. petræa *Tuck.*
Umbilicaria proboscidea *DC.*
Agaricus Hypnorum *Batsch.*
A. umbelliferus *L.*

(5.)

NAMES OF CONTRIBUTORS, WITH THEIR CONTRIBUTIONS.

Mrs. E. E. ATWATER, Chicago, Ill.

Dianthus Armeria *L.*
Anemone pat. *v.* Nuttalliana *Gr.*
Dalibarda repens *L.*
Achillea Millefolium *L.*
Sabbatia stellaris *Pursh.*
Spiranthes gram. *v.* Walteri *Gr.*

Hon. G. W. CLINTON, Buffalo, N. Y.

Aquilegia vulgaris *L.*
Nymphæa minor *DC.*
N. tuberosa *Paine.*
Alyssum calycinum *L.*
Sisymbrium canescens *Nutt.*
Lepidium ruderale *L.*
Reseda alba *L.*
Raphanus sativus *L.*
Dianthus Armeria *L.*
Lychnis vespertina *Sibth.*
Silene Armeria *L.*
Malva Alcea *L.*
M. moschata *L.*
Althæa rosea *Cav.*
A. ficifolia *Cav.*
Oxalis corniculata *L.*
Saxifraga aizoides *L.*
Sedum ternatum *Michx.*
Trifolium procumbens *L.*
Prunus Americana *Marshall.*
Prunus Mahaleb *L.*
P. Virginiana *L.*
P. Padus *L.*
Rosa setigera *Michx.*
R. micrantha *Smith.*
Coriandrum sativum *L.*
Anethum graveolens *L.*
A. fœniculum *L.*
Aster azureus *Lindl.*
Solidago Houghtonii *T. & G.*
Matricaria Chamomilla *L.*
M. Parthenium *L.*
Lampsana communis *L.*
Tragopogon porrifolius *L.*
Lactuca sativa *L.*
Cirsium altissimum *Spreng.*
Campanula rapunculoides *L.*
Thymus Serpyllum *L.*
Hyssopus officinalis *L.*
Phlox paniculata *L.*

Cuscuta inflexa *Engelm.*
Vinca minor *L.*
Gentiana Andrewsii *Griseb.*
Chenopodium album *L.*
C. murale *L.*
Corispermum hyssopifolium *L.*
Spinacea oleracea *Mill.*
Roubieva multifida *Moquin.*
Atriplex patula *L.*
Amarantus spinosus *L.*
A. hypochondriacus *L.*
Polygonum orientale *L.*
P. lapathifolium *Ait.*
Polygonum incarnatum *Ell.*
Rumex Brittanica *L.*
Rumex obtusifolius *L.*
Euphorbia Peplus *L.*
E. Lathyris *L.*
Juniperus sab. *v.* procumbens *P.*
Sparganium eurycarpum *Engel.*
Tofieldia glutinosa *Willd.*
Carex sterilis *Willd.*
Agaricus acutesquamosus *Wei.*
A. Americanus *Peck.*
Cantharellus cibarius *Fr.*
Boletus strobilaceus *Scop.*
Cyathus striatus *Hoff'm.*
Diachea elegans *Fr.*
Cystopus candidus *Lev.*
Peziza granulata *Bull.*

Hon. A. S. JOHNSON, Utica, N. Y.

Agaricus procerus *Scop.*
A. dryophilus *Bull.*
Cantharellus cibarius *Fr.*
Boletus strobilaceus *Scop.*
Clavaria fusiformis *Sow.*
Polyporus lucidus *Fr.*

E. C. HOWE, M. D., New Baltimore, N. Y.

Carex Grayii *Carey.*
Favolus Europæus *Fr.*
Uredo Ari-Virginicæ *Schw.*
U. Vacciniorum *Fr.*
U. Cichoraceorum *Lev.*
Ustilago utriculosa *Tul.*
Æcidium Clematitis *Schw.*
Septoria Plantaginicola *B. & C.*
S. Œnotheræ *B. & C.*
S. Pyri *Cast.*
S. Vitis *B. & C.*
S. sanguinea *Desm.*
S. destruens *Desm.*
Cytispora carphosperma *Fr.*
Sphæropsis Candollei *B. & Br.*
Aregma mucronatum *Fr.*
Sporocybe Persicæ *Fr.*
Puccinia Peckiana *Howe.*
Hypoxylon coprophilum *Fr.*
Fusisporium Buxi *Fr.*
Peziza Caulicola *Fr.*
Patellaria congregata *B. & C*
Sphæria putaminum *Schw.*
Erysiphe Vaccinii *Schw.*
Microsphæria penicillata *Lev.*
Uncinula adunca *Lev.*
Labrella Pomi *Mont.*
Physcia stellaris *Wallr.*
Lecanora pallescens *Ach.*
Placodium cerinum *Ach.*
Biatora rubella *Ehrh.*
Pyrenula nitida *Ach.*
Arthonia Lecideëlla *Fr.*
Rinodina sophodes *Ach.*
R. constans *Tuck.*
Pertusaria velata *Nyl.*
Mycoporum pycnocarpum *Tuc*
Theloschistes candelarius *L.*
Parmelia Borreri *Turn.*
Dicranum spurium *Hedw.*

G. B. BRAINERD, Brooklyn, L. I.

Chondria Baileyana *Mont.*
C. tenuissima *Ag.*
Desmarestia aculeata *Lamour.*
Ceramium arachnoideum *Ag.*
Callithamnion Baileyi *Harv.*
Callithamnion cruciatum *Ag.*
Enteromorpha intestinalis *Lk.*
Lyngbya flacca *Ag.*
Cladophora fracta *Fl. Dan.*

W. R. GERARD, Poughkeepsie, N. Y.

Eupatorium purpureum *L.*
E. perfoliatum *L.*
Polemonium cæruleum *L.*
Taraxacum Dens-leonis *Desf.*
Lobelia syphilitica *L.*
Aspidium acrostichoides *Sz.*

E. L. HANKENSON, Newark, N. Y.

Impatiens pallida *Nutt.*
Anethum fœniculum *L.*
Alyssum calycinum *L.*

D. F. DAY, Buffalo, N. Y.

Valeriana officinalis *L.*
Nicotiana rustica *L.*
Silybum Marianum *Gært.*

H. GILLMAN, Detroit, Mich.

Goodyera Menziesii *Lindl.*
Fragaria Gillmani *Clinton.*

J. S. MERRIAM, New York.

Ascyrum Crux-Andreæ *L.*
Polygala lutea *L.*

C. F. AUSTIN, Closter, N. J.

Galium Mollugo *L.*
Callitriche verna *L.*
Schistidium confertum *Funk.*
Dicranum pellucidum *Hedw.*
Plagiothecium latebricola *B.E*

Rev. J. FOWLER, New Brunswick.

Clematis Virginiana *L.*
Anemone Virginiana *L.*
Thalictrum Cornuti *L.*
Ranunculus recurvatus *Poir.*
R. Pennsylvanicus *L.*
R. Flam. *var.* reptans *Gr.*
Coptis trifolia *Salisb.*
Aquilegia vulgaris *L.*
Berberis vulgaris *L.*
Nuphar advena *Ait.*
N. luteum *var.* pumilum *Gr.*
Corydalis glauca *Pursh.*
Dentaria diphylla *L.*
Cardamine hirsuta *L.*
Sinapis alba *L.*
S. arvensis *L.*
Viola lanceolata *L.*
V. pubescens *Ait.*
V. tricolor *L.*
Hudsonia tomentosa *Nutt.*
Drosera rotundifolia *L.*
D. longifolia *L.*
Hypericum mutilum *L.*
H. Canadense *L.*
Elodes Virginica *Nutt.*
Lychnis Githago *Lam.*
Arenaria lateriflora *L.*
A. serpyllifolia *L.*
Sagina procumbens *L.*
Spergularia rubra *Presl.*
Impatiens fulva *Nutt.*
Oxalis Acetosella *L.*
O. stricta *L.*
Rhus Toxicodendron *L.*
Acer Pennsylvanicum *L.*
A. saccharinum *Wang.*
A. rubrum *L.*
Vicia Cracca *L.*
Lathyris maritimus *Bigel.*
L. palustris *L.*
Medicago lupulina *L.*
Prunus Virginiana *L.*
P. serotina *Ehrh.*
Geum macrophyllum *Willd.*

Geum rivale *L.*
Potentilla tridentata *Ait.*
P. fruticosa *L.*
Fragaria vesca *L.*
Dalibarda repens *L.*
Rubus Chamæmorus *L.*
R. triflorus *Rich.*
R. hispidus *L.*
Rosa Carolina *L.*
R. lucida *Ehrh.*
R. rubiginosa *L.*
Cratægus Oxyacantha *L.*
Pyrus arbutifolia *L.*
P. Americana *DC.*
Amelanchier Can. *v.* oligocarpa.
Ribes rotundifolium *Michx.*
R. lacustre *Poir.*
R. prostratum *L'Her.*
R. rubrum *L.*
Mitella nuda *L.*
Tiarella cordifolia *L.*
Chrysosplenium Americanum.
Sedum Rhodiola *DC.*
Myriophyllum tenellum *Bigel.*
Hippuris vulgaris *L.*
Œnothera pumila *L.*
Circæa alpina *L.*
Hydrocotyle Americana *L.*
Sanicula Marilandica *L.*
Archangelica atropurpurea *Hm.*
Conioselinum Canadense *T. & G.*
Cicuta maculata *L.*
C. bulbifera *L.*
Sium lineare *Michx.*
Heracleum lanatum *Michx.*
Aralia hispida *Michx.*
A. trifolia *Gray.*
Cornus Canadensis *L.*
Linnæa borealis *Gronov.*
Symphoricarpus racemosus *Mx.*
Lonicera ciliata *Muhl.*
L. cærulea *L.*
Viburnum nudum *L.*
V. Opulus *L.*
Galium trifidum *L.*
G. triflorum *Michx.*
G. asprellum *Michx.*
Mitchella repens *L.*
Houstonia cærula *L.*
Eupatorium purpureum *L.*
Nardosmia palmata *Hook.*
Aster acuminatus *Michx.*
Aster corymbosus *Ait.*
A. puniceus *L.*
A. Radula *Ait.*
A. miser *L.*
A. longifolius *Lam.*
A. simplex *Willd.*
Solidago stricta *Ait.*
S. sempervirens *L.*
S. altissimus *L.*
S. bicolor *L.*
Antennaria margaritacea *R. Br*
Erechthites hieracifolia *Raf.*
Senecio aureus *L.*
Cnicus benedictus *L.*
Hieracium Canadense *Michx.*
H. scabrum *Michx.*
Nabalus albus *Hook.*
Lactuca Canadensis *L.*
Mulgedium leucophæum *DC.*
Artemisia Absinthium *L.*
A. Abrotanum *L.*
Lobelia Dortmanna *L.*
Campanula rotundifolia *L.*
Gaylussacia dumosa *T. & G.*
Vaccinium Canadense *Kalm.*
V. Pennsylvanicum *Lam.*
V. macrocarpon *Ait.*
Epigæa repens *L.*
Cassandra calyculata *Don.*
Andromeda polifolia *L.*
Kalmia glauca *Ait.*
Rhodora Canadensis *L.*
Ledum latifolium *Ait.*
Pyrola rotundifolia *L.*
Moneses uniflora *Gray.*
Chimaphila umbellata *Nutt.*
Monotropa uniflora *L.*
Ilex verticillata *Gray.*
Nemopanthes Canadensis *DC*
Plantago maritima *L.*
Statice Limonium *L.*
Trientalis Americana *Pursh.*
Lysimachia thyrsiflora *L.*
L. stricta *Ait.*
Glaux maritima *L.*
Samolus Valerandi *L.*
Utricularia cornuta *Michx.*
U. clandestina *Nutt.*
Linaria vulgaris *Mill.*
Chelone glabra *L.*
Mimulus ringens *L.*
Veronica Americana *Schw.*

Veronica agrestis *L.*
Rhinanthus Crista-galli *L.*
Mentha sativa *L.*
Lycopus Europ. *v.* sinuatus *Gr.*
Nepeta Cataria *L.*
N. Glechoma *Benth.*
Leonurus Cardiaca *L.*
Calamintha Clinopodium *Benth.*
Myosotis arvensis *Hoffm.*
M. palustris *With.*
Convolvulus arvensis *L.*
Hyoscyamus niger *L.*
Menyanthes trifoliata *L.*
Apocynum androsæmifolium *L.*
Fraxinus Americana *L.*
Salicornia herbacea *L.*
Suæda maritima *Dumort.*
Salsola Kali *L.*
Polygonum maritimum *L.*
P. Hydropiper *L.*
P. Convolvulus *L.*
Rumex orbiculatus *Gray.*
Quercus tinctoria *Bartram.*
Fagus ferruginea *Ait.*
Myrica Gale *L.*
Betula lenta *L.*
B. papyracea *Ait.*
B. lutea *Michx.*
B. pumila *L.*
Alnus viridis *DC.*
Salix humilis *Marshall.*
S. discolor *Muhl.*
S. myrtilloides *L.*
S. cordata *Muhl.*
S. rostrata *Rich.*
S. lucida *Muhl.*
Populus balsamifera *L.*
Pinus Banksiana *Lamb.*
Juniperus communis *L.*
J. Sab. *v.* procumbens *Ph.*
Arisæma triphyllum *Torr.*
Calla palustris *L.*
Acorus Calamus *L.*
Sparganium simplex *Huds.*
Zannichellia palustris *L.*
Zostera marina *L.*
Ruppia maritima *L.*
Sagittaria graminea *Michx.*
Potamogeton Claytonii *Tuck.*
P. pauciflorus *Pursh.*
Triglochin maritimum *L.*
Habenaria tridentata *Hook.*
Habenaria psycodes *Gray.*
Goodyera repens *R. Br.*
Spiranthes Romanzoviana *Cha.*
Listera convallarioides *Hook.*
Pogonia ophioglossoides *Nutt.*
Calopogon pulchellus *R. Br.*
Corallorhiza multiflora *Nutt.*
Cypripedium acaule *Ait.*
Sisyrinchium Bermudiana *L.*
Trillium cernuum *L.*
Medeola Virginica *L.*
Uvularia sessilifolia *L.*
Streptopus roseus *Michx.*
Clintonia borealis *Raf.*
Smilacina racemosa *Desf.*
S. trifolia *Desf.*
Lilium Canadense *L.*
Luzula campestris *DC.*
Juncus effusus *L.*
J. Balticus *Dethard.*
Eriocaulon septangulare *With.*
Eleocharis obtusa *Schultes.*
E. palustris *R. Br.*
E. tenuis *Schultes.*
E. acicularis *R. Br.*
E. pygmæa *Torr.*
Scirpus cæspitosus *L.*
S. Eriophorum *Michx.*
Eriophorum vaginatum *L.*
E. Virginicum *L.*
E. russoleum *Fr.*
E. polystachyon *L.*
E. gracile *Koch.*
Carex teretiuscula *Good.*
C. stellulata *L.*
C. canescens *L.*
C. vulgaris *Fr.*
C. aquatilis *Wahl.*
C. torta *Boott.*
C. stricta *Lam.*
C. maritima *Vahl.*
C. limosa *L.*
C. aurea *Nutt.*
C. pallescens *L.*
C. gracillima *Schw.*
C. Emmonsii *Dew.*
C. varia *Muhl.*
C. scabrata *Schw.*
C. arctata *Boott.*
C. debilis *Michx.*
C. flexilis *Rudge.*
C. flava *L.*

Carex Œderi *Ehrh.*
C. filiformis *L.*
C. lanuginosa *Michx.*
C. riparia *Curt.*
C. Pseudo-Cyperus *L.*
C. utriculata *Boott.*
C. Tuckermani *Boott.*
C. miliaris *Michx.*
Leersia oryzoides *Swartz.*
Alopecurus aristulatus *Michx.*
Agrostis alba *L.*
Calamagrostis Canadensis *Br.*
Spartina cynosuroides *Willd.*
Glyceria Canadensis *Trin.*
G. elongata *Trin.*
G. fluitans *R. Br.*
G. maritima *Wahl.*
Triticum caninum *L.*
Hordeum jubatum *L.*
Elymus Virginicus *L.*
Aira cæspitosa *L.*
Hierochloa borealis *R. & S.*
Setaria viridis *Beauv.*
Equisetum hyemale *L.*
E. arvense *L.*
E. sylvaticum *L.*
E. limosum *L.*
Asplenium thelypteroides *Mx.*
Aspidium marginale *Swartz.*
Struthiopteris Germanica *Willd.*
Lycopodium complanatum *L.*
L. dendroideum *Michx.*
L. lucidulum *Michx.*
L. inundatum *L.*

(6.)

EDIBLE FUNGI.

Agaricus cæsareus *Scop.*
Cortinarius cinnamoneus *Fr.*
C. castaneus *Fr.*
Lactarius deliciosus *Fr.*
L. subdulcis *Fr.*
Cantharellus cibarius *Fr.*
Lycoperdon cælatum *Fr.*
L. giganteum *Batsch.*
Boletus luteus *L.*
B. flavidus *Fr.*
B. collinitus *Fr.*
B. subtomentosus *L.*
B. edulis *Bull.*
Hydnum imbricatum *L.*
Helvella Infula *Schœff.*

(7.)

PLANTS FOUND GROWING SPONTANEOUSLY IN THE STATE AND NOT BEFORE REPORTED.

OXALIS CORNICULATA *L.*

In Conservatories, Buffalo. *G. W. Clinton.*

VALERIANA OFFICINALIS *L.*

Buffalo. *D. F. Day.* Escaped from gardens.

SPERGULARIA MEDIA *Presl.*

Shore of Shelter Island opposite Greenport. July.

NABALUS BOOTII *D C.*
Summit of Mt. Whiteface. August.

RHINANTHUS CRISTA-GALLI *L.*
Summit of Mt. Marcy. August.

CUSCUTA ARVENSIS *Beyrich.*
Rockland county. *C. F. Austin.*

CUSCUTA COMPACTA *Juss.*
Near Tappantown. *Austin.*

VINCETOXICUM NIGRUM *Mœnch.*
Waste places about Albany. Introduced.

CALAMAGROSTIS PICKERINGII *Gray.*
Summit of Mt. Marcy. August. In our specimens, the lower palet is two-toothed at the apex, and the panicle is about one-fourth the length of the culm.

STIPA RICHARDSONII *Lk.*
Summit of Mt. Marcy. August.

ASPIDIUM FRAGRANS *Swartz.*
Crevices of rocks at Lake Avalanche, near the trap dyke. August.

Mosses.

BRUCHIA FLEXUOSA *Schwœgr.*
Sandy fields. West Albany. June.

DICRANUM PELLUCIDUM *Hedw.*
Ravines. Marathon. *Austin.* Sterile.

PLAGIOTHECIUM LATEBRICOLA *Bry. Eur.*
Swamps at Slate Hill, where it is plentiful. *Austin.*

Lichens.

PLACODIUM CERINUM *Ach.*
Bark of hickory and poplar trees. New Baltimore. *E. C. Howe.* Albany and Center.

THELOSCHISTES CANDELARIUS *L.*
Bark of trees. New Baltimore. *Howe.*

RINODINA SOPHODES *Ach.*
Bark of hickory trees. New Baltimore. *Howe.*

Rinodina constans *Tuck.*
Bark of pine trees. New Baltimore. *Howe.*

Arthonia lecideella *Fr.*
Bark of hickory trees. New Baltimore. *Howe.*

Biatora Hypnophila *Tuck.*
Incrusting mosses. Helderberg Mts.

Buellia geographica *Schaer.*
Rocks. Summit of Mt. Marcy and of Mt. Whiteface.

Calicium subtile *Pers.*
On old hemlock trunks. Helderberg Mts.

Calicium Curtisii *Tuck.*
Bark of sumach, *Rhus typhina.* Helderberg Mts.

Mycoporum pycnocarpum *Tuck.*
Bark of trees. New Baltimore. *Howe.* Sandlake.

Algæ.

Chorda lomentaria *Lb.*
Rocks near low tide limits. Long Island Sound at Greenport and Orient. July.

Desmarestia aculeata *Lamour.*
Flushing Bay. March. *G. B. Brainerd.*

Elachista Fucicola *Fr.*
On Fuci. Long Island Sound at Greenport and Plum Island.

Polysiphonia subcontorta *n. sp.*
Tufts rigid, two to three inches high, loosely entangled, dark red; filaments slender, naked below, alternately and subdistantly branched above; branches short, subequal, naked at the base, much branched above and expanded into a rigid, subsquarrose bushy tuft of ramuli which are subfusiform and more or less curved or contorted; tubes four, surrounding a small central one; articulations of the leading filaments six to ten times, of the branches two to four times their breadth, those of the ramuli shorter than broad; tetraspores in the swollen part of the ramuli.

The filaments are about as thick as hog bristles, nearly equal in thickness throughout, constituting a leading stem, with its

articulations distinct and very long toward the base, and giving out its branches, which are four or five lines long, at intervals of three or four lines. The plant becomes blackish in drying, and does not adhere closely to paper. In size, consistency and coloration, this species resembles *P. fastigiata*, but in ramification, number of tubes, length of articulations, etc., it is far removed from that species.

Rocks near low-water mark. Long Island Sound at Greenport and Orient. July.

NEMALION MULTIFIDUM *J. Ag.*

Rocks near low-water mark. Long Island Sound at Greenport and Orient. July.

CALLITHAMNION CRUCIATUM *Ag.*

Brooklyn Basin and Fort Hamilton. November–February. *Brainerd.*

CALLITHAMNION VIRGATULUM *Harv.*

On Zostera. Shelter Island. July.

CLADOPHORA UNCIALIS *F. Dan.*

Rocks near low-water mark. Long Island Sound at Greenport and Orient. July.

CALOTHRIX CONFERVICOLA *Ag.*

On algæ. Greenport. July.

LYNGBYA FLACCA *Ag.*

Astoria. April. *Brainerd.*

HYDRODICTYON UTRICULATUM *Ag.*

Hudson River below Albany. September.

Fungi.

FAVOLUS EUROPÆUS *Fr.*

On dead branches. Fort Edward. *Howe.* Greenbush. June. It resembles *Polyporus Boucheanus.*

POLYPORUS SALICINUS, *Fr.*

On prostrate trunks of white birches. Helderberg Mts. June.

POLYPORUS ULMARIUS *Fr.*

On the trunks of birches. Sandlake. April.

HYDNUM IMBRICATUM *L.*

Ground in open woods and groves. New Baltimore. *Howe.* Sandlake. July and August. Edible.

Thelephora laciniata *Pers.*

Mossy marshy places. Sandlake.

Stereum corrugatum *Berk.*

On dead saplings. North Greenbush and Knowersville. June.

Clavaria fusiformis *Sow.*

Utica. *A. S. Johnson.* Poughkeepsie. *W. R. Gerard.*

Clavaria pistillaris *L.*

Poughkeepsie. *Gerard.*

Tulostoma fimbriatum *Fr.*

Sandy soil. Center. May.

Lycoperdon cælatum *Bull.*

Grassy ground. West Albany. June. Edible.

Lycoperdon giganteum *Batsch.*

Pastures. Bethlehem and Greenbush. October. Edible. The edible qualities of this magnificent fungus, though highly extolled, have been by no means overestimated. It affords a most palatable and nutritious diet; it is free from the attacks of insects, grows to a large size, and is easily known by its brown surface cracking into rather large angular areas. It should be procured for the table while the flesh is yet white. It is to be regretted that it is not more common, and it is desirable that efforts should be made to cultivate it. (Plate 1, fig. 1).

Geaster saccatus *Fr.*

On the ground among leaves and woods. Helderberg Mts. June.

Leocarpus vernicosus *Lk.*

Bark of hemlock trunks. Helderberg Mts. June.

Didymium cinereum *Fr.*

On stems of grass. Center. June.

Arcyria digitata *Schw.*

On dead wood. Greenbush. June.

Stemonitis oblonga *Fr.*

On living stems of bladder nut, *Staphylea trifolia.* Helderberg Mts. June.

DIACHEA ELEGANS *Fr.*

Sticks and leaves, either living or dead, on or near the ground. Buffalo. *Clinton.* Sandlake. August.

CYATHUS STRIATUS *Hoffm.*

Poughkeepsie. September. *Gerard.* Buffalo. *Miss Mary L. Wilson.*

LEPTOSTROMA LITIGIOSUM *Desm.*

Dead stems of *Pteris aquilina.* Greenbush. May.

LEPTOSTROMA FILICINUM *Fr.*

Dead stems of *Pteris aquilina.* Sandlake. April.

SPHÆRONEMA SPINA *B. & C.*

Dead branches of ash trees, *Fraxinus Americana.* Sandlake and Greenbush. May.

DIPLODIA MORI *Berk.*

Dead branches of mulberry, *Morus rubra.* Greenbush. May.

SPHÆROPSIS CANDOLLEI *B. & Br.*

Leaves of box, *Buxus sempervirens.* New Baltimore. *Howe.*

SEPTORIA PLANTAGINICOLA *B. & C.*

On leaves of plantain, *Plantago lanceolata.* New Baltimore. *Howe.*

SEPTORIA LIRIODENDRI *B. & C.*

Leaves of the tulip tree, *Liriodendron Tulipifera.* Sandlake. August.

SEPTORIA RUBI *B. & C.*

Leaves of the low blackberry, *Rubus Canadensis.* Common. July, October.

SEPTORIA PYRI *Cast.*

Leaves of apple trees, *Pyrus Malus.* New Baltimore. *Howe.*

SEPTORIA VITIS *B. & C.*

Leaves of grape vine. New Baltimore. *Howe.* Greenport. July.

SEPTORIA ŒNOTHERÆ *B. & C.*

Leaves of *Œnothera biennis.* Common. July.

Septoria destruens *Desm.*

Leaves of mallows, *Malva rotundifolia.* New Baltimore. *Howe.* West Albany. June.

Septoria sanguinea *Desm.*

Leaves of cherry trees. New Baltimore. *Howe.* Riverhead. July.

Septoria viride-tingens *Curtis in lit. n. sp.**

Spots obscure, vague, confluent, mostly tinged with green; perithecia very abundant, minute, of a waxy appearance, dull amber colored, rarely becoming black; spores thread-like, not septate, $\frac{1}{1000}'$–$\frac{1}{800}'$ long.

On leaves of the wild leek, *Allium tricoccum.* Helderberg Mts. May.

The leaves attacked by this parasite turn yellow as if dying, with a motling, in a confused manner, of a dull green. The perithecia are more abundant on these greenish spots, but not at all limited to them, for they occur upon nearly the whole of the upper surface of the leaf and sparingly on the lower surface. The larger spots often have an arid central space, either wholly or partially retaining the greenish border.

Stilbospora magna *Berk.*

Dead branches of ash trees. West Albany. June.

Cytispora carphosperma *Fr.*

Fallen twigs of plum trees. New Baltimore. *Howe.*

Coniothecium toruloideum *B. & C.*

Dead branches of willows. Albany. May.

Spilocæa Pomi *Fr.*

On apples. Common.

Aregma mucronatum *Fr.*

Leaves of rose bushes. New Baltimore. *Howe.* Green bush. October.

The specimens of Dr. Howe, as well as those of my own collecting, have the spores 8—10-septate, not 5—7-septate, as described. Still I hesitate to consider them any thing more than an American variety of the species.

Triphragmium clavellosum *Berk.*

Leaves of sarsaparilla, *Aralia nudicaulis.* Jordanville and North Elba.

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* This, and other names similarly referred, were given by Rev. M. A. Curtis, to whom specimens were sent for identification; but, having drawn up the descriptions myself, I must be responsible for their accuracy.

PUCCINIA CRYPTOTÆNIÆ *n. sp.*

Spots indistinct, scarcely discolored; sori minute, subcircinating, at length subconfluent; spores about $\frac{1}{800}'$ long, $\frac{1}{1500}'$ broad, irregular, with a slight blunt point or umbo at the apex; pedicel very short.

Under surface of leaves of *Cryptotænia Canadensis.* North Greenbush. June.

PUCCINIA UMBELLIFERARUM *DC.*

Leaves of various umbelliferous plants. North Greenbush. June. New to this country.

PUCCINIA CIRCÆÆ *Pers.*

Leaves of *Circæa Lutetiana* and *C. alpina.* Common. August.

PUCCINIA HELIANTHI *Schw.*

Leaves of *Helianthus divaricatus.* Albany. September.

PUCCINIA XANTHII *Schw.*

Leaves of the cocklebur, *Xanthium strumarium.* West Albany. September.

PUCCINIA VIOLARUM *Lk.*

Leaves of violets. West Albany. September.

PUCCINIA COMPOSITARUM *Schl.*

Leaves of Canada thistle, *Cirsium arvense.* Sandlake. August.

PUCCINIA TIARELLÆ *B. & C.*

Leaves of *Tiarella cordifolia.* Sandlake and North Elba. August and September.

PUCCINIA ASTERIS *Schw.*

Leaves of various species of Aster. Sandlake and North Elba. July and August.

PUCCINIA ANEMONES *Pers.*

Leaves of *Anemone nemorosa* and *Thalictrum Cornuti.* Greenbush and Center. May–August.

PUCCINIA CORONATA *Corda.*

Leaves of oats. North Greenbush. July.

PUCCINIA MESOMAJALIS *B. & C.*

Leaves of *Clintonia borealis.* North Elba. August.

PUCCINIA PECKIANA *Howe n. sp.*

Spots small, concealed by the tomentum of the leaf, yellowish and confluent on the opposite side; spore clusters small, scattered plentifully over the lower surface of the leaf, partly concealed by its tomentum; spores broadly elliptical, rarely subpyriform, scarcely constricted in the middle, brown, $\frac{1}{700}'$ to $\frac{1}{500}'$ long, $\frac{1}{1000}'$ broad, pedicel short, separable.

On leaves of cultivated *Rubus occidentalis*. New Baltimore. August. *Howe.*

Many of the spores, when scraped from the leaf and placed under the microscope, will be seen to have no pedicel, or only a slight remnant of one; others not yet mature have it entire.

PUCCINIA ACUMINATA *n. sp.*

Spots orbicular, purplish; spore clusters confluent, the larger ones forming a circle about a free central space, surrounded by the ruptured epidermis of the leaf; spores oblong, constricted in the middle, pointed at the apex; pedicel shorter than, or equaling the spore, which is $\frac{1}{500}'$ or more in length, and about $\frac{1}{1500}'$ broad.

On the lower surface of leaves of *Cornus Canadensis*. Sandlake and North Elba. August.

The acumination at the apex of the spore is often oblique, sometimes very abrupt and short, sometimes quite long and almost beak-like. Related to *P. Waldsteiniæ*.

PODISOMA MACROPUS *Schw.*

Branches of *Juniperus Virginiana*. Helderberg Mts. and Bethlehem. May.

UREDO AZALEÆ *Schw.*

Leaves of *Azalea nudiflora*. Sandlake. August.

UREDO VACCINIORUM *Johnst.*

Leaves of *Vaccinium corymbosum*. New Baltimore. *Howe.* West Albany. September.

UREDO ARI-VIRGINICI *Schw.*

Leaves of *Arisæma triphyllum* and *Peltandra Virginica*. Common. July.

UREDO CHÆROPHYLLI *Schw.*

Leaves of sweet cicely, *Osmorrhiza brevistylis*. N. Greenbush and Guilderland. June and July.

UREDO CICHORACEARUM *Lev.*

Leaves of dandelion, *Taraxacum Dens-leonis*. New Baltimore. *Howe.* Greenbush. May–August.

UREDO FILICUM *Desm.*

On ferns. North Elba. August.

UREDO PUSTULATA *Pers.*

Leaves of *Epilobium hirsutum.* Albany. September.

TRICHOBASIS HOWEI *n. sp.*

Spore clusters scattered or subconfluent, hypogenous, surrounded by the ruptured epidermis, from one-half to one line in diameter; spores brown, subglobose, roughened with slight indentations, $\frac{1}{1200}' - \frac{1}{1000}'$ in diameter.

On leaves of the milkweed, *Asclepias Cornuti.* North Greenbush. September.

The spore clusters are sometimes sparingly, sometimes profusely scattered over the under surface of the leaf, or over a part of it. The spores are sometimes a little longer than broad, sometimes subpyriform, and occasionally furnished with a slight pedicel.

LECYTHEA OVATA *Strauss.*

Leaves of *Populus grandidentata.* Greenbush. September.

LECYTHEA CYLINDRICA *Strauss.*

Leaves of *Populus monilifera.* Albany. September.

LECYTHEA GYROSA *Berk.*

On the upper surface of leaves of *Rubus hispidus.* Sandlake. August.

UROMYCES MACROSPORA *B. & C.*

Leaves of *Lespedeza capitata.* Albany. September.

UROMYCES LIMONII *Lev.*

Leaves of sea lavender, *Statice Limonium.* Greenport. July.

POLYCYSTIS RANUNCULACEARUM *Desm.*

Leaves of the liverwort, *Hepatica acutiloba*, and of *Anemone Pennsylvanica.* Helderberg Mts. and Greenbush. May and June. New to this country.

RAVENELIA GLANDULIFORMIS *B. & C.*

Leaves and stems of *Tephrosia Virginiana.* Center. October.

ÆCIDIUM EPILOBII *DC.*

Leaves of the evening primrose, *Œnothera biennis.* West Albany. July.

ÆCIDIUM AROIDATUM *Schw.*

Leaves of Indian turnip, *Arisæma triphyllum.* Common. June.

ÆCIDIUM CLAYTONIATUM *Schw.*

Leaves of the Spring beauty, *Claytonia Caroliniana.* Knowersville. May.

ÆCIDIUM QUADRIFIDUM *DC.*

Radical leaves of the wind flower, *Anemone nemorosa.* Center. May. New to this country.

ÆCIDIUM GERANII *DC.*

Leaves of *Geranium maculatum.* North Greenbush. June.

ÆCIDIUM IMPATIENTIS *Schw.*

Leaves of *Impatiens pallida.* Helderberg Mts. July. Poughkeepsie. *Gerard.*

ÆCIDIUM VIOLÆ *DC.*

Leaves of violets. West Albany. June.

ÆCIDIUM FRAXINI *Schw.*

Leaves of ash trees, *Fraxinus Americana.* Bethlehem. June.

ÆCIDIUM OROBI *DC.*

Leaves and petioles of white clover, *Trifolium repens.* Sandlake. September.

ÆCIDIUM RANUNCULI *Schw.*

"*A Ranunculi* (abortivi). Frequens in foliis rotundis radicalibus, expers fere macula."—*Syn. Fung. Car. Sup.* p. 41.

Spots none, the upper surface of the leaf rugose; peridia sub-crowded or loosely scattered over the lower surface, short; spores orange subglobose, $\frac{1}{1500}'$ in diameter; spermogonia abundant, scattered over the lower surface of the same or of different leaves.

On the radical leaves, rarely on the stem leaves of *Ranunculus abortivus.* Greenbush. May.

ÆCIDIUM PODOPHYLLI *Schw.*

Spots large, subconfluent, yellow, not always thickened; peridia very short, hypogenous, crowded; spores bright orange, subglobose, $\frac{1}{1200}'-\frac{1}{1000}'$ in diameter; spermogonia few, scattered on the upper suface.

On leaves of the mandrake, *Podophyllum peltatum*. Bethlehem. June.

The spots occur most often at or near the base of the leaf lobes, where they are frequently confluent.

ÆCIDIUM PUSTULATUM *Curtis in lit., n. sp.*

Spots small, yellowish, sometimes stained with red, thickened, often concave above, convex below; peridia short, subcrowded, often forming a circle about a free central space; spores pale orange, subglobose, $\frac{1}{1500}'-\frac{1}{1200}'$ in diameter.

On leaves of toad flax, *Comandra umbellata*. Center. June.

ÆCIDIUM ŒNOTHERÆ *n. sp.*

Spots orbicular, scarcely thickened, reddish purple, sometimes stained with yellow; peridia short, crowded, generally with a small free central space; spores pale orange, subglobose, small, $\frac{1}{2000}'$ in diameter.

On leaves of the evening primrose, *Œnothera biennis*. Knowersville. June.

Not unfrequently a reddish purple dash extends from the spot to the margin of the leaf. The cups sometimes occur sparingly on the upper surface of the leaf. The free central space appears umbilicus-like, and, when present, is a noticeable feature.

ÆCIDIUM MYRICATUM *Schw.*

Spots dark red, much thickened, scattered, very variable in size and shape, often angular; peridia short, subimmersed, scattered or subcrowded; spores very bright orange, subglobose, large, $\frac{1}{1000}'-\frac{1}{800}'$ in diameter; spermogonia on the upper surface.

On leaves of the wax-myrtle, *Myrica cerifera*. Riverhead. July.

The white cups, filled with brilliant orange colored spores, and sitting upon their dark red or chestnut colored bed, present a beautiful appearance. A few cups sometimes occur on the upper surface. Small spots with but two or three cups have the subiculum distinctly thickened. The species is related to *Æcidium Berberidis*, but is distinguished by its shorter cups and larger spores. I have not found it growing on the petioles of the leaves. After a considerable time the spores fade to a pale yellow.

ÆCIDIUM LIMONII *n. sp.*

This is a species closely related to the preceding one, occurring in thickened spots on the leaves (and their midribs) of *Statice Limonium*, at Greenport. The cups occur upon both surfaces of the leaf, but more sparingly on the upper surface.

Our specimens were too old, when collected, for a full description.

ÆCIDIUM MACROSPORUM *n. sp.*

Spots small, orbicular, yellowish, not thickened; peridia elongated, cylindrical, few, generally forming a circle about a free central space; spores yellow or pale orange, minutely roughened, nearly globose, very large, $\frac{1}{600}' - \frac{1}{500}'$ in diameter; spermogonia numerous, distinct, on the upper surface of the leaf.

On leaves of *Smilax rotundifolia.* Riverhead. July.

There is seldom more than one spot on a leaf, and generally not more than one or two on a plant. The species is quite distinct from *Æcidium Smilacis* Schw., and is related to *Æcidium Hydnoideum* B. & C., from which it differs in its larger spores, fewer cups growing close to the margin of the spot, and in its more distinct spermogonia.

ÆCIDIUM CLEMATITIS *Schw.*

On virgin's bower, *Clematis Virginiana.* New Baltimore. *Howe.*

ILLOSPORIUM CARNEUM *Fr.*

On lichens, *Peltigera aphthosa.* Helderberg Mts.

SPOROCYBE PERSICÆ *Fr.*

On the bark of peach trees. New Baltimore. *Howe.* Also on the wild cherry tree, *Prunus Pennsylvanica.* Sandlake. August.

HELMINTHOSPORIUM TIARA *B. & R.*

Dead branches on the ground. Greenbush. May.

MACROSPORIUM CHEIRANTHI *Fr.*

On dead herbs. Common. May and June.

BOTRYTIS VITICOLA *B. & C.*

Leaves of grape vines. Shelter Island. July.

STREPTOTHRIX ATRA *B. & C.*

On bark of *Juniperus Virginiana.* Bethlehem. June.

FUSISPORIUM BUXI *Fr.*

Leaves of box, *Buxus sempervirens.* New Baltimore. *Howe.*

FUSISPORIUM MINIATUM *B. & C.*

On sap-moistened stumps of deciduous trees. Helderberg Mts. June.

HELVELLA INFULA *Schæff.*
Old trunks and stumps. Catskill Mts. October. Edible.

MITRULA PALUDOSA *Fr.*
On decaying wood and sticks in damp places. Sandlake. August.

LEOTIA LUBRICA *Pers.*
Mossy ground in woods. Sandlake and North Elba. Aug.

PEZIZA COCHLEATA *L.*
Ground in woods. Helderberg Mts. and Greenbush. June.

PEZIZA COCCINEA *Jacq.*
Half buried sticks. Sandlake and Helderberg Mts. April and May.

PEZIZA NIGRELLA *Pers.*
Ground in pine woods. Sandlake. April.

PEZIZA FLOCCOSA *Schw.*
Sticks and branches on the ground. Greenbush. July.

PEZIZA AURANTIA *Fr.*
About the roots of stumps. Greenbush. October. A showy species.

PEZIZA GRANULATA *Bull.*
In flower pots. Buffalo. March. *G. W. Clinton.*

PEZIZA ANOMALA *Pers.*
On dead branches of the water beech, *Carpinus Americana.* Bethlehem. May.

PEZIZA VIRGINEA *Batsch.*
Dead sticks. Greenbush. July.

BULGARIA RUFA *Schw.*
Ground among leaves in woods. Sandlake. August.

RHIZINA UNDULATA *Fr.*
Ground in woods. Adirondack Mts. August.

TYMPANIS PICASTRA *B. & C.*
Dead trunk of red maple, *Acer rubrum.* Sandlake. April.

PATELLARIA CONGREGATA *B. & C.*
On chestnut log. Moreau. *Howe.*

Glonium stellatum *Muhl.*
Rotton stumps in woods. Helderberg Mts. May.

Hysterium vulvatum *Schw.*
Dead branches of poplar trees, *Populus tremuloides.* Albany. June.

Hysterium Fraxini *Pers.*
Dead branches of ash trees. Greenbush. May.

Hysterium Rubi *Pers.*
Dead stems of raspberry, *Rubus strigosus.* Greenbush. June.

Labrella Pomi *Mont.*
Skin of apples. New Baltimore. *Howe.*

Cordyceps militaris *Fr.*
On dead pupæ. Sandlake. August.

Cordyceps purpurea *Fr.*
On panicles and spikes of grasses and rye. Common. Sterile. This is the well-known *ergot.* Spore-bearing specimens are rarely found.

Hypocrea lateritia *Fr.*
On the gills of *Lactarius uvidus.* North Elba. August.

Hypoxylon coprophilum *Fr.*
On dung of cows. New Baltimore. *Howe.*

Diatrype haustellata *Fr.*
On old trunks of water beech, *Carpinus Americana.* Bethlehem. May.

Diatrype virescens *Schw.*
Dead branches of the beech, *Fagus sylvatica.* Sandlake. April.

Diatrype Duriæi *Mont.*
Dead branches of poison sumach, *Rhus venenata.* Guilderland. May.

Melogramma Quercuum *Fr.*
Dead twigs of oak. Center. June.

Sphæria aquila *Fr.*
Fallen branches. Greenbush. May.

SPHÆRIA ELONGATA *Fr.*

Dead branches of the locust tree, *Robinia Pseudacacia*. Greenbush. May.

SPHÆRIA CONFLUENS *Fr.*

Dead branches of poplars. Sandlake. April.

SPHÆRIA DOLIOLUM *Pers.*

Dead stems of herbs. Common. May.

SPHÆRIA GRAMINIS *Pers.*

Leaves of grasses. Common. September.

SPHÆRIA SPRAGUEI *B. & C.*

Bark of pine trees, *Pinus Strobus*. West Albany. May.

SPHÆRIA MORBOSA *Schw.*

On the branches of plum and cherry trees. Very common and injurious. This fungus is commonly called "*black knot*." It is apparently native on our indigenous cherry trees, and, having escaped from them, it has attacked the cultivated one (*Prunus Cerasus*) in some localities with such vigor as to destroy it, and make "cherry raising" an unprofitable business. Cutting away the affected branches and burning them, early in the season, before the fungus has matured its seed, has been recommended. This should be done as early as May, for I have found the spores developed in June. Among our indigenous species of cherry trees, I have found the choke cherry (*Prunus Virginiana*) and the wild cherry (*Prunus Pennsylvanica*) especially liable to the attacks of this fungus. This pest is scarcely less injurious to plum trees.

DEPAZEA KALMICOLA *Schw.*

Leaves of the laurel, *Kalmia latifolia*. Greenport and Catskill Mountains. July, October.

DEPAZEA PYROLÆ *Fr.*

Leaves of prince's pine, *Chimaphila umbellata*. Helderberg Mts. May.

DEPAZEA SMILACICOLA *Schw.*

Leaves of smilax. Riverhead. July.

DEPAZEA FRAXINICOLA *Curtis in lit. n. sp.*

Spots arid, suborbicular, sometimes with a brownish border, one-fourth to one-half an inch in diameter; perithecia black; those well developed are concave above, with a slight central elevation; asci subfusiform, containing four to eight spores apiece; spores densely packed in the asci, oblong or narrowly ellip-

tical, having a little nucleus near each end, $\frac{1}{2000} - \frac{1}{1500}$ long, about one-third as wide.

On ash leaves. *Fraxinus Americana.* Albany. September.

Ascospora Podophylli *Curtis in lit. n. sp.*

Spots arid, rather small, suborbicular, numerous, brown; perithecia minute, black; spores oblong, simple.

Leaves of the mandrake, *Podophyllum peltatum.* Bethlehem. June.

Dothidea Robertiani *Fr.*

Leaves of *Geranium Robertianum.* Helderberg Mts. May and June.

Massaria vomitoria *B. & C.*

Dead branches of ash and red maple. Sandlake and Greenbush. May and June.

Erysiphe fuscata *B. & C.*

Leaves of *Bidens connata.* North Greenbush. September. A Sphærotheca.

Erysiphe lamprocarpa *Lev.*

Leaves of species of Aster, Solidago, Artemisia, Inula, etc. Common. September.

Erysiphe Vaccinii *Schw.*

Leaves of trailing arbutus, *Epigæa repens.* New Baltimore. *Howe.* Sandlake. September.

Uncinula adunca *Lev.*

Leaves of willows. Very common. September.

Microsphæria Friesii *Lev.*

Leaves of the lilac, *Syringa vulgaris.* Albany. September.

Microsphæria Vaccinii *n. sp.*

Conceptacles small, globose; sporangia six to eight, ovate, each containing four to six elliptical spores; appendages ten to twenty, white, very long, length more than twice the diameter of the conceptacles.

On both sides of leaves of *Vaccinium vacillans.* West Albany. October.

Eurotium herbariorum *Lk.*

On dried plants. Albany.

ORDER—AGARICINI.

Hymenium inferior, spread over the surface of distinct gill-like processes, which are easily divisible into two plates. *Berk. Outl.* p. 89.*

The Agaricini are cellular, flowerless plants, consisting essentially of an expanded suborbicular part (*pileus or hymenophorum*) bearing on its lower surface thin vertical plates (*lamellæ or gills*) radiating from a central or marginal point, and either attached to its place of growth by a part of its margin, or supported upon a central or lateral stem (*stipe*). The lamellæ or gills consist of two separable membranes (*hymenium*) applied, one on either side, to an intermediate stratum (*trama*) and producing minute reproductive bodies (*spores*) on their exterior surfaces.† They may be attached by their inner extremity to the stem and extend a little distance down it (*decurrent*), nearly or quite reach the stem without being attached to it (*free*), or terminate at a considerable distance from it (*remote*). They may have the edge broadly curved, so that they appear bent like a bow (*arcuate*), or shortly curved near the inner extremity, and at the same time be slightly decurrent, so as to appear hook-like (*uncinate*), or they may have the edge rough with little projections or teeth (*serrate*), or simply notched near the inner extremity (*emarginate*).

The stem may be of the same diameter in every part (*equal*), or be thicker in the middle, tapering toward either extremity (*ventricose*). It may be hollow, or have its center of different texture from its exterior (*stuffed*), the center in such case being either cottony or spongy, or it may be of uniform texture throughout its diameter (*solid*). Its base may be coated or fringed with minute entangled filaments (*mycelium*), the immediate product of the spores, while toward its top there is often seen a flabby, lacerated, membranaceous ring (*annulus*) girding it. Sometimes the young plant is completely enveloped by a submembranaceous wrapper (*volva*) which it bursts as it increases in size, and in other cases the envelope may be only partial, and even composed of little flocks or fibres which are scarcely conspicuous. Both the stem and the pileus may be wholly or partially sprinkled with fine, meal-like powder (*farinaceous*), or coated with little fibres (*fibrillose*), or rough, with distinct scales or scale-like tufts of fibres (*squamose*), which are sometimes quite minute (*squamulose*). The surface of the pileus in some species is sticky to the touch (*viscid*), in others it may be in moist weather covered with a gelatinous substance (*glutinous*). The flesh of some, when moist, presents a more watery appearance and a greater depth of coloring than

* This and the generic and subgeneric characters hereinafter given are taken from *Berkeley's Outlines of British Fungology.*

† The lamellæ are rarely branched, and in a few instances reduced to obtuse, vein-like elevations.

when dry (*hygrophanous*), and in such species, in the moist state, fine, radiating, parallel lines may sometimes be seen on the margin (*striatulate*). The Agaricini comprise by far the greater number of the larger, conspicuous, umbraculiform, fleshy fungi. Individual plants are generally of short duration, growing up in a few hours or days, and decaying as rapidly as they grow. They are more abundant toward the end of the season than in the beginning, and in wet weather than in dry. In long continued dry weather, almost none can be found unless they be sought in deep wet marshes. In some seasons, therefore, they grow much more profusely than in others, and in deep woods and mountainous regions more abundantly than in open cultivated districts.

Unlike most other plants, they are seldom of a green color; red, brown, white and yellow, in an almost infinite variety of shading and blending, being the prevailing hues. The great beauty and variety of their colors, their singular and manifold forms (all, however, variations of a single type), their strangely peculiar habits, perishable nature and remarkable properties, all combine to make them objects of great interest.

Many of them afford very savory and nutritious food, but some are reputed poisonous. Some that are acrid or nauseous in the raw state become pleasant and edible by cooking. Vinegar is known to have the power of abstracting the poisonous properties of the deleterious ones, so that from these two facts it is not improbable that, with proper preparation, nearly all our species may be made edible.

SYNOPSIS OF THE GENERA.

Edge of the lamellæ obtuse ..... vii. CANTHARELLUS.
Edge of the lamellæ acute..... A.
A. Plant fleshy, with a milky (rarely colored) juice..... v. LACTARIUS.
A. Plant destitute of a milky juice ..... B.
B. Lamellæ of a waxy texture, with a watery juice..... iv. HYGROPHORUS.
B. Lamellæ dissolving into an inky fluid ..... ii. COPRINUS.
B. Lamellæ dry, persistent..... C.
C. Pileus fleshy, putrescent..... D.
D. Trama vesiculose; spores white or yellow *..... vi. RUSSULA.
D. Trama filamentous; spores various..... i. AGARICUS.
D. Trama floccose; spores reddish ochre ..... iii. CORTINARIUS.
C. Pileus firm, coriaceous or subcoriaceous, persistent ..... E.
E. Lamellæ entire ..... viii. MARASMIUS.
E. Lamellæ serrate, thin..... ix. LENTINUS.

Genus — AGARICUS *L.*

Gills membranaceous, persistent (not melting); trama filamentous, continuous with the substance of the pileus; edge acute. *Fleshy putrescent Fungi.—Berk. Outl.*

* The color of the spores may be determined by cutting a well-developed pileus from its stem and placing it in its natural position on white paper. In a few hours enough spores will descend upon the paper to show their color. White spores show best on black paper. Should the atmosphere be dry or the pileus thin, invert a goblet over the pileus.

The genus Agaricus is a large one, and is divided, by the color of the spores, into five series, which are again divided into sub genera, distinguished by characters of minor importance.

Series 1 — LEUCOSPORI.

Spores white, rarely whitish or yellowish.

Subgenus — Amanita.

Veil universal, distinct from the cuticle of the pileus. Hymenophorum distinct from the stem.—*Berk. Outl.*

Terrestrial species of moderate or large size, at first entirely enveloped in the volva, which is burst by the growing plant, a part being carried up by the pileus and forming evanescent patches or scattered, persistent, wart-like elevations upon its surface; the other part evanescent, or persistent, and attached to the base of the stem. The pileus at length becomes nearly horizontally expanded or slightly depressed, with the margin even or sulcate-striate. The stem is generally rather long, firm, fleshy and stuffed. The spores are subglobose. Most of the species are deemed poisonous.

SYNOPSIS OF THE SPECIES.

Stem annulate	a.
a. Margin of the pileus striate	b.
b. Volva loose, sheathing at the base, lamellæ yellow	1.
b. Volva connate, ruptured at the base into concentric scales	2.
a. Margin of the pileus even	c.
c. Volva appressed at the base	3.
c. Volva loose, forming a margin to the bulb	4.
Stem with no annulus	d.
d. Pileus smooth, volva sheathing	5.
d. Pileus warty, volva evanescent	6.
d. Pileus pulverulent, volva evanescent	7.

1. AGARICUS CÆSARIUS *Scop.*

Pileus hemispherical, then expanded, striate on the margin, naked, yellow; flesh yellow under the cuticle; lamellæ free, yellow; stipe slightly tapering upward, annulate, sheathed at the base by the volva, stuffed. Utica. *A. S. Johnson.* (v. s.)

This is one of the few edible species of this subgenus.

2. AGARICUS MUSCARIUS *L.*

Pileus at first slightly viscid, hemispherical, then convex, expanded or even slightly depressed, substriate on the margin, warty, rarely naked, red, yellow, or nearly white; flesh yellow under the separable cuticle; lamellæ free, white; stipe cylindrical or slightly tapering upward, annulate,

ovate-bulbous and concentrically scaly at the base, stuffed, farinaceous, white, rarely yellow.

Height 6′–8′, breadth of pileus 3′–5′.

Common in open woods and in pastures. August-October.

A beautiful but very variable species. Reputed poisonous, and said to possess intoxicating properties. The color of the pileus varies from orange to white, being commonly yellow, and becoming paler with age. Two varieties are worthy of mention; one, var. *minor*, with the pileus bright orange, 1′–2′ broad, lamellæ tinged with yellow, stipe yellow and not scaly at the base, occurring in woods from June to October; the other, var. *major*, very large, nearly one foot high, with the pileus 8′–10′ in diameter, and with the thick bulb above the surface of the ground, its upper part being often split into thick appressed truncate rays. I have met with this variety but once. Catskill Mountains. October.

3. AGARICUS VERNUS *Bull.*

Pileus at first ovate and slightly viscid, then expanded, smooth, with the margin even; lamellæ free; stipe stuffed, annulate, bulbous, smooth; volva sheathing, appressed.

Height 3′-6′, breadth of pileus 2′-3′.

Found in woods and open places. July. Sag Harbor and Sandlake.

It has a strong odor and is white throughout. The stem is sometimes lacerated.

4. AGARICUS PHALLOIDES *Fr.*

Pileus at first campanulate, and when moist slightly viscid, then expanded with the margin even, smooth, or innately fibrillose; lamellæ white, free; stipe stuffed, annulate, whitish or pallid, bulbous, the bulb large, flattened above, and narrowly margined with the remains of the volva.

Height 4′-6′, breadth of pileus 2′-4′.

In woods. North Elba, West Albany, and Catskill Mountains. August–October.

Pileus white, brown or blackish-brown. I have seen no specimens with a greenish pileus, though such are not rare in Europe. White specimens are easily confounded with the preceding, if the character of the volva and bulb is not noticed. Fragments of the veil may be found on the young pileus.

5. AGARICUS VAGINATUS *Bull.*

Pileus thin, sulcate-striate on the margin, at first ovate campanulate, then expanded, smooth; lamellæ white, free, rather broad and rounded at the outer extremity; stipe whitish, slightly tapering upward, minutely squamulose or

mealy, hollow or loosely stuffed with cottony fibres, not annulate, sheathed at the base with the persistent volva.

Height 3′–6′ breadth of the pileus 1′–4′.

Common in woods. August.

The color of the pileus is various, but commonly a livid or grayish-brown. I have seen the white variety, *A. nivalis* Grev., on sterile grassy banks in Keene, Essex county. Patches of the torn volva may be seen on the young pileus.

6. AGARICUS CECILIÆ *B. & Br.*

Pileus sulcate-striate on the margin, grayish-brown, warty, at first ovate and slightly viscid, then broadly convex, expanded or even slightly depressed; lamellæ broad, white, free; stipe white, slightly tapering upward, minutely squamulose, hollow or stuffed with cottony fibres, not annulate; the volva soon disappearing.

Height 4′–6′, breadth of pileus 2′–3′.

Grassy borders of a grove at Greenport. July.

This species is closely related to the preceding one, but easily separated by the warty pileus and evanescent basal portion of the volva. I do not find the stem more densely stuffed than it is in *A. vaginatus.*

7. AGARICUS FARINOSUS *Schw.*

Pileus sulcate-striate on the margin, livid-brown, pulverulent coated; lamellæ whitish, free; stipe pallid, cylindrical, becoming hollow, farinaceous, subbulbous, not annulate; volva evanescent or none.

Height 2′, breadth of the pileus 1′–2′.

In open woods. Greenbush. July.

The powdery or dust-like coating of the pileus is more abundant on the disk, where it is collected in heaps or patches capable of being rubbed off. The plant might easily be mistaken for a species of *Russula.*

Subgenus—Lepiota.

Veil universal, concrete with the cuticle of the pileus. Hymenophorum distinct from the stem.—*Berk. Outl.*

The species of this subgenus are generally smaller than those of the preceding, and the most of them have the pileus rough with tufts or scales formed by the breaking up of the cuticle with the concrete veil. This frequently gives them a beautiful variegated appearance.

SYNOPSIS OF THE SPECIES.

Pileus scaly ..... a.
a. Annulus movable ..... 8.
a. Annulus not movable ..... b.

b. Scales acute, erect..... 9.
b. Scales appressed..... c.
c. Stipe with an elongated bulbous base..... 10.
c. Stipe not bulbous, floccose..... 11.
c. Stipe not bulbous, smooth..... 12.
Pileus smooth, annulus large..... 13.
Pileus granulose, annulus small..... 14.

*8. AGARICUS PROCERUS *Scop.*

Pileus at first ovate, then broadly convex or expanded, strongly umbonate,† spotted with broad brownish scales, the margin deflexed, fibrillose; lamellæ remote, whitish or flesh colored; stipe long, cylindrical, hollow, bulbous, squamulose, annulate with a firm movable ring.

Height 6′–10′, breadth of pileus 3′–5′.

Fields, pastures and roadsides. Utica. *A. S. Johnson.* West Albany. Aug.–Sept.

An edible species of a dingy whitish color.

9. AGARICUS ACUTESQUAMOSUS *Weinm.*

Pileus convex, obtuse or very broadly subumbonate, rough with small erect acute scales which are more numerous on the disk; lamellæ narrow, free, yellowish; stipe equal, annulate, bulbous; annulus whitish, not movable.

Height 3′–4′, breadth of the pileus 2′–3′.

In a grapery at Buffalo. *G. W. Clinton.* November.

The pileus is tawny on the disk, elsewhere whitish, with subconcentrically-arranged tawny scales.

*10. AGARICUS AMERICANUS *n. sp.*

Pileus convex, distinctly umbonate, squamose, with the margin obscurely striate; lamellæ free; stipe slender, smooth, annulate, stuffed or hollow, gradually enlarged below into a long subventricose bulb-like base; annulus thin, subpersistent, fixed.

Height 3′–5′, breadth of pileus 1.5′–3′ or more.

Grassy ground by roadsides. August. Buffalo. *G. W. Clinton.*

The whole plant in drying becomes of a dull pinkish-red color. This plant was noticed in a previous report as *A. rachodes*, but upon further investigation I am satisfied it is a species distinct by its umbonate, not depressed pileus, substriate margin, fixed annulus, and peculiar elongated bulbous base.

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* Species marked with the asterisk have been before reported, but are repeated for the sake of the description.

† Having an abrupt obtuse elevation or boss in the center.

11. AGARICUS CLYPEOLARIUS *Bull.*

Pileus subcampanulate or convex, umbonate, at first uniformly brownish-coated, then whitish, thickly set with small brownish scales, the margin sometimes obscurely striate; lamellæ white, free; stipe slender, hollow, floccose-scaly below the slight evanescent annulus.

Height 2′-3′, breadth of pileus .5′-1.5′.

In woods. North Elba. August.

Some specimens are much darker colored than others. The cuticle does not break up on the disk, which in consequence remains brown. The plant has a pleasant odor, even after it has been kept a long time in the herbarium.

*12. AGARICUS CRISTATUS *Fr.*

Pileus convex, at first reddish-brown then, from the breaking up of the cuticle, whitish, spotted with reddish-brown scales, which are larger and closer toward the disk where the cuticle is unbroken; lamellæ white, free; stipe slender, smooth, hollow, slightly bulbous, annulate; annulus at length disappearing.

Height about 2′, breadth of pileus 1′-1.5′.

Ground along the borders of woods. Guilderland. July.

This plant has a strong odor, by which, with its smooth stipe, it is best distinguished from the preceding one.

13. AGARICUS NAUCINUS *Fr.*

Pileus at first subglobose, then convex, fleshy, soft, even, smooth, white; lamellæ close, narrower toward the inner extremity, white, then dirty flesh-colored, free; stipe white, smooth, equal, stuffed, bulbous, annulate, with a rather large white ring.

Height 2′-3′, breadth of pileus 1′-3′.

Grassy places in pastures. Knowersville. September and October.

I have seen no specimens with the cuticle broken up into granules. Without observing the color of the spores, this plant might be taken for a species of *Psalliota*, especially since the lamellæ assume a brownish hue in drying.

14. AGARICUS GRANULOSUS *Batsch.*

Pileus thin, convex or subcampanulate, often umbonate, sometimes corrugated (radiately wrinkled), granulose; lamellæ white, reaching the stem, sometimes attached to it, sometimes free; stipe slender, stuffed or hollow, floccose-squamulose below the evanescent ring.

Height 1.5′-3′, breadth of pileus about 1′.

In woods and open places. August. October. Common. A variable species. Var. *Carcharius* Pers. has the pileus white and the granules darker, or almost black. Catskill Mountains.

Var. *amianthinus* Scop. has the pileus generally umbonate, with the margin at first scalloped or crenate, and the stem elongated. In mossy places in woods. North Elba. The prevailing color of the pileus is a bright ochraceous yellow. The stem is generally colored like the pileus.

Subgenus—Armillaria.

Veil partial, annular. Hymenophorum confluent with the stem.—*Berk. Outl.*

As yet we have found but a single species of this subgenus.

*16. AGARICUS MELLEUS *Vahl.*

Pileus fleshy, expanded, sprinkled with minute, erect, hair-like scales, dull honey color; lamellæ rather broad, whitish, slightly sinuate at the inner extremity and subdecurrent: stipe nearly equal, whitish, fibrous, rarely squamose, solid, annulate.

Height 3′-6′, breadth of pileus 1′-4′.

Ground in woods and in pastures. August–October. Common.

A variable species, deemed edible, but having an acrid nauseous taste when raw.

A large solitary form, of a darker color, and with the margin striate when moist, occurs in woods; a cæspitose form grows in cleared land about the roots of stumps; and a smaller more yellow form is gregarious in grassy places.

Subgenus—Tricholoma.

Stem fleshy; gills with a sinus behind. Veil obsolete, or, if present, floccose, and adhering to the margin of the pileus. —*Berk. Outl.*

The species of this subgenus are mostly easily recognizable by their stout fleshy appearance and emarginate lamellæ. The pileus may be viscid, moist, or dry and scaly. Nearly all the species grow on the ground. The stem is never annulate.

SYNOPSIS OF THE SPECIES.

Pileus dry, scaly ..... a.
a. Pileus with a purplish-red tomentum ..... 17.
a. Pileus dull rufous-brown ..... 18.
a. Pileus dark livid-brown, bluish tinged ..... 19.
Pileus moist, smooth ..... b
b. Pileus subviolaceous ..... 20.
b. Pileus white ..... 21.

17. AGARICUS VARIEGATUS *Scop.*

Pileus fleshy, convex, at length expanded or slightly depressed, variegated with a red squamulose tomentum; lamellæ narrow, close, pale yellow or whitish; stipe equal, stuffed, tomentose like the pileus.

Height 2′, breadth of pileus 2′, diameter of stipe 3″-6″.

About the roots of old stumps. Albany and Sandlake. June.

The flesh of the pileus is whitish, inclining to yellow. The color of the tomentum varies in intensity. It is usually paler, as well as less dense, on the stem than on the pileus.

18. AGARICUS VACCINUS *Pers.*

Pileus fleshy, rather thin, except the disk, at first ovate-convex, then subcampanulate or expanded, generally broadly umbonate, dull reddish-brown with innate blackish fibres or scales, generally rough squamose from the breaking up of the cuticle; lamellæ whitish, at length becoming spotted and margined with dull rufous, close or subdistant, slightly or deeply emarginate; stipe concolorous with the pileus, whitish and pruinose at the top, fibrous-scaly, equal or subventricose, stuffed or hollow.

Height 2′-3′, breadth of pileus 2′-3′, diameter of stipe 4″-6″.

Ground under balsam trees in pastures. Catskill Mountains. October.

A very variable species, not agreeing rigidly with the description of *A. vaccinus*, but I am unwilling to found a new species on the slight differences exhibited by so variable a plant. Two principal forms are noticeable; one, with the pileus smooth, expanded, not umbonate, the margin smooth, marked at little intervals with slight, short, polished elevations, and the lamellæ close; the other, with the pileus convex-campanulate broadly umbonate, rimose-squamose, the margin when young slightly tomentose, and the lamellæ subdistant, often wavy and marked with little transverse lines. The latter form is the more common one. The color inclines to cinnamon-brown.

19. AGARICUS TERREUS *Schæff.*

Pileus fleshy on the disk, elsewhere rather thin, convex, then expanded, with a short broad umbo, densely squamulose, dark or livid-brown, the floccose scales blackish, often bluish tinged; lamellæ whitish, subdistant, thick, ventricose, deeply emarginate or subrounded at the inner extremity, with a slight decurrent tooth; stipe equal or slightly tapering

upward, firm, solid, fibrillose, slightly mealy-squamulose at the top, whitish or subconcolorous.

Height 1′-2′, breadth of pileus 6″-18″, diameter of stipe 2″-3″. Under pine trees. Albany. October and November.

A gregarious plant, with a meal-like flavor. The margin of the pileus sometimes has a paler appearance than the rest, from the absence or diminished density of the squamulæ.

*20. AGARICUS PERSONATUS *Fr.*

Pileus thick, fleshy, convex, even, smooth, moist, pallid or cinereous, tinged with pale violet or lilac; lamellæ close, narrow, rounded at the inner extremity, narrowed outwardly, whitish, often tinged with pink or violet; stipe stout, solid, whitish or concolorous fibrillose, slightly thickened at the base.

Height 2′-4′, breadth of pileus 2′-5′, diameter of stipe 6″ or more.

Open woods. West Albany and Catskill Mountains. October. Edible.

21. AGARICUS ALBOFLAVIDUS *n. sp.*

Pileus at first convex, with the margin incurved, then expanded or slightly depressed, moist, smooth, even, white, in exposed places becoming yellowish; lamellæ close, narrow, thin, emarginate and decurrent with a tooth; stipe whitish, equal, solid, striate-fibrillose, with a thin, tough cuticle.

Height 3′-4′, breadth of pileus 2′-3′, stipe about 3″ thick.

Ground in woods and open fields. Sandlake and North Elba. August.

The pileus is sometimes slightly and broadly umbonate.

Subgenus — Clitocybe.

Stem elastic, with a fibrous outer coat; gills decurrent, or acutely adnate.—*Berk. Outl.*

The form of the pileus in this subgenus is commonly that of an inverted cone, or, from the depression of the center in the thin species, of a funnel. The lamellæ are decurrent or acutely attached to the stem, which is of a soft or spongy texture within, and destitute of an annulus. The veil, which is marginal and more or less perceptible in the preceding subgenus, in this is seldom noticeable.

SYNOPSIS OF THE SPECIES.

Stem not hollow ..... a
a. Plant not hygrophanous ..... b.
b. Lamellæ not branched ..... c.
c. Pileus not funnel-form ..... 22.
c. Pileus funnel-form ..... 23.
b. Lamellæ (at least some of them) branched ..... d.
d. Pileus brown ..... 24.
d. Pileus yellow ..... 25.
a. Plant hygrophanous ..... e.
e. Pileus funnel-form, white ..... 27.
e. Pileus funnel-form, brown ..... 28.
e. Pileus convex or expanded ..... 29.
Stem hollow ..... f.
f. Pileus umbilicate, white ..... 30.
f. Pileus not umbilicate, plant odorous ..... 31.
f. Pileus not umbilicate, plant inodorous ..... 32.

*22. AGARICUS NEBULARIS *Batsch.*

Pileus fleshy, firm, at first convex, obtuse or subumbonate, then expanded or slightly depressed, smooth, grayish-white; lamellæ close, narrow, subarcuate, slightly decurrent, whitish; stipe thick, stuffed, concolorous, sometimes a little tapering upward.

Height 2′-4′, breadth of pileus 2′-4′, diameter of stipe 6″-12″.

Pine woods. West Albany. October.

A thick, fleshy, dingy-white or grayish species. Edible.

23. AGARICUS INFUNDIBULIFORMIS *Schæff.*

Pileus thin, fleshy, at first convex, umbonate, minutely tomentose, then funnel-form, with the margin slightly decurved, dull pale reddish-buff; lamellæ whitish, not crowded; stipe whitish or subconcolorous, soft, elastic, slightly tapering upward.

Height 2′-3′, breadth of pileus 1.5′-2′, stipe 2″-4″ thick.

Pine woods. North Greenbush and Sandlake. June.

24. AGARICUS CARNOSIOR *n. sp.*

Pileus thick, fleshy, obconic, at first convex, then plane or slightly depressed, subumbonate, brown, the margin at first involute, at length expanded, thin; lamellæ white, not crowded, some of them forked; stipe concolorous with the pileus, fibrillose, slightly tapering upward.

Height 2′-4′, breadth of pileus 1′-3′, stipe 3″-6″ thick.

Pine woods. West Albany and Sandlake. September and October.

The flesh is moist, soft and white. The plant is sometimes cæspitose. Taste pleasant.

25. AGARICUS ILLUDENS *Schw.*

Pileus fleshy, convex or expanded, smooth, generally with a small umbo; lamellæ not crowded, unequally decurrent, some of them branched, narrowed toward each end, the edge, in dry specimens, discolored; stem firm, solid, long, smooth, tapering at the base.

Height 5′-8′, breadth of pileus 4′-6′, stipe 6″-8″ thick.

Generally growing on rotten wood. Common.

The plant is of a bright saffron yellow color, and grows in dense clusters or tufts, so that the pileus is often irregular or excentric from its crowded mode of growth. The cuticle sometimes cracks in areas, and the color, when old, becomes brownish. The large bright-colored tufts form a conspicuous object, and catch the eye at a considerable distance.

27. AGARICUS ADIRONDACKENSIS *n. sp.*

Pileus thin, submembranaceous, funnel form, with the margin decurved, nearly smooth, hygrophanous, white, the disk often darker; lamellæ white, very narrow, scarcely broader than the thickness of the flesh of the pileus, crowded, long decurrent, subarcuate, some of them forked; stipe slender, subequal, not hollow, whitish, mycelio-thickened at the base.

Height 1′-3′, breadth of pileus 1′-2′, diameter of stipe 1″-2″.

Among leaves in woods. August.

I have seen this pretty species in the Adirondack region only. The lamellæ are sometimes tinged with yellow. The margin of the pileus is occasionally wavy.

28. AGARICUS POCULUM *n. sp.*

Closely related to the preceding, being of the same size and shape, but differing in being of a grayish-brown color, having the lamellæ less crowded, twice as broad, and darker colored.

Woods. North Elba and West Albany. August–October.

29. AGARICUS LACCATUS *Scop.*

Pileus thin, fleshy, convex, sometimes expanded, even or slightly umbilicate, smooth or minutely tomentose-scaly, hygrophanous, when moist, dull reddish-yellow or reddish-flesh-colored, sometimes striatulate; when dry, pallid or pale dull ochraceous; lamellæ broad, rather thick and distant, attached, not decurrent, flesh-colored; stipe slender, firm, fibrous, stuffed, equal, concolorous.

Height 1′-6′, breadth of pileus 6″-2′. Common.

June–October.

An extremely variable and abundant species occurring almost everywhere throughout the season.

30. AGARICUS BRUMALIS *Fr.*

Pileus thin, at first convex, then expanded or depressed, umbilicate, smooth, hygrophanous; lamellæ narrow, close, slightly decurrent; stipe slender, smooth, equal, hollow.

Height 1′-2′, breadth of the pileus 8″-18″, stipe 1″-2″ thick.

Pine woods. West Albany. October.

The plant is watery gray when moist, dull white when dry. I do not find it deeply funnel form.

31. AGARICUS DITOPUS *Fr.*

Pileus thin, submembranaceous, convex, rarely with a small umbo, smooth, hygrophanous, brown when young and moist, grayish-white when dry; lamellæ grayish, close, thin, attached, not decurrent; stipe slender, equal, smooth, hollow.

Height 1′-2′, breadth of pileus 6″-18″, stipe 1″-2″ thick

Pine woods. West Albany. October.

The plant has the odor and taste of new meal. I have seen no specimens with the pileus depressed.

32. AGARICUS METACHROUS *Fr.*

Separated from the preceding by its thicker, depressed pileus, its thicker, less close lamellæ, and the absence of odor.

Pine woods. West Albany. October.

Subgenus — Collybia.

Stem cartilaginous externally. Margin of pileus at first involute. Gills not decurrent.—*Berk. Outl.*

The pileus is generally convex or expanded, not obconic or depressed, as in the preceding subgenus. The lamellæ reach the stem, but are not decurrent, though sometimes emarginate as in *Tricholoma*. The stipe is firm and cartilaginous, without any annulus.

SYNOPSIS OF THE SPECIES.

Stipe with a long tapering root..... 33.
Stipe with no conspicuous root, nor with tubers..... a.
a. Stipe smooth, plant terrestrial..... 34.
a. Stipe smooth, plant lignatile..... 35.
a. Stipe not smooth, plant lignatile..... b.
b. Pileus viscid..... 15.
b. Pileus not viscid..... 36.
Stipe having small tubers at the base, pileus umbilicate..... 37.
Stipe having small bay or brown tubers, pileus umbonate..... 38.

*33. Agaricus radicatus *Relh.*

Pileus thin, convex, then expanded, subumbonate, often radiately wrinkled, smooth, glutinous when moist, grayish brown; lamellæ white, subdistant, rather broad, emarginate, attached to the stipe; stipe long, firm, smooth, stuffed, slightly tapering upward, subconcolorous, having a root-like prolongation extending deep into the earth.

Height 4′-8′, breadth of pileus 2′-3′, stipe 2″-3″.

Woods and open places. Common. June–August. Edible.

34. Agaricus dryophilus *Bull.*

Pileus fleshy, not thick, convex or expanded, rarely slightly depressed, smooth; lamellæ narrow, crowded, white, sometimes pale yellow, rounded or emarginate at the inner extremity, subfree; stipe equal, slender, smooth, hollow, concolorous, mostly mycelio-enlarged at the base.

Height 1′-2′, breadth of pileus 1′-1.5′, stipe 1″-2″ thick.

Very common in woods and pastures, growing among leaves and decaying vegetable matter. June–November.

*15. Agaricus velutipes *Curt.*

Pileus fleshy, thin on the margin, convex, sometimes irregular, smooth, very viscid, pale dull yellow with a brownish disk or bright reddish-yellow; lamellæ close, rounded behind, nearly or quite free, yellowish; stipe equal or slightly tapering upward, hollow or stuffed, generally velvety and brown, sometimes pale yellow and pruinose.

Plant cæspitose, 1′-2′ high, pileus 6″-15″ broad.

On stumps, trunks of trees, etc. April–October.

This plant was first found by me growing on a stump which had been cut close to the ground. Its pale pileus with a brownish disk, yellowish hollow stem with its pubescence scarcely perceptible, looking like a slight pruinosity, were all so unlike the characters assigned to *A. velutipes* in the description, that I was disposed to regard our plant as distinct. Further observation, however, convinces me that it is a mere variety, but one so marked that I have thought it worthy of illustration. (Plate 5, figs. 12–17.)

35. Agaricus Familia *n. sp.*

Pileus thin, hemispherical or convex, smooth, whitish, often tinged with yellow, the disk darker; lamellæ narrow, crowded, reaching the stem, rounded at the inner extremity, almost free; stipe slender, white, smooth, hollow; plant cæspitose.

Height 2′–3′, breadth of pileus 6″–12″, stipe 1″ thick.

Grows in dense tufts of individuals of various sizes, on old logs in woods. Adirondack Mountains. August.

The disk is clouded with brown. The plant becomes dark colored in drying.

36. AGARICUS STIPITARIUS *Fr.*

Pileus thin, submembranaceous, convex or expanded, umbilicate, minutely scaly; lamellæ rather broad, separating from the stem, white; stipe tough, hollow, hairy-fibrillose, slender.

Height 1′–2′, breadth of pileus 3″–6″.

On twigs, etc., under trees. Knowersville and Sandlake. July and August.

Sometimes a minute papilla is visible in the center of the umbilicus. In dry weather the pileus withers, appears thickly coated with tawny fibrous scales, and is sometimes constricted below the apex and a little striated or furrowed.

37. AGARICUS CIRRHATUS *Schum.*

Pileus thin, expanded, umbilicate or slightly depressed, white or grayish, with a faint reddish tinge; lamellæ very narrow, crowded, white, attached to the stem; stipe very slender, whitish, subflexuous, hollow, generally with little yellowish tubers at the base.

Height about 1′, breadth of pileus 1″–4″.

On decaying vegetable matter in woods and open places. Common. June–September.

38. AGARICUS TUBEROSUS *Bull.*

Closely related to the preceding, having the same size and color, but the pileus umbonate, and the tubers of a bay or brownish color. Poughkeepsie. *Gerard.* Knowersville. June.

Less common than the preceding. The last three species are easily preserved, and appear to be related to the *Marasmii.*

Subgenus—Mycena.

Stem externally cartilaginous. Margin of pileus (which is mostly campanulate) at first straight and pressed to the stem.—*Berk. Outl.*

The species are all small, slender, having the pileus thin, generally striate or striatulate, smooth, or only clothed with a few silky fibres, obtusely conical or bell-shaped. The lamellæ are seldom crowded, not strictly decurrent, but often uncinate and

attached, from which they appear subdecurrent. The stipe is smooth and hollow, often villous at the base, but not strictly bulbous. The species are subhygrophanous, with no veil, hence the stipe is never annulate.

Synopsis of the Species.

Plant neither viscid nor having a colored juice ..... a.
a. Pileus brown (fuscous) or grayish-brown ..... b.
b. Lamellæ uncinate, distinct ..... c.
c. Pileus obtusely conical or bell-shaped ..... 39.
c Pileus narrowly conical; stipe very long ..... 40.
c. Pileus convex; stipe rather short ..... 41.
b Lamellæ united at the stipe ..... 42.
b Lamellæ not uncinate ..... d.
d. Plant growing on peat moss (Sphagnum) ..... 43.
d. Plant growing on trunks of trees ..... 50.
a. Pileus purplish or lilac ..... 44.
a. Pileus yellow; lamellæ yellow ..... 45.
a. Pileus pallid, whitish, yellowish or flesh-colored; lamellæ flesh-colored .... 46.
Plant viscid; stipe yellow ..... 47.
Plant viscid; stipe not yellow ..... 48.
Plant not viscid; having a colored juice ..... 49.

*39. Agaricus galericulatus *Scop.*

Pileus obtusely conical or bell-shaped, sometimes umbonate, long striate, variable in color, but some shade of brown or cinereous; lamellæ not crowded, uncinate, decurrent-toothed, abruptly pointed at the outer extremity, venose-connected, distinct at the stipe, white or flesh-colored; stipe firm, smooth, hollow, with white filaments at the base.

Height 2′–4′, breadth of pileus 6″–18″.

On old logs, decaying sticks, etc., in woods. Common. July–October. Sometimes cæspitose.

40. Agaricus prælongus *n. sp.*

Pileus at first subcylindrical, then narrowly conical, inclining to bell shape, striate, blackish-brown with a plumbeous or leaden tint; lamellæ narrow, white, uncinate and slightly decurrent-toothed; stipe very long, firm, smooth, hollow, paler than the pileus, generally tinged with red, villous at the base.

Height 5′–7′, breadth of pileus 4″–8″.

Sphagnous marshes. Sandlake. June. Gregarious.

The pileus, as in most of the species of a dark brown color, becomes paler in drying and the striæ disappear.

41. Agaricus latifolius *n. sp.*

Pileus convex, rarely somewhat umbonate, striatulate, grayish-brown; lamellæ white, broad, uncinate, decurrent-toothed;

stipe slender, smooth, hollow, subconcolorous, white-villous at the base.

Height 1′-1.5′, breadth of pileus, 4″-6″. Stipe .5″ thick.

Under pine trees. Center. October.

A small species with quite broad lamellæ, growing among the fallen leaves of pine trees. Gregarious. (Plate 6, figures 8–14.)

42. AGARICUS COLLARIATUS *Fr.*

Pileus subcampanulate becoming convex, striatulate, brown, sometimes with a pinkish tinge ; lamellæ numerous, uncinate, united at their inner extremity, whitish, sometimes with a flesh-color, sometimes with a yellowish tinge : stipe slender, rather firm, hollow, smooth, subconcolorous, villous at the base.

Height about 2′, breadth of pileus 5″-10″.

Old stumps and rotten logs in woods. Sandlake. June.

This species is distinguished from *A. galericulatus* by the lamellæ being united with each other at the stipe as if in a collar, and in not being venose-connected.

43. AGARICUS PALUSTER *n. sp.*

Pileus convex, becoming expanded, umbonate, striatulate, grayish-brown ; lamellæ not uncinate, rather broad, subventricose, nearly free, sordid white ; stipe slender, smooth, hollow, equal or slightly narrowed upward, villous at the base, pallid.

Height 3′-4′, breadth of pileus 5″-9″.

Growing on Sphagnum in cranberry marshes. Sandlake. June.

I have found this plant in but one locality. It is quite distinct from all other *Mycenæ* known to me, by its broadly convex or expanded umbonate pileus. The umbo is small and subacute. The pileus becomes of a whitish-gray color in drying, and appears to be covered with numerous whitish fibrils. The lamellæ reach the stem, but are slightly attached to it and easily separated from it. (Plate 5, figs. 6–11.)

44. AGARICUS PURUS *Pers.*

Pileus convex, smooth, striatulate, pinkish-purple or lilac ; lamellæ rather broad, sometimes rounded, sometimes sinuated at the inner extremity, connected by numerous veins, colored like the pileus ; stipe firm, smooth, hollow, concolorous ; plant odorous.

Height about 2′, breadth of pileus 6″–12″.

Pine woods. West Albany and Sandlake. October.

The plant has the odor of radishes. It becomes paler in drying. I have seen no umbonate specimens.

45. AGARICUS PULCHERRIMUS *n. sp.*

Pileus subcampanulate or convex, rarely subumbonate, striatulate, dull yellow, the disk a little darker; lamellæ broad, subventricose, attached to the stem, not uncinate, yellowish; stipe slender, hollow, concolorous, white, villous at the base; plant gregarious.

Height 1′–1.5′, breadth of pileus 3″–5″.

Under pine trees. Center. October.

Related to *A. acicula*, but that has a smaller scarlet-colored pileus.

46. AGARICUS SUBINCARNATUS *n. sp.*

Pileus hemispherical, convex or expanded, striatulate, of a pale yellow or flesh-colored hue, becoming whitish; lamellæ subincarnate, uncinate, decurrent-toothed; stipe slender, hollow, white-villous at the base; plant gregarious.

Height 1′–1.5′, breadth of pileus 3″–6″.

Under pine trees. Center and Sandlake. October.

Near the preceding, but at once distinguished by the color of the pileus and the form and color of the lamellæ. The latter are sometimes nearly white, but tinged with flesh-color.

*47. AGARICUS EPIPTERYGIUS *Scop.*

Pileus bell-shaped or hemispherical, sometimes convex, striate, viscid, grayish-yellow, the disk brownish; lamellæ white or yellowish, sharply uncinate and decurrent-toothed; stipe yellow, shining, viscid, white-villous at the base.

Height 1′–2′, breadth of pileus 2″–5″.

Not rare. In woods and groves, especially of pine. October.

48. AGARICUS VULGARIS *Pers.*

Pileus convex or expanded, substriate, viscid, cinereous or brown; lamellæ uncinate, decurrent-toothed, white; stipe firm, hollow, viscid, grayish.

Height 1′, breadth of pileus 2″–5″.

Common in pine woods. July–October.

The pileus is described as having a small umbo or papilla. I have seen no such specimens. On the other hand, it is occasionally slightly umbilicate.

49. AGARICUS SANGUINOLENTUS *A. & S.*

Pileus subcampanulate, umbonate, striatulate, brownish,

with a dark reddish tinge; lamellæ uncinate, decurrent toothed, white, tinged with pink, the edge dark vinous-red; stipe very slender, paler than the pileus, villous at the base, containing a reddish juice.

Height 1′–1.5′, breadth of pileus 3″–4″.

At the mossy base of trees. Greenbush. June.

All my specimens have the pileus umbonate, and were cæspitose, in which particulars they do not agree with published descriptions; still, I am unwilling to make a new species on such slight differences.

50. Agaricus Corticola *Schum.*

Pileus hemispherical or convex, subumbilicate, striate, brown, sometimes with a purplish tint, and sometimes having a grayish mealy appearance; lamellæ few, distant, subdecurrent, and broadly attached to the stipe; stipe short, curved, stuffed or hollow, subconcolorous.

About 6″ high, pileus 2″-3″ broad.

Among moss and lichens, on trunks of elm trees. Albany. September.

Subgenus — Omphalia.

Stem cartilaginous. Gills truly decurrent.—*Berk. Outl.*

The species of this subgenus are closely related to those of the preceding one, from which they differ chiefly in the decurrent lamellæ, which, though sometimes arcuate, are scarcely uncinate. The pileus is often umbilicate.

Synopsis of the Species.

Pileus, or stem, minutely scaly ..... a.
a. Pileus not yellow ..... 51.
a. Pileus yellow; stem smooth ..... 52.
a. Pileus yellow; stem scaly ..... 53.
Pileus smooth ..... b.
b. Stem pale yellow, short ..... 54.
b. Stem brown ..... 55.
b. Stem orange, very long ..... 56.

51. Agaricus Oculus *n. sp.*

Pileus thin, convex, umbilicate, generally with a small umbo or papilla in the umbilicus, minutely squamulose, dingy white, the umbilicus blackish-brown; lamellæ white, narrow, close, subarcuate; stipe whitish, minutely squamulose or furfuraceous, hollow, often curved, easily splitting.

Height 1′-2′, breadth of pileus 6″-12″, stipe 1″ thick.

On prostrate trunks in woods. Adirondack Mountains. August.

The dark colored disk is a prominent feature.

52. Agaricus chryseus *n. sp.*

Pileus thin, convex, at length plane or slightly depressed, umbilicate, striatulate, minutely squamulose; lamellæ not crowded, rather narrow, yellow; stipe nearly smooth, stuffed or hollow, sometimes curved.

Height 1′-1.5′, breadth of pileus 8″-12″, stipe 1″ thick.

Old logs in woods. Adirondack Mountains. August.

The whole plant is yellow.

53. Agaricus scabriusculus *n. sp.*

Pileus thin, broadly convex or expanded, striate, yellow; lamellæ distant, broad, subtriangular, connected by numerous veins, white or pale yellow; stipe firm, yellow, minutely squamulose, stuffed or solid.

Height 1.5′-2′, breadth of pileus 6″-12″.

Mossy prostrate trunks in woods. Adirondack Mts. August.

A firm species, quite distinct from the preceding one. The numerous connecting veins between the lamellæ give a wrinkled appearance to the striated margin of the pileus.

54. Agaricus umbelliferus *L.*

Pileus thin, fleshy on the disk, convex or expanded, obconic, subumbilicate, striate, pale yellow; lamellæ broad, distant, white, subtriangular; stipe smooth, solid, often curved, concolorous.

Height 1′, breadth of pileus 6″-8″.

Mossy places in swamps, and in vegetable mold on the top of high mountains. North Elba and Mts. Marcy and Whiteface. August.

A fragile species, soon decaying when collected. The color is said to be variable.

*55. Agaricus Campanella *Batsch.*

Pileus thin, convex, umbilicate, smooth, striatulate, hygrophanous, dull reddish-yellow; lamellæ narrow, yellowish, venose-connected, arcuate; stipe slender, firm, hollow, often curved, brown, a little paler at the top, tawny-villous at the base.

Height 1′-1.5′, breadth of pileus 4″-12″.

On rotten logs and stumps in woods and open places. May–October. Very common.

56. AGARICUS FIBULA *Bull.*

Pileus thin, convex, umbilicate, smooth, yellow or pale orange, striatulate; lamellæ narrow, arcuate, long decurrent, whitish; stipe elongated, slender, smooth, hollow, concolorous.

Height 1′-2′, breadth of pileus 1″-3″.

On mossy ground in fields and groves. June–October. Common.

The pileus becomes brighter colored in drying.

Subgenus — Pleurotus.

Stem eccentric, lateral or wanting. Mostly growing on wood.—*Berk. Outl.*

In this subgenus the pileus is either destitute of a stem or has it attached to the margin or to some point outside of the center. The texture is more firm, the plant of slower growth and longer duration than in any of the preceding subgenera.

SYNOPSIS OF THE SPECIES.

58. AGARICUS SULFUREOIDES *n. sp.*

Pileus rather thin, fleshy, convex, umbonate, subsquamulose or smooth, sulphur-yellow; lamellæ moderately close, rather broad, rounded or slightly emarginate at the inner extremity, easily separating from the stipe, pale yellow; stipe firm, equal, slightly fibrillose, stuffed or hollow, generally curved and eccentric, rarely central, a little mealy-tomentose at the top.

Height 1′-1.5′, breadth of pileus 1′-2′, stipe 2″-3″ thick.

On old logs in woods. Catskill Mountains. October.

The pileus becomes paler in drying. The minute scales are brown, but often wanting. It resembles *A. sulfureus*, but from its firm texture and eccentric stipe it must be placed with the *Pleuroti*.

59. AGARICUS SEROTINOIDES *n. sp.*

Pileus fleshy, thick, firm, convex above, minutely punctate-tomentose, slightly viscid when young or moist, the margin usually incurved; lamellæ close, determinately ceasing, some of them forked, white or yellowish; stipe lateral, short, thick, scarcely distinct when viewed from above, yellow and tomentose beneath.

Plant cæspitose-imbricating or solitary, 1′-3′ broad. Trunks of deciduous trees in woods. Common. October and November.

The color of the pileus is a peculiar grayish-brown, variously modified with yellow and greenish or olivaceous hues. The edge of the lamellæ is sometimes discolored and slightly floccose.

Series 2 — Hyporhodii.

Spores salmon-colored.

Subgenus — Pluteus.

Hymenophorum distinct from the stem. Veil none.—*Berk. Outl.*

In this subgenus the lamellæ are generally free, and at length flesh-colored, the pileus convex and the stem solid.

Synopsis of the Species.

60. Agaricus cervinus *Schæff.*

Pileus fleshy, at first campanulate, then expanded, fibrillose, grayish-brown, sometimes splitting into cracks or chinks; lamellæ moderately distant, rather broad, a little narrowed toward the stipe, free, white, changing to flesh-color; stipe equal or slightly tapering upward, firm, solid, striated-fibrous, blackish-brown or whitish.

Height 3′-6′, breadth of pileus 2′-4′, stipe 3″-6″ thick.

On or about old stumps in open places, groves and borders of woods. Common. May–October.

Sometimes the stipe is nearly smooth and white, at others it is quite dark and fibrous or scaly.

61. Agaricus nanus *Pers.*

Pileus convex, rather thin, fibrillose or somewhat mealy, brown; lamellæ rather broad, a little narrower outwardly, white, becoming pale flesh-color, free; stipe white, firm, striate, solid.

Height 1′-2′, breadth of pileus about 1′.

On decaying wood in groves. West Albany. October.

62. Agaricus leoninus *Schæff.*

Pileus thin, submembranaceous, convex, becoming expanded, smooth, subhygrophanous, striatulate on the margin; lamellæ rather broad, free, at length flesh-colored; stipe white, solid, firm, slightly striate, equal.

Height 2′, breadth of pileus 1′-2′. Woods. North Elba. August.

The color of the pileus in our specimens was a pale watery cinnamon, changing to yellow.

Subgenus—Entoloma.

Hymenophorum continuous with the fleshy or fibrous stem: gills sinuato-adnexed, or parting from the stem.—*Berk. Outl.*

SYNOPSIS OF THE SPECIES.

63. AGARICUS STRICTIOR *n. sp.*

Pileus thin, submembranaceous, broadly convex or expanded, umbonate, smooth, shining, hygrophanous, striatulate, grayish-brown; lamellæ rather broad, rounded or deeply emarginate at the stipe, pale flesh-colored; stipe straight, equal or very slightly tapering upward, nearly smooth, hollow, with a dense white mycelium at the base.

Height 2′-4′, breadth of pileus 1′-2′, stipe 1″-2″ thick.

Ground in groves and their borders. Albany. October.

The umbo is small but distinct, the stipe is quite straight, and the aspect of the whole plant is beautifully regular and symmetrical. It differs from *A. Elodes* in being hygrophanous, destitute of odor, etc. (Plate 2, figures 6-9.)

64. AGARICUS RHODOPOLIUS *Fr.*

Pileus thin, campanulate or convex becoming expanded, scarcely umbonate, grayish-brown, hygrophanous, the margin wavy; lamellæ attached, slightly emarginate, whitish, becoming flesh-colored; stipe white, silky, pruinose above, hollow.

Height 3′-4′, breadth of pileus 2′-3′. North Elba. September.

Subgenus—Clitopilus.

Hymenophorum confluent with the fleshy or fibrous stem: gills decurrent.—*Berk. Outl.*

The decurrent gills enable the species of this subgenus to be readily known.

SYNOPSIS OF THE SPECIES.

65. AGARICUS PRUNULUS *Scop.*

Pileus fleshy, firm, convex, then expanded or slightly depressed, often irregular or wavy, whitish or cinereous;

lamellæ rather narrow and close, tapering toward each end decurrent, whitish, becoming tinged with flesh-color; stipe short, subequal, solid, concolorous, often eccentric.

Height 2′–3′, breadth of pileus 2′–4′, stipe 3″–6″ thick.

Ground in groves and open places. Often cæspitose. Albany and Catskill. October. Edible.

66. AGARICUS NOVEBORACENSIS *n. sp.*

Pileus fleshy, thin, convex, then expanded or slightly depressed, with the margin decurved, dingy white, the surface cracking into areas or concentrically rivulose, sometimes obscurely zonate; lamellæ close, narrow, long-decurrent, some of them forked, white, at length dingy, tinged with yellow or flesh-color; stipe concolorous with the pileus, equal, solid, smooth, with white mycelium and brittle branching white rootlets.

Height 1′–2′, breadth of pileus 1′–2′, stipe 1″–2″ thick.

In woods and pastures. North Elba and Albany. August–October.

Gregarious or subcæspitose. Odor of new meal; taste very bitter; spores globose, pale flesh-colored.

Subgenus—Leptonia.

Stem with a cartilaginous bark. Margin of pileus at first incurved; gills separating from the stem.—*Berk. Outl.*

67. AGARICUS SERRULATUS *Pers.*

Pileus thin, submembranaceous, convex, umbilicate, squamulose or streaked with dark fibrils, color various, grayish-brown, cinereous, etc.; lamellæ not crowded, attached to but easily separating from the stem, pale flesh-colored, the edge blackish and serrulate; stipe equal, smooth, hollow, mostly a little paler than the pileus.

Height 1′–1.5′, breadth of pileus 6 –12″.

Banks by the roadside. North Elba. September.

Easily known by the dark-colored serrulate edge of the lamellæ.

Series 3—DERMINI.

Spores ferruginous, sometimes tawny or brownish.

The spores in this series are not as uniform in color as in the foregoing ones. They must be carefully observed in connection with the veil and other parts, that the species be not confused with those of the genus *Cortinarius*.

Subgenus—Pholiota.

Stem furnished with a ring.—*Berk. Outl.*

SYNOPSIS OF THE SPECIES.

Pileus scaly..... 68
Pileus smooth..... 69

68. AGARICUS ADIPOSUS *Fr.*

Pileus fleshy, firm, conical, then convex or expanded, glutinous when moist, squamose, with dark or reddish scales, the margin slightly surpassing the gills, yellow; lamellæ broad, attached, yellow, at length ferruginous; stipe firm, solid or stuffed, slightly enlarged at the base, scaly below the slight fugacious annulus, with a slight floccose collar at the top, yellow.

Height 3′–4′, breadth of pileus 2′–3′, stipe 4″–6″ thick.

Base of trees. Greenbush. November. Poughkeepsie. *Gerard.* The plant is cæspitose.

69. AGARICUS TEMNOPHYLLUS *n. sp.*

Pileus fleshy, hemispherical, then convex, smooth, dull yellow; lamellæ very broad, attached, obliquely truncate at the inner extremity, brownish-ferruginous; stipe equal, smooth, white, hollow, annulate; the annulus membranaceous, white, dusted with the brownish-ferruginous spores.

Height 2′–4′, breadth of pileus 1.5′–2′, stipe 3″–4″ thick.

Grassy ground by roadside. Sandlake. June.

This species resembles *A. semiorbicularis* so closely in color, taste, etc., that in the absence of the annulus it might be taken for a large form of that species.

Subgenus—Flammula.

Stem fleshy; gills adnate or decurrent.—*Berk. Outl.*

SYNOPSIS OF THE SPECIES.

Stem hollow..... 70
Stem solid..... 71

70. AGARICUS HALLIANUS *n. sp.*

Pileus thin, hemispherical or convex, smooth, hygrophanous, watery cinnamon with the margin obscurely striatulate when moist, dull yellow when dry; lamellæ close, subarcuate, slightly decurrent, tapering to a narrow point at the outer extremity and ceasing before the margin, cinnamon color; stipe equal, slightly fibrillose, hollow, with a slight annulus, reddish-brown.

Height 2′–3′, breadth of pileus 1′–2′, stipe 2″–3″ thick.

Pastures. Bethlehem. November.

Taste a little bitter. The annulus is very thin, membranaceous and stained with the spores.

Dedicated to Professor James Hall, a most earnest promoter and eminent patron of the natural sciences.

*71. AGARICUS POLYCHROUS *Berk.*

Pileus fleshy, convex, smooth, viscid, yellow, the disk reddish or brownish, the margin sometimes wavy; lamellæ close, emarginate and decurrent-toothed, yellow, then ferruginous; stipe firm, solid, equal, often curved, yellow; plant gregarious or cæspitose.

Height 1′-2′, breadth of pileus 9″-18″.

Ground and rotten wood in pastures and woods. Very common. August–November.

The veil is webby, fugacious.

Subgenus—Naucoria.

Stem cartilaginous externally; margin more or less convex; pileus inflexed.—*Berk. Outl.*

The spores are ferruginous, or brownish-ferruginous. The color of the pileus is some shade of yellow. The stipe is not distinctly annulate, but sometimes a slight spore-stained band marks the place of the obsolete annulus.

SYNOPSIS OF THE SPECIES.

Pileus umbonate ..... a.
a. Stem hollow, tapering toward the base ..... 72.
a. Stem hollow, equal ..... 73.
a. Stem solid ..... 74.
Pileus not umbonate ..... b.
b. Stem hollow ..... c.
c. Pileus hygrophanous ..... 75.
c. Pileus not hygrophanous ..... 76.
b. Stem solid or stuffed ..... d.
d. Stem solid, margin of pileus recurved ..... 77.
d. Stem containing a pith ..... 78.

72. AGARICUS VERNALIS *n. sp.*

Pileus thin, fleshy, convex, then a little depressed, with a deflexed margin, umbonate, hygrophanous, dull yellow, darker when moist; lamellæ narrow, attached, cinnamon-color; stipe long, flexuous, striate-sulcate, hollow, tapering downward, white-villous at the base, brownish.

Height 2′, breadth of pileus 8″-12″, stipe 1″ thick.

On rotten wood. Greenbush. May.

73. AGARICUS LIGNICOLA *n. sp.*

Pileus thin, convex, umbonate, smooth or slightly fibrillose, hygrophanous, watery cinnamon and the margin striatulate

when moist, dull yellow when dry; lamellæ narrow, close, attached, cinnamon-color; stipe slender, equal, hollow, slightly fibrillose, firm, mostly curved, reddish-brown.

Height 1′–2′, breadth of pileus 6″–12″.

On old logs in woods. Sandlake. June.

74. AGARICUS FULVUS *n. sp.*

Pileus thin, convex, then expanded, umbonate, tawny yellow, darker when moist; lamellæ broad, emarginate, decurrent-toothed, cinnamon-colored; stipe equal, solid, subflexuous, a little paler than the pileus.

Height 1′–1.5′, breadth of pileus 4″–8″.

Ground in pine woods. Bethlehem. November.

75. AGARICUS AUTUMNALIS *n. sp.*

Pileus thin, fleshy, convex, smooth, hygrophanous, watery cinnamon and marginally striatulate when moist, dull yellow when dry; lamellæ close, slightly emarginate, spuriously decurrent-toothed, easily separating from the stipe, yellowish, then cinnamon-color; stipe slender, equal, hollow, fibrillose, paler than the pileus; plant often cæspitose.

Height 1′–2′, breadth of pileus 6″–12″

On rotten wood in woods. North Greenbush. November.

Sometimes a trace of an annulus may be seen on the stem. The taste resembles that of *A. semiorbicularis.*

76. AGARICUS SCORPIOIDES *Fr.*

Pileus fleshy, thin, short conic, obtuse or subumbonate, smooth, reddish-yellow, the margin incurved and paler, lamellæ attached, pale yellow, becoming darker with age; stipe long, slender, equal, wavy, silky, white or yellowish, hollow.

Height 3′–5′, breadth of pileus 5″–8″.

Among moss in woods. North Elba. August.

77. AGARICUS CURVO-MARGINATUS *n. sp.*

Pileus thin, convex, smooth, reddish-yellow, the margin paler, reflexed, extending beyond the lamellæ; lamellæ subventricose, emarginate, decurrent-toothed, pale yellow or whitish, with a flesh-colored tinge; stipe equal, solid, wavy with a whitish silky luster.

Height 2′–3′, breadth of pileus 4″–6″.

In mossy places in woods. North Elba. August.

This and the preceding have a darker color when moist, but they are scarcely hygrophanous. The solid stem and up-

curved margin separate this from the preceding species. (Plate 2, figures 1–5.)

*78. AGARICUS SEMIORBICULARIS *Bull.*

Pileus thin, fleshy, hemispherical, at length expanded, smooth, subviscid, dull yellow; lamellæ close, broad, attached, at length dark ferruginous; stipe slender, equal, firm, stuffed with a distinct whitish pith, yellowish.

Height 1′–2′, breadth of pileus 6″–12″.

Fields and manured grounds. West Albany. June.

It is sometimes cæspitose. The pileus sometimes cracks into areas. It has an oily flavor, resembling that of beech nuts.

Subgenus — Galera.

Stem externally subcartilaginous; pileus more or less campanulate; margin straight. — *Berk. Outl.*

The spores are generally bright ferruginous. The pileus is thin, obtusely conical or bell-shaped, and the stem is hollow, rather long and slender, so that in aspect the species correspond to those of the subgenus *Mycena* in the first series. All of our species, so far as known, are hygrophanous.

SYNOPSIS OF THE SPECIES.

Pileus at length expanded ..... a.
a. Plant growing in fields or on dung; pileus not umbonate ..... 79.
a. Plant growing in marshes; pileus generally umbonate ..... 82.
Pileus not expanded ..... b.
b. Plant growing in fields or groves ..... c.
c. Pileus dark ferruginous ..... 80.
c. Pileus pale yellow ..... 81.
b. Plant growing in woods among moss ..... 83.

79. AGARICUS LATERITIUS *Fr.*

Pileus thin, submembranaceous, fragile, conical, at length expanded, closely and finely striate on the margin, grayish-yellow, darker when moist; lamellæ close, narrow, nearly or quite free, yellow-ferruginous; stipe long, white, fragile, easily splitting, pruinose or farinaceous above, slightly tapering upward.

Height 3′–4′, breadth of pileus, 1′–2′.

On dung heaps. West Albany. June.

Sometimes there is a slight pinkish tinge to the pileus and stem.

80. Agaricus ovalis *Fr.*

Pileus thin, submembranaceous, conical or bell-shaped, obtuse, smooth, brownish-ferruginous and obscurely striatulate when moist, dark ferruginous when dry; lamellæ broad, subventricose, nearly free, ferruginous; stipe slender, nearly straight, slightly striate, subconcolorous.

Height 3′–4′, breadth of the pileus 6″–12″.

In a pine grove. West Albany. June.

This is *A. campanulatus* Bull, in the Epicrisis of Fries, p. 205. The cuticle of the pileus sometimes cracks and scales off in irregular patches.

81. Agaricus tener *Schæff.*

Pileus submembranaceous, oval or obtusely conical, sometimes campanulate, smooth, watery, tawny and striatulate when moist, yellowish-white when dry; lamellæ close, quite broad, slightly attached, cinnamon-color; stipe slender, smooth, colored like the pileus.

Height 2′–3′, breadth of pileus 4″–8″.

On dung, manured ground and in rich pastures. West Albany and North Elba. June–October.

*82. Agaricus Sphagnorum *Pers.*

Pileus thin, fleshy, fragile, broadly conical or convex, then expanded, generally with a small umbo, striatulate on the margin, pale watery cinnamon, becoming ochraceous-yellow when dry; lamellæ broad, attached, dull cinnamon-color; stipe long, fragile, flexuous or straight, subconcolorous, silky fibrillose, whitish-villous at the base.

Height 4′–6′, breadth of pileus 6″–12″.

In peat marshes, among Sphagnum. Sandlake. June–September.

Fries considers this a variety of the next species. It appears to me to be quite distinct.

83. Agaricus Hypnorum *Batsch.*

Pileus submembranaceous, obtusely conical, hemispherical or convex, with or without a small papilla at the apex, ferruginous-yellow and marginally striatulate when moist, yellow and substriate when dry; lamellæ broad, attached, pale cinnamon-color; stipe long, slender, subconcolorous.

Height 2′–4′, breadth of pileus 3″–5″.

Mossy places in woods. North Elba. August.

Subgenus—Hebeloma.

Veil, if present, floccose, not interwoven; stem fleshy; gills sinuated.—*Berk. Outl.*

The pileus is thin, but fleshy, generally fibrillose or scaly; the gills are most often of a dingy or olivaceous color, and emarginate; the stipe is fleshy, more or less fibrous, and, in our species, solid or stuffed. The color of the spores is generally olivaceous, or brownish-ochraceous.

Synopsis of the Species.

Pileus splitting and cracking into fibres..... a.
a. Stipe subbulbous..... 84.
a. Stipe not bulbous..... 85.
Pileus entire, scaly, not white..... b.
b. Pileus ochraceous..... 86.
b. Pileus brown..... 87.
Pileus entire, smooth, white..... c.
c. Lamellæ deeply emarginate..... 88.
c. Lamellæ slightly emarginate..... 89.

84. Agaricus rimosus *Bull.*

Pileus fleshy, thin, conical or campanulate, then expanded, sometimes umbonate, longitudinally cracking, fibrous, dull reddish-brown, the margin sometimes uneven, often splitting; lamellæ narrow, close, tapering toward the stipe, subfree, whitish, becoming darker; stipe equal or slightly tapering upward, fibrous, solid, white, rarely brownish, bulbous, the bulb flattened.

Height 2′–3′, breadth of pileus 1′–2′.

Roadsides in woods. North Elba. August.

85. Agaricus lacerus *Fr.*

Pileus thin, fleshy, conical or campanulate, then convex or expanded, fibrous, longitudinally cracking, the margin splitting, color pale yellowish-brown; lamellæ not broad, tapering toward the stem, nearly free, brownish-yellow; stipe equal, firm, solid, fibrous, white; spores rough.

Height 2′, breadth of pileus 6″–18″.

Grassy grounds in fields and open woods. Greenbush. June.

The cuticle of the disk sometimes breaks up into scales.

86. Agaricus subochraceous *n. sp.*

Pileus thin, conical or convex, sometimes expanded, generally umbonate, fibrillose-squamulose, pale ochraceous-yellow; lamellæ rather broad, attached, emarginate, whitish,

becoming brownish-yellow; stipe equal, whitish, slightly fibrillose, solid.

Height 1′–2′, breadth of pileus 9″–18″.

Ground in groves and open places. Sandlake and West Albany. June–October.

In very wet weather the pileus sometimes splits on the margin.

87. AGARICUS FLOCCULOSUS *Berk.*

Pileus thin, fleshy, convex or subcampanulate, umbonate, squamulose, grayish-brown; lamellæ broad, subventricose, attached, pale brownish, tinged with red; stipe firm, solid, fibrillose, a little paler than the pileus.

Height 1′–2′, breadth of pileus 6″–12″.

Ground in fields and by roadsides. North Elba and West Albany. September and October.

88. AGARICUS SARCOPHYLLUS *n. sp.*

Pileus fleshy, short and obtusely conical or convex, smooth, white, the margin incurved; lamellæ broad, not crowded, attached, deeply emarginate, dingy flesh-color; stipe equal, smooth, white, firm, stuffed, mealy-squamulose above, spores smooth, very dark ferruginous.

Height 1′–2′, breadth of pileus 6″–18″.

Wet grassy ground. Greenbush. June.

Taste slightly bitter. The edge of the lamellæ is slightly eroded. Their deep emargination and peculiar color make this a strongly marked species. At first sight, it looks like a small *Psalliota.* (Plate 1, figs. 7-11.)

89. AGARICUS GEOPHYLLUS *Sow.*

Pileus fleshy, thin, conical, then convex or expanded, broadly umbonate, silky, smooth, white; lamellæ close, not broad, slightly emarginate, attached, whitish, becoming dingy brownish; stipe firm, equal, rather long, white, solid or stuffed.

Height 2′–3′, breadth of pileus 6″–9″.

Ground in woods and open places. North Elba and Greenbush. August–October.

Series 4 — PRATELLÆ.

Spores brownish-purple or brown.

Subgenus — Psalliota.

Veil fixed to the stem, forming a ring.— *Berk. Outl.*

The species of this subgenus are easily recognized, though not always easily distinguished from each other. The pileus is generally white or yellowish, the lamellæ at length brown or blackish, and the stipe generally rather stout, fleshy and annulate.

Synopsis of the Species.

Stem hollow or stuffed ..... a.
a. Pileus thick, fleshy; stem stout ..... b.
b. Stem not bulbous ..... 90.
b. Stem bulbous ..... 91.
a. Pileus thin; stem slender ..... c.
c. Stem hollow ..... 94.
c. Stem stuffed with a pith ..... 95.
Stem solid, scaly ..... 92.
Stem solid, smooth ..... 93.

* 90. Agaricus campestris *L.*

Pileus thick, fleshy, convex, smooth or slightly silky, white, the margin surpassing the gills; lamellæ close, rounded, free, bright flesh-colored, then blackish-brown; stipe short, stout, white, stuffed, annulate, not bulbous; annulus white, single.

Height about 2′, breadth of pileus 1′–3′, stipe 4″–6″ thick.

Grassy ground in fields. Albany. September.

Not abundant. Edible. This is the species commonly cultivated, and generally know by the indefinite term *Mushroom.*

91. Agaricus Silvicola *Vitt.*

Pileus fleshy, campanulate, becoming convex, smooth, white or yellowish, the margin scarcely exceeding the gills and often purplish-stained; lamellæ whitish, then pinkish brown, narrower toward either end, rounded and free; stipe rather long, stout, stuffed or hollow, bulbous, annulate, white; annulus thick, double, the outer part often splitting into rays.

Height 4′–6′, breadth of pileus 3′–5′.

Ground in pine woods. West Albany. October.

This species is sometimes called a variety of *A. campestris;* but it appears to me to be clearly distinct. The bulb of the stem is flattened. The exterior of the annulus is sometimes stained with yellow, and the pileus becomes more yellow by bruising.

92. Agaricus Hornemanni *Fr.*

Pileus fleshy, convex, becoming expanded, smooth, viscid when moist, pale yellow; lamellæ moderately broad, attached,

subdecurrent, whitish, then purplish-brown; stipe stout, solid, rough, with squarrose scales below the annulus, slightly striate above, white or pale yellow; spores purplish-brown.

Height 4′–6′, breadth of pileus 2′–4′, stipe 6″ thick.

Ground in woods. Sandlake and Catskill Mountains. October. A fine species.

93. AGARICUS JOHNSONIANUS *n. sp.*

Pileus fleshy, soft, brittle, broadly convex or expanded, smooth, white, the disk yellowish, the margin thin, sometimes purplish-stained, and, when moist, striatulate; lamellæ close, rounded at the inner extremity, nearly free, white, then brown; stipe equal, smooth, annulate, solid, slightly striate at the top; annulus white, tumid, stained by the brown spores.

Height 2′–4′, breadth of pileus 2′–4′, stipe 3″–5″ thick.

Grassy ground in pastures. Knowersville. September. It has a sweetish nutty flavor.

Dedicated to Hon. A. S. Johnson, a worthy patron of natural science, who has communicated to me specimens of some fine species of fungi. (Plate 3, figs. 4–6.)

94. AGARICUS SEMIGLOBATUS *Batsch.*

Pileus thin, hemispherical, sometimes convex, smooth, glutinous when moist, white or pale yellow; lamellæ very broad, loose, attached, becoming black; stipe slender, smooth, tall, hollow, concolorous, annulate, viscid; the annulus slight, stained by the purplish-black spores, at length disappearing.

Height 3′–5′, breadth of pileus 6″–12″.

On dung. Very common. May–September.

95. AGARICUS STERCORARIUS *Fr.*

Pileus thin, fleshy, convex, then expanded, smooth, viscid, yellow; lamellæ broad, attached, brownish or brownish-black; stipe firm, viscid when moist, stuffed with a whitish pith.

Height 2′–3′, breadth of pileus 6″–9″.

On dung and rich soil. West Albany. June.

Differs from the preceding by its stuffed stem, and expanded pileus.

Subgenus — Hypholoma.

Veil woven into a fugacious web, which adheres to the margin of the pileus. — *Berk. Outl.*

In this subgenus the stem is not annulate.

SYNOPSIS OF THE SPECIES.

Pileus smooth, not hygrophanous..... 96.
Pileus tomentose, hygrophanous..... 97.

96. AGARICUS PERPLEXUS *n. sp.*

Pileus fleshy, convex, then expanded, often broadly subumbonate, smooth, yellow, the disk red or brownish-red, the margin paler; lamellæ not broad, rounded at the inner extremity, easily separating from the stipe, pale yellow, then greenish-tinged, finally purple-brown; stipe subequal, firm, slightly fibrillose, hollow, yellow, reddish at the base; flesh white; spores purplish-brown.

Height 2′–3′, breadth of pileus 2′–3′, stipe 2″–3″ thick.

About stumps in woods or open places. Common. Sandlake, Albany and Catskill Mountains. September and October.

The plant has a mild taste and no marked odor. It grows singly or in dense tufts. It is closely related to *A. sublateritius*, *A. epixanthus* and *A. fascicularis*, but as it does not agree with the description of either of them, I have no alternative but to describe it as a new species.

97. AGARICUS VELUTINUS *Pers.*

Pileus fleshy, thin, convex or expanded, brittle, minutely tomentose-scaly, becoming smooth, hygrophanous, yellow with the disk reddish; lamellæ rather broad, attached, tapering toward the outer extremity, dark brown tinged with red, the edge whitish-beaded; stipe equal, rather slender, hollow, fibrillose, subconcolorous, white-mealy and slightly striate at the top; spores black.

Height about 2′, breadth of pileus 1′–1.5′.

Roadsides. Albany Cemetery. September. The pileus sometimes cracks transversely.

Subgenus — Psilocybe.

Veil, if present, not forming a ring. Margin of pileus at first incurved.—*Berk. Outl.*

The species of this subgenus are smaller, and have the pileus thinner than those preceding.

SYNOPSIS OF THE SPECIES.

98. AGARICUS SPADICEUS *Schæff.*

Pileus thin, submembranaceous, hemispherical, then convex or expanded, smooth, hygrophanous, pale grayish-brown and striatulate when moist, white or yellowish when dry; lamellæ narrow, close, attached, easily separating from the stipe, at first whitish, then brown, tinged with flesh-color; stipe straight, equal, hollow, smooth, white.

Height 1′–2′, breadth of pileus 1′–1.5′, stipe 1″–2″ thick.

Grassy ground in yards and fields. Albany. June. Gregarious or cæspitose. The pileus is fragile, the spores are brown.

99. AGARICUS CERNUUS *Mull.*

Pileus thin, slightly fleshy, convex, smooth, hygrophanous, dark watery brown and marginally striatulate when moist, yellowish or pale ochraceous and more or less rugose-wrinkled when dry; lamellæ close, narrow, attached, whitish, then dark brown; stipe smooth, shining, white, hollow, sometimes wavy; spores brown.

Height 1′–2′, breadth of pileus 8″–18″.

About or on old stumps and logs in woods. Sandlake and Catskill Mountains. September and October.

In drying, the pileus begins to change color on the disk, leaving the margin dark for a little time.

100. AGARICUS SEMILANCEOLATUS *Pers.*

Pileus thin, submembranaceous, smooth, conical and acute, or convex and obtuse, sometimes with a small acute umbo, viscid when moist, and sometimes obscurely striatulate, whitish or pale yellow; lamellæ rather broad, loose, attached, slightly emarginate, purple-black, the edge white; stipe slender, subflexuous, smooth, pruinose at the top, stuffed with a pith or hollow, white-villous at the base.

Height 2′–3′, breadth of pileus 6″–10″.

On dung in pastures. Bethlehem. November.

Series 5 — COPRINARIUS.

Spores black; gills never becoming purple or brown.

Subgenus — Panæolus.

Veil, when present, interwoven. Pileus rather fleshy, without striæ; margin at first extending beyond the gills, which are clouded.—*Berk. Outl.*

The pileus is thin, seldom expanded; the lamellæ are ascending, becoming clouded, at length black with spores, not dissolving, the edge often white; the stipe is smooth, rather long and firm, generally hollow.

SYNOPSIS OF THE SPECIES.

Stem solid ..... 101.
Stem hollow ..... a.
a. Pileus with an obscure marginal band ..... 102.
a. Pileus with no marginal band ..... b.
b. Pileus reticulated ..... 103.
b. Pileus not reticulated ..... c.
c. Whitish-gray or yellowish-white ..... 104.
c. Brownish, subshining ..... 105.

101. AGARICUS SOLIDIPES *n. sp.*

Pileus firm, at first hemispherical, then subcampanulate or convex, smooth, whitish, the cuticle at length breaking up into dingy-yellowish, rather large, angular scales; lamellæ broad, slightly attached, whitish, becoming black; stipe firm, smooth, white, solid, slightly striate at the top; spores very black with a bluish tint.

Height 5′–8′, breadth of pileus 2′–3′, stipe 2″–4″ thick.

Dung heaps. West Albany. June.

A large species, remarkable for its solid stem. The scales on the pileus are larger on the disk, becoming smaller toward the margin. The upper part of the stipe is sometimes beaded with drops of moisture. (Plate 4, figs. 1–5.)

102. AGARICUS FIMICOLA *Fr.*

Pileus subcampanulate or convex, smooth, moist, pale grayish-brown tinted with ochre, girt with a narrow darker marginal band; lamellæ broad, attached, becoming blackish with a grayish-purple tinge; stipe hollow, pallid, pruinose above.

Height 2′–4′, breadth of pileus 10″–18″.

Dung heaps. West Albany. June.

The plant is sometimes cæspitose. The pileus is often darker on the disk and sometimes spotted or scaly there. The marginal zone is more distinct in young and moist specimens, becoming obsolete or even disappearing in old or dry ones.

103. AGARICUS RETIRUGIS *Batsch.*

Pileus at first subglobose, at length hemispherical and broadly subumbonate, reticulate-veined, grayish-white, the margin subfringed with the appendiculate veil; lamellæ broad, attached, becoming grayish-black; stipe long, firm, hollow, pruinose, pinkish-tinged.

Height 3′–4′, breadth of pileus 6″–12″.

Pastures. Knowersville. September.

104. AGARICUS PAPILIONACEUS *Bull.*

Pileus subhemispherical, sometimes subumbonate, smooth, or with the cuticle breaking up into scales, whitish-gray, often tinged with yellow; lamellæ very broad, attached, becoming black; stipe slender, firm, hollow, pruinose above, whitish, sometimes tinged with red or yellow, slightly striate at the top and generally stained by the spores.

Height 3′–5′, breadth of pileus 6″–18″.

On dung and rich soil. Common. May and June.

A small form occurs with the pileus nearly white, scarcely half an inch in diameter, and the cuticle not cracking.

105. Agaricus campanulatus *L.*

Pileus oval campanulate or obtusely conical, sometimes umbonate, smooth, somewhat shining, brownish, with a peculiar gray or lead-colored tint, sometimes becoming reddish tinted, the margin often scolloped or fringed with the appendiculate veil; lamellæ not broad, attached, becoming grayish-black; stipe long, slender, hollow, reddish, pruinose and slightly striate at the top, at length dusted with the spores.

Height 4′–6′, breadth of pileus 6″–12″.

On horse dung and rich soil. June and July. Common.

In very wet weather the cuticle of the pileus sometimes cracks into scales or areas.

Subgenus — Psathyrella.

Veil not interwoven; pileus membranaceous, margin not reaching beyond the gills. — *Berk. Outl.*

The species in this subgenus are more fragile than those in the preceding, the pileus thinner, often hygrophanous and striatulate, and the gills extend to its margin.

Synopsis of the Species.

106. Agaricus gracilis *Fr.*

Pileus submembranaceous, conical, smooth, hygrophanous, watery-brown and striatulate when moist, yellowish or cream-colored when dry; lamellæ broad, not close, attached, becoming grayish-black; stipe slender, straight, smooth, hollow, whitish.

Height 4′–6′, breadth of pileus 9″–12″.

Rich grassy ground. Knowersville. September.

The straight tall stem and regular conical pileus make this a beautiful species. The margin of the pileus first begins to decay.

107. Agaricus atomatus *Fr.*

Pileus membranaceous, subcampanulate, obtuse, smooth hygrophanous, brownish, tinged with pink or ochre and striatulate when moist, paler and with sparkling atoms when

dry; lamellæ broad, attached, dusky-brown, stipe whitish, hollow, fragile, mealy above.

Height 2′, breadth of pileus 6″–10″

Grassy ground. West Albany. June.

108. Agaricus disseminatus *Pers.*

Pileus membranaceous, ovate or subcampanulate, obtuse, sulcate-striate, grayish; lamellæ few, distant, not broad, whitish, then pinkish purple, finally black; stipe slender, hollow, fragile, white; plant cæspitose.

Height about 1′, breadth of pileus 3″–4″.

On decaying sticks. Albany Rural Cemetery. September.

It resembles the small sulcate-striate *Coprini*, but the lamellæ do not dissolve.

Genus—COPRINUS *Fr.*

Gills membranaceous, deliquescent, spores black.—*Berk. Outl.*

The species of this genus are readily known by the lamellæ soon dissolving into an inky fluid. They are quite ephemeral, many of them not continuing beyond a single day. Specimens are preserved with difficulty, these plants being fragile as well as perishable. The inky fluid from the lamellæ, after being boiled, is sometimes used as ink. The larger species may also be made into a catsup.

Synopsis of the Species.

Stem annulate	1.
Stem not annulate	a.
a. Pileus not at all or only closely striate	b.
b. Pileus with an evanescent floccose covering	2.
b. Pileus with a persistent floccose covering	3.
b. Pileus naked, or nearly so	4.
a. Pileus distantly sulcate-striate	c.
c. Lamellæ attached to a collar	5.
c. Lamellæ attached to the stem	6.

*1. Coprinus comatus *Fr.*

Pileus thin, cylindrical, then campanulate, rough with broad rather distant fibrous scales, whitish, the margin soon discolored revolute and lacerated; lamellæ linear, crowded, free, white, then pink, finally black; stipe nearly equal, fibrillose, hollow, annulate, the annulus movable, the cavity of the stem containing a gossamer-like web.

Height 6′–8′, breadth of pileus 2′–3′, stipe 3″–4″ thick.

Manured grounds. Common. September and October. Edible. Our largest species.

2. Coprinus tomentosus *Fr.*

Pileus very thin, at first oblong-oval and floccose-scaly, soon campanulate, naked, closely striate, cinereous-brown or blackish-brown, often with a leaden hue, finally expanded, the disk smooth, reddish or ochraceous-brown, the margin revolute and much split or lacerated; lamellæ closely crowded, linear, free, white, then pinkish, finally black; stipe white, tall, fragile, tapering upward, finely floccose-sqamulose, hollow, sometimes with a large tap root; plant gregarious or cæspitose.

Height 3′–6′, breadth of pileus 6″–18″.

Dung heaps. West Albany and Sandlake. June and July.

Very variable in size and color. The covering of the pileus is easily rubbed off. It soon disappears, and the plant quickly decays, seldom continuing through the day.

3. Coprinus niveus *Fr.*

Pileus thin, at first long ovate, then campanulate or expanded, coated with a dense white mealy or floccose-squamulose persistent covering, slightly tinged with pink, the margin somewhat revolute and splitting; lamellæ narrow, crowded, attached, white, then pinkish, finally black; stipe white, nearly equal, fragile, hollow, with a white villous-floccose covering.

Height 3′–5′, breadth of pileus 8″–15″.

Dung heaps. West Albany. June.

*4. Coprinus micaceus *Fr.*

Pileus thin, ovate, then campanulate, with the margin more or less revolute, wavy, splitting, closely striate, with a few minute scales and sparkling atoms, or naked, varying in color from whitish-ochraceous to livid brown, generally darker when moist or old; lamellæ rather narrow, crowded, white, then pinkish, finally black; stipe slender, fragile, easily splitting, slightly silky, white, hollow, often twisted; plant mostly cæspitose.

Height 2′–4′, breadth of pileus 1″–2″.

Streets, yards and fields, on or about old stumps. May–September.

*5. Coprinus plicatilis *Fr.*

Pileus very thin and delicate, soon expanded, distantly sulcate-striate, grayish-brown, tinged with red, the disk smooth, depressed, the margin splitting; lamellæ narrow, distant,

attached to a collar formed of the dilated apex of the stipe, grayish, then black; stipe slender, hollow, smooth, white.

Height 1′–2′, breadth of pileus 6″–9″.

Rich ground. Albany. June.

6. COPRINUS EPHEMERUS *Fr.*

Pileus very thin and delicate, ovate-campanulate, at length expanded with the margin recurved and split, distantly sulcate-striate, cinereous, the disk smooth, elevated, reddish; lamellæ distant, very narrow, attached, grayish, then black, stipe very slender, fragile, white, hollow; plant sometimes cæspitose.

Height 1′–1.5′, breadth of pileus 4″–6″.

Dung heaps. Albany and Sandlake. June and July.

Genus — CORTINARIUS *Fr.*

Gills membranaceous, persistent; trama floccose. Veil consisting of arachnoid threads. Spores rusty-ochre. — *Berk. Outl.*

A large and difficult genus, containing many closely related species, varying in color and differing in size, according to conditions of weather and locality. The color of the spores is reddish-ochre, sometimes ochraceous, and the veil is composed of fine filaments, which may generally be seen in the young expanding plant, stretching from the stipe to the margin of the pileus. The prevailing color of these plants is some shade of yellow or ochre, and the emarginate lamellæ at length become cinnamon-color. Most of the species grow in woods and shaded places.

Subgenus — Phlegmacium.

Pellicle of pileus viscid when moist. Veil, and consequently the stem from which it springs, dry. — *Berk. Outl.*

The viscid pileus and dry stem are the marks of this subgenus, but it should be borne in mind that a viscid pileus when old or dry ceases to be viscid.

SYNOPSIS OF THE SPECIES.

1. CORTINARIUS COLORATUS *n. sp.*

Pileus fleshy, broadly convex or expanded, smooth, bright reddish-yellow; lamellæ thin, deeply emarginate, eroded on

the edge, whitish, then cinnamon; stipe equal, solid or stuffed, firm, fibrillose, whitish, bulbous.

Height 4′–6′, breadth of pileus 3′–4′, stipe 4″–6″ thick.

Mossy ground under fir trees. Catskill Mountains. October.

The lamellæ appear as if finely and obscurely striated transversely. The color of the pileus is a rich, reddish-yellow, almost orange.

2. CORTINARIUS LUTEO-FUSCUS *n. sp.*

Pileus fleshy, broadly convex, even, smooth, brown; lamellæ rather close, yellow, then cinnamon, deeply emarginate; stipe equal, nearly straight, solid, silky, striate, whitish, bulbous.

Height about 4′, breadth of pileus 2′, stipe 3″–4″ thick.

Woods. North Elba. August. The fuscous pileus, yellow lamellæ, and white stem give the plant a tricolored appearance.

3. CORTINARIUS COMMUNIS *n. sp.*

Pileus fleshy, broadly convex or expanded, whitish or gray, tinged with red, the disk deeper colored; lamellæ rather broad, not crowded, emarginate and spuriously decurrent-toothed, whitish, then ochraceous-cinnamon; stipe equal, solid or stuffed, not bulbous, white-mealy at the top, fibrillose below, dingy white.

Height 2′–4′, breadth of pileus 2′–3′, stipe 3″–5″ thick.

Woods and open places. Common. Center, Catskill Mountains, etc. September and October.

4. CORTINARIUS CAPERATUS *Fr.*

Pileus fleshy, not thick except on the disk, at first ovate, then subcampanulate or expanded, obtuse or broadly subumbonate, often irregular and rugose-wrinkled, bright egg-yellow; lamellæ rather broad, slightly emarginate and decurrent-toothed, whitish, then pale cinnamon; stipe stout, nearly equal, not bulbous, solid, annulate, white, mealy-squamulose above the ring.

Height 4′–8′, breadth of pileus 3′–5′, stipe 6″–10″ thick.

Woods. Catskill and Adirondack Mountains. August–October.

A large and showy species, not agreeing well with the characters of the subgenus. The pileus is said to be slightly viscid and incrusted with superficial white flocci, which at length disappear. In our specimens, even when young, no incrustation was perceptible, neither was the pileus clearly

viscid. The edge of the lamellæ, too, is entire, not serrated, as described. These facts show it to be not only an aberrant species, but also a variable one. The annulus shows its relation to the subgenus *Pholiota*, in which it was formerly placed. The character and color of the pileus and the obscure transverse striations of the lamellæ indicate its relation to the following species.

Subgenus—Myxacium.

Universal veil, and consequently the stem, viscid and polished when dry.—*Berk. Outl.*

SYNOPSIS OF THE SPECIES.

Stem not bulbous ..... 5.
Stem bulbous ..... 6.

5. CORTINARIUS COLLINITUS *Fr.*

Pileus fleshy, rather thin except the disk, subcampanulate, then convex, obtuse or broadly umbonate, generally longitudinally rugose-wrinkled, very viscid or glutinous, bright tawny-yellow, shining; lamellæ slightly emarginate, whitish, then pale cinnamon; stipe stout, equal, solid, viscid, white, smooth or at length scaly from the cracking of the viscid covering when dry.

Height 3′–5′, breadth of pileus 2′–3′, stipe 4″–6″ thick.

Ground in woods. Sandlake and Catskill Mountains. September and October.

Plant sometimes cæspitose.

6. CORTINARIUS TRICOLOR *n. sp.*

Pileus convex, smooth, yellow; lamellæ rather close, attached, emarginate, whitish, slightly violet-tinged, then pale cinnamon; stipe equal, bulbous, white, tinged with violet at the top.

Height 2′–3′, breadth of pileus 1.5′–2′, stipe 3″–4″ thick.

Sandy soil. Center. October.

Subgenus—Inoloma.

Pileus fleshy, dry, at first silky with scales or innate fibres, not hygrophanous; stem bulbous.—*Berk. Outl.*

The bulbous or enlarged base of the stem in many species gradually tapers upward so that the stem becomes somewhat conical, or obclavate.

SYNOPSIS OF THE SPECIES.

Pileus densely squamulose ..... a.
a. Plant violet-colored ..... 7.
a. Plant cinnamon-brown ..... 8.
Pileus smooth or silky ..... b.
b. Pileus tinged with violet or lilac ..... c.
c. Stem white; plant odorous ..... 9.
c. Stem tinged with lilac above ..... 10.
b. Pileus not violet or lilac-tinged ..... d.
d. Dull yellow, variegated with matted ferruginous fibrils ..... 11.
d. Ferruginous, sprinkled with whitish fibrils ..... 12.
d. Ochraceous ..... 13.

7. CORTINARIUS VIOLACEUS *L.*

Pileus fleshy, even, convex, rough with numerous small hairy scales, dark violet-color; lamellæ loose, thick, rather broad, violet, then brownish-cinnamon; stipe equal or slightly tapering upward, solid, slightly striate-fibrillose, bulbous, violet.

Height 3′–5′, breadth of pileus 2′–3′, stipe 3″–5″ thick.

Ground in woods. Adirondack Mountains. August.

A pretty species. The flesh is pale violet color. Edible.

8. CORTINARIUS SQUAMULOSUS *n. sp.*

Pileus thick, fleshy, convex, densely fibrillose-squamulose, cinnamon-brown, the scales darker; lamellæ not crowded, deeply emarginate, pale pinkish-brown, then cinnamon-colored; stipe thick, solid, shreddy, subsquamulose, concolorous, swollen at the base into a very large tapering or subventricose bulb.

Height 4′–6′, breadth of pileus 2′–4′, stipe 6″–9″ thick at the top, 12″–18″ at the bottom.

Borders of swamps in woods. Sandlake. August.

Related to *C. pholideus* and *C. arenatus*, but distinct by the deep emargination of the lamellæ. It gives out a strong odor while drying. The color of the flesh is pinkish-white. (Plate 3, figs. 1–3.)

9. CORTINARIUS ARGENTATUS *Fr.*

Pileus fleshy, convex, then expanded, smooth, bluish-lilac or pale violet, the margin at first silky, then whitish; lamellæ rather close, whitish, then cinnamon-color; stipe short, thick, solid, somewhat bulbous, easily splitting, whitish.

Height 2′–3′, breadth of pileus 2′–4′, stipe 6″–10″ thick.

Ground in woods. Bethlehem and Knowersville. September.

It has a strong odor not unlike that of chestnut blossoms. The lamellæ are sometimes serrated.

10. Cortinarius alboviolaceus *Pers.*

Pileus fleshy, rather thin, convex, then expanded, sometimes broadly subumbonate, smooth, silky, whitish, tinged with lilac or pale violet; lamellæ generally serrulate, whitish-violet, then cinnamon-color; stipe equal or a little tapering upward, solid, silky, white, stained with violet, especially at the top, slightly bulbous, the bulb gradually tapering into the stipe.

Height, 3′–4′, breadth of pileus 2′–3′, stipe 3″–6″ thick.

Ground in thin woods, more frequently under poplars. Center. October.

The stem is sometimes subannulate, and being violet above and white below the obscure ring, it appears as if sheathed with a silky white covering. Inodorous. Sometimes the stem gradually tapers from the base to the top, so that it can scarcely be called bulbous.

11. Cortinarius autumnalis *n. sp.*

Pileus fleshy, convex or expanded, dull rusty-yellow, variegated or streaked with innate ferruginous fibrils; lamellæ rather broad, with a wide shallow emargination; stipe equal, solid, firm, bulbous, a little paler than the pileus.

Height 3′–4′, breadth of pileus 2′–4′, stipe 6″ thick.

Pine woods. Bethlehem. November.

The plant is sometimes cæspitose. The flesh is white.

12. Cortinarius Catskillensis *n. sp.*

Pileus fleshy, convex or subcampanulate, then subexpanded, even, pale ferruginous clothed with minute scattered white fibrils; lamellæ watery cinnamon, becoming darker with age, deeply emarginate; stipe stout, solid, nearly white, fibrillose; the bulbous base gradually tapering into the stipe.

Height 3′–4′, breadth of pileus 2′–3′, stipe 6″–10″ thick.

Ground in open places. Catskill Mountains. October.

13. Cortinarius ochraceus *n. sp.*

Pileus fleshy, convex, at length broadly subumbonate or gibbous, smooth, even or obscurely wrinkled, pale ochraceous; stipe solid, fibrillose, ochraceous at the top, white below, gradually enlarged into a thick bulbous base.

Height 2′–4′, breadth of pileus 2′–3′, stipe 4″–6″ thick at the top, 12″–18″ at the base.

Under balsam trees in open places. Catskill Mountains. October.

The stipe appears as if sheathed. In some specimens the stipe is short and rapidly tapers from the base to the top.

Subgenus—Dermocybe.

Pileus thin, silky with innate down, dry, not hygrophanous; stem equal or attenuated, not bulbous.—*Berk. Outl.*

SYNOPSIS OF THE SPECIES.

Stem red ..... 14.
Stem yellow 15

14. CORTINARIUS SANGUINEUS *Fr.*

Pileus rather thin, convex or expanded, with decurved margin, silky or minutely squamulose, bright red; lamellæ rather close and broad, emarginate, a little darker red than the pileus; stipe equal, stuffed or solid, nearly smooth, concolorous.

Height about 2′, breadth of pileus 6″–12″, stipe 1″–2″.

In woods. Adirondack Mountains. August.

A beautiful species, easily recognized.

15. CORTINARIUS CINNAMOMEUS *Fr.*

Pileus fleshy, thin, convex, sometimes obtusely umbonate, silky or minutely squamulose, cinnamon-brown; lamellæ close, not broad, slightly emarginate, yellow, then cinnamon; stipe equal, solid or stuffed, silky, yellow.

Height 2′–4′, breadth of pileus about 1′, stipe 2″ thick.

In woods. Adirondack Mountains. August.

The pileus varies in color, being at one time nearly yellow, at another dark brown. The color of the lamellæ also varies.

Var. *semisanguinea* has the lamellæ red, almost as in the preceding species, also the base of the stipe red. Center. October.

Subgenus—Telamonia.

Pileus moist, hygrophanous, smooth, or clothed only with evanescent threads; stem peronate (sheathed with the interwoven veil).—*Berk. Outl.*

SYNOPSIS OF THE SPECIES.

Stipe bulbous ..... 16.
Stipe not bulbous ..... a.
a. Pileus at first squamulose ..... 17.
a. Pileus smooth, bay ..... b.
b. Stipe stout ..... 18.
b. Stipe slender, subannulate ..... 19.

16. CORTINARIUS ARMILLATUS *Fr.*

Pileus fleshy, thick, convex or subcampanulate, then expanded, minutely squamulose, yellowish-red; lamellæ not

close, broad, slightly emarginate, whitish-ochraceous, then cinnamon; stipe stout, solid, fibrillose, whitish, girt with one to four red bands, bulbous.

Height 4′–6′, breadth of pileus 2′–4′, stipe 4″–8″ thick.

Woods. North Elba. August.

A large and noble species. The margin of the pileus is thin and sometimes uneven; the upper band on the stem is usually the brightest and most regular. The pileus is not distinctly hygrophanous.

17. CORTINARIUS DISTANS *n. sp.*

Pileus thin except the disk, convex, squamulose, bay-brown when moist, tawny when dry; lamellæ broad, distant, thick, dark cinnamon-color; stipe subequal, often a little tapering upward, solid, slightly fibrillose-scaly, concolorous.

Height 2′–3′, breadth of pileus 1′–2′, stipe 4″–6″ thick.

Grassy ground in pine woods. Greenbush. June.

The flesh is dull yellowish. The pileus, when drying, has for a time a brown marginal zone.

18. CORTINARIUS BIFORMIS *Fr.*

Pileus fleshy, thin except the disk, convex or subcampanulate, then expanded and broadly umbonate, smooth, shining, of a bay color; lamellæ rather broad at the inner extremity, tapering outwardly, subrounded at the stipe, scarcely emarginate, watery cinnamon; stipe stout, solid or stuffed, fibrillose-striated, paler than the pileus, subannulate, the sheath white, generally obliquely terminating, sometimes distant.

Height 2′–4′, breadth of pileus 2′, stipe 3″–4″ thick.

Ground under spruce and balsam trees. Catskill Mountains. October.

The plant is sometimes cæspitose, and not unfrequently the cuticle cracks into scales or areas.

19. CORTINARIUS CASTANEOIDES *n. sp.*

Pileus thin, convex, becoming expanded, with deflexed margin, smooth, dark bay or chestnut-color when moist, paler when dry; lamellæ not crowded, slightly and unequally emarginate, yellowish-cinnamon, then cinnamon-color; stipe slender, equal, stuffed or hollow, subannulate, paler than the pileus, the veil or sheath white.

Height 1′–2′, breadth of pileus 6″–12″, stipe 1″–2″ thick.

Under hemlock trees. Catskill Mountains. October.

The pileus sometimes has a small umbo. The plant is gregarious or cæspitose. The veil is subpersistent, and its abrupt termination affords a quite distinct annulus. (Plate 4, figs. 10–15.)

Subgenus—Hygrocybe.

Pileus hygrophanous; stem distinct from the fibrillose veil, hence neither annulate nor floccose-squamulose.—*Berk. Outl.*

SYNOPSIS OF THE SPECIES.

Pileus dark bay ..... 20.
Pileus pale watery cinnamon ..... 21.

20. CORTINARIUS CASTANEUS *Bull.*

Pileus fleshy, thin, campanulate or convex, then expanded, dark chestnut-color when moist, paler when dry; lamellæ rather broad, violet-tinged, then cinnamon, stipe fibrillose, stuffed or hollow, lilac-tinged at the top, white below.

Height 2′–3′, breadth of pileus 1′–2′, stipe 3″–4″ thick.

Ground under spruce and balsam trees. Catskill Mountains. October. Edible.

21. CORTINARIUS VERNALIS *n. sp.*

Pileus thin, hemispherical or convex, then more or less expanded, smooth or at first clothed with a few silky fibrils, pale watery cinnamon when moist, nearly white or yellowish-white when dry; lamellæ rather close, tapering toward the outer extremity, very slightly emarginate, pale cinnamon; stipe subconcolorous, smooth, slender, hollow, easily splitting.

Height 1′–1.5′, breadth of pileus 6″–12″, stipe 1″ thick.

Wet ground in pastures. Helderberg Mountains. May. In very wet ground the margin of the pileus becomes recurved. The spores are ochraceous.

Genus—HYGROPHORUS *Fr.*

Hymenophorum continuous with the stem, and descending without change into the sharp-edged gills; hymenium waxy. —*Berk. Outl.*

The pileus is viscid or moist; the lamellæ are generally distant and decurrent, of a waxy nature and with a watery juice.

SYNOPSIS OF THE SPECIES.

Pileus convex conic or campanulate, not umbilicate ..... a.
a. Pileus viscid or glutinous when moist ..... b.
b. Stem solid or stuffed ..... c.
c. Lamellæ white ..... 1.
c. Lamellæ red ..... 5.
b. Stem hollow ..... 4.
a. Pileus not distinctly viscid ..... e.
e. Lamellæ white ..... 2.
e. Lamellæ colored ..... 3.
Pileus convex, at length umbilicate or depressed ..... f.
f. Pileus not viscid ..... 6.
f. Pileus viscid ..... 7.

1. Hygrophorus chrysodon *Fr.*

Pileus fleshy, not thick, convex, then expanded, viscid when moist, white, the disk often yellowish, the margin dotted with little yellow floccose scales; lamellæ subarcuate, decurrent, distant, white, sometimes faintly pinkish-tinged; stipe equal or slightly attenuated below, solid, white, dotted with yellow floccose scales, especially toward the top.

Height 2′–3′, breadth of pileus 1′–2′, stipe 2″–4″ thick.

Pine woods. Bethlehem. November.

The lamellæ are said to be crisped, and, when young, to have the edge yellow-floccose; but I have seen no such specimens.

2. Hygrophorus pratensis *Fr.*

Pileus convex, firm, even, smooth, moist, white; lamellæ distant, rather thick, arcuate, decurrent, white or yellowish-white; stipe nearly equal, smooth, firm, solid or stuffed, white.

Height about 2′, breadth of pileus 6″–18″, stipe 2″ thick.

Woods. North Elba.

This is the white variety, growing in northern woods. The common form, with a turbinate pileus, of a fulvous or tawny color, and lamellæ either white or concolorous, growing in meadows, I have not seen. I suspect a rigid division would separate our plant as a distinct species.

*3. Hygrophorus conicus *Fr.*

Pileus thin, submembranaceous, fragile, smooth, conical, generally acute, sometimes obtuse, the margin often lobed; lamellæ rather close and broad, subventricose, narrower toward the stem, free, terminating in an abrupt tooth at the outer extremity, scarcely reaching the margin, yellow; stipe equal, fibrous-striate, yellow, hollow.

Height 3′–6′, breadth of pileus 6″–12″, stipe 1″–2″ thick.

Ground in woods and open places. North Elba and Center. August–October.

The color of the pileus is variable. I have taken specimens with it pale sulphur-yellow and others with it bright red or scarlet. The plant turns black in drying.

* 4. Hygrophorus ceraceus *Fr.*

Pileus thin, convex, becoming expanded, smooth, shining, viscid, yellow; lamellæ distant, subemarginate, yellow; stipe smooth, shining, viscid, hollow, more or less tapering, compressed or irregular, concolorous.

[Assem. No. 133.] 15.

Height 1′–3′, breadth of pileus 8″–18″.

Open woods. North Greenbush. October.

5. HYGROPHORUS CONGELATUS *n. sp.*

Pileus thin, convex, even, smooth or obscurely fibrillose, sordid red, sometimes tinged with yellow; lamellæ few, distant, broad, subemarginate, decurrent-toothed, bright red; stipe equal, slender, smooth, solid, red, yellow within.

Height 1′, breadth of pileus 4″–6″, stipe about 1″ thick.

Banks by roadsides. North Elba. September.

The specimens were collected in dry weather, but when moistened the pileus appears to be viscid. It has a peculiar, faded, dingy red appearance as if frost-bitten; whence the name. At first sight the plant might be taken for small *Hygrophorus miniatus*, from which it is clearly distinct by the smooth pileus and the color and character of the lamellæ.

6. HYGROPHORUS CANTHARELLUS *Schw.*

Pileus thin, convex, at length umbilicate or centrally depressed, minutely squamulose, moist, bright red, becoming orange or yellow; lamellæ distant, subarcuate, decurrent, yellow, sometimes tinged with vermilion; stipe smooth, equal, subsolid, sometimes becoming hollow, concolorous, whitish within.

Height 2′–4′, breadth of pileus 6″–12″, stipe 1″–2″ thick.

Swamps and damp shaded places in fields or woods. July–September. Common.

Var. *rosea* has the pileus expanded and the margin wavy scolloped. Swamps. Sandlake.

7. HYGROPHORUS NITIDUS *B. & R.*

Pileus thin, fleshy, convex, broadly umbilicate, smooth, shining, viscid, pale yellow with the margin striatulate when moist, nearly white when dry; lamellæ arcuate, decurrent, yellow; stipe slender, brittle, smooth, viscid, hollow, yellow; flesh yellow.

Height 2′–4′, breadth of pileus 8″–12″, stipe 1″–2″ thick.

Swamps. Sandlake. August.

The cavity of the stem is very small. (Plate 1, figs. 2-6.)

Genus—LACTARIUS *Fr.*

Hymenophorum confluent with the stem and vesiculose trama.

Gills milky, edge acute.—*Berk. Outl.*

The species of this genus are most readily known by the milky or rarely colored juice which oozes from the lamellæ when cut or broken. The pileus is generally rather thick, fleshy, at first convex, then more or less centrally depressed, often subfunnel form; the lamellæ are rather close, attached and appearing decurrent from the form of the pileus; the stem is most frequently short and thick, either solid, spongy, stuffed or hollow. The taste is often acrid, hot or peppery, yet some species are mild and considered not only esculent but delicious. The spores are globose and minutely papillose.

Synopsis of the Species.

Pileus viscid when moist ..... a.
a. Milk white, not changing color ..... 2.
a. Milk white, becoming purplish or lilac ..... 3.
a. Milk orange-colored ..... 4.
Pileus dry or not clearly viscid when moist ..... b.
b. Taste mild ..... c.
c. Stem solid; pileus yellowish-tawny ..... d.
d. Lamellæ close ..... 5.
d. Lamellæ distant, connected by veins ..... 6.
c. Stem stuffed or hollow; pileus dark rufous ..... 7.
b. Taste acrid (hot like pepper) ..... e.
e. Milk white, becoming yellow ..... f.
f. Pileus pinkish-yellow ..... 11.
f. Pileus sooty-brown ..... 15.
e. Milk white, unchangeable ..... g
g. Margin of the pileus tomentose ..... 1.
g. Margin of the pileus naked ..... h.
h. Stem solid ..... i.
i. Pileus white ..... 12.
i. Pileus brown ..... 15.
h. Stem stuffed ..... k.
k. Pileus dark rufous ..... 9.
k. Pileus cinereous or brown, plant odorous ..... 18.
k. Pileus cinereous or brown, plant inodorous ..... 14.
h. Stem at length hollow ..... 1.
l. Stem thick ..... m.
m. Lamellæ broad (4″) ..... 10.
m. Lamellæ narrow (2″) ..... 13.
l. Stem slender ..... n.
n. Pileus cinereous ..... 17.
n. Pileus pale reddish-ochraceous ..... 8.

* 1. Lactarius torminosus *Fr.*

Pileus depressed with the margin decurved and villous-tomentose, pallid, sometimes banded or zonate; lamellæ narrow, close, whitish, inclining to yellowish flesh-color; stipe equal, smooth, hollow, whitish.

Height 2′–4′, breadth of pileus 2′–4′, stipe 4″–8″ thick.

Woods. North Elba. August.

The pileus is generally pale ochraceous, somewhat mottled with flesh-color. Sometimes the tomentum extends over nearly the whole surface of the pileus. Taste acrid.

2. LACTARIUS AFFINIS *n. sp.*

Pileus fleshy, viscid, smooth, centrally depressed, pale ochraceous-yellow; lamellæ rather broad, whitish, tinged with yellow, some of them forked near the inner extremity; stipe equal, smooth, stuffed, at length hollow, concolorous; flesh, milk and spores white.

Height 2′–4′, breadth of pileus 3′–4′, stipe 6″–8″ thick.

Pastures. Catskill Mountains. October.

Very near *Lactarius insulsus*, from which it differs only in the entire absence of zones or bands, and in having the spores white, instead of yellow. The taste is acrid. But for the color of the spores, I should not have separated it from *L. insulsus*.

3. LACTARIUS UVIDUS *Fr.*

Pileus rather thin, convex, then expanded, sometimes depressed, smooth, viscid, grayish-brown or livid-brown, tinged with flesh-color, often with a small umbo; lamellæ narrow, close, white or yellowish, becoming purplish or dull lilac where cut or bruised; stipe rather long, equal, or slightly tapering upward, white, stuffed or hollow, smooth; milk white, changing to dull lilac color.

Height 2′–4′, breadth of pileus 1′–2.5′, stipe 3″–5″ thick.

Woods, generally in moist places. North Elba and West Albany. August–October.

Flesh turning purplish when cut. The taste is slightly acrid.

4. LACTARIUS DELICIOSUS *Fr.*

Pileus at first convex and broadly umbilicate, then depressed, smooth, viscid when moist, pale orange with brighter colored bands; lamellæ rather broad, subconcolorous; stipe equal, smooth, stuffed or hollow, concolorous, sometimes spotted; milk orange-colored.

Height 2′–3′, breadth of pileus 2′–3′, stipe 4″–6″ thick.

Ground in woods and open places. Catskill and Adirondack Mountains and Sandlake. August–October.

Esculent, and said to be very good. The taste is mild. The pileus fades with age, and the wounded lamellæ at length become stained with green.

*5. LACTARIUS VOLEMUS *Fr.*

Pileus fleshy, thick, firm, convex, then expanded or depressed, dry, yellowish-tawny, the cuticle of the disk sometimes cracking into areas; lamellæ narrow, close, white or

yellowish; stipe nearly equal, short, firm, solid, smooth or pruinose, concolorous; flesh whitish; milk abundant, white, not acrid.

Height 2′–4′, breadth of pileus 2′–4′, stipe about 6″ thick.

Common. July–September. Edible.

6. Lactarius distans *n. sp.*

Pileus fleshy, firm, convex or expanded, centrally depressed, pruinose-tomentose, yellowish-tawny, sometimes rugulose-wrinkled; lamellæ distant, subarcuate, connected by veins, white or yellowish; stipe very short, solid, firm, equal or tapering downward, pruinose, subconcolorous; flesh and milk white, mild.

Height 1′–2′, breadth of pileus 2′–4′.

Grassy ground. Albany. July.

The pileus is sometimes irregular and eccentric, and the cuticle often cracks into areas. The stipe scarcely exceeds one inch in length. Allied to *L. hygrophoroides*, of which it may possibly prove to be a large variety.

7. Lactarius camphoratus *Bull.*

Pileus thin, fleshy, convex, then expanded or depressed, smooth, with a very small umbo or papilla, dark bay or brownish-red; lamellæ rather narrow, close, a little paler than the pileus, sometimes tinged with yellow; stipe nearly equal, smooth, subconcolorous, stuffed above, hollow below, flesh tinged with dull red; milk white, mild.

Height 2′–3′, breadth of pileus 8″–18″, stipe 2″–4″ thick.

Swamps. Sandlake. August.

I have not seen specimens with the pileus zonate. The dried specimens emit an agreeable odor, like that of *Cyperus inflexus*. In size and shape it is like *L. subdulcis*, from which it is distinct by its mild taste and darker color. Its color is like that of *L. rufus*, but that species is larger and intensely acrid.

8. Lactarius subdulcis *Bull.*

Pileus thin, fleshy, plane or depressed, smooth, with a very small umbo or papilla, pale ochraceous-red, tinged with flesh-color; lamellæ close, more narrow toward the stipe, whitish, tinged with red or flesh-color; stipe nearly equal, rather slender, smooth, stuffed or hollow, concolorous, villous at the base; flesh whitish; milk white.

Height 2′–3′, breadth of pileus 8″–15″, stipe 2″–3″ thick.

Swamps and wet places in woods and fields.

Very common. July–October. The taste is at first mild, soon slightly acrid and woody.

9. Lactarius rufus *Scop.*

Pileus fleshy, at first convex and centrally depressed, then funnel-form, smooth, often with a small umbo, dull bay; lamellæ not broad, close, yellowish, tinged with red or flesh-color; stipe equal, smooth, stuffed, subconcolorous; flesh pinkish-tinged; milk white.

Height 3′–5′, breadth of pileus 2′–4′, stipe 3″–5″ thick.

Low swampy woods. North Elba. August. Taste intensely acrid.

10. Lactarius platyphyllus *n. sp.*

Pileus fleshy, thick, depressed, with the margin spreading or decurved, sometimes subfunnel-form, smooth, yellowish flesh-color; lamellæ broad, not crowded, dull yellowish; stipe equal, stout, smooth, hollow, a little paler than the pileus; flesh white; milk white.

Height 4′–6′, breadth of pileus 4′–8′, stipe 6″–12″ thick.

Woods. North Elba. August.

A very large species, with an acrid taste. In color it resembles *L. chrysorheus*, from which it is distinct by its large size, zoneless pileus, unchanging milk, and very broad lamellæ, which are 4″ wide. The pileus is perhaps viscid in moist weather. I have only seen it dry.

11. Lactarius chrysorheus *Fr.*

Pileus fleshy, not thick, convex, umbilicate, then expanded and centrally depressed or subfunnel-form, nearly smooth, yellowish flesh-colored, with brighter bands; lamellæ narrow, close, yellowish, stained with sordid reddish or brown spots where bruised; stipe equal, smooth, paler than the pileus, stuffed or hollow; flesh white, stained with yellow; milk white, quickly changing to yellow.

Height 2′–4′, breadth of pileus 2′–4′, stipe 4″–6″ thick.

Woods and groves. Common. North Elba, West Albany, etc. August–October.

The taste is acrid and woody. The colored bands of the pileus are sometimes wanting.

*12. Lactarius piperatus *Scop.*

Pileus fleshy, thick, firm, smooth, at first convex and umbilicate or centrally depressed, at length funnel-form; lamellæ narrow, close, some of them forked, white; stipe short, stout, equal, firm, solid; flesh white; milk white.

Breadth of pileus 4′–6′, stipe 1′–2′ long, 8″–12″ thick.

Woods, especially under hemlock trees. Very common.

This is classed with the edible species, although its taste is acrid in the uncooked state.

13. LACTARIUS SORDIDUS *n. sp.*

Pileus fleshy, thick, firm, convex and centrally depressed, at length subfunnel-form, nearly smooth, pale brownish-yellow, the disk darker, with greenish hues; lamellæ very narrow, close, white or yellowish; stipe short, firm, equal or slightly tapering upward, hollow, concolorous, generally spotted; flesh white, with a pinkish tinge; milk white.

Height 2′–3′, breadth of pileus 2′–4′, stipe 4″–6″ thick.

Ground under spruce and balsam trees. North Elba. September. Taste acrid.

The pileus of this, like that of *L. piperatus*, is often soiled by dirt carried up in its growth. (Plate 2, figs. 10–12.)

14. LACTARIUS PYROGALUS *Fr.*

Pileus fleshy, expanded or depressed, smooth, often slightly zoned when moist, livid-gray; lamellæ narrow, not crowded, white or yellowish; stipe short, equal, stuffed or hollow, concolorous; flesh whitish; milk white.

Height 1′–2′, breadth of pileus 1′–2′, stipe 2″–4″ thick.

Ground in grassy places and borders of woods. Greenbush and Center. October. Taste acrid, woody.

15. LACTARIUS PLUMBEUS *Fr.*

Pileus fleshy, firm, convex and centrally depressed, then subfunnel-form, dry, minutely tomentose, varying in color, grayish-brown, pinkish-brown, or blackish-brown; lamellæ narrow, close, yellowish; stipe firm, equal, solid, paler than the pileus; flesh and milk white.

Height 1′–3′, breadth of pileus 1′–3′, stipe 3″–6″ thick.

In hemlock woods. Catskill Mountains. October. Taste acrid.

* 16. LACTARIUS SUBTOMENTOSUS *B. & R.*

Pileus fleshy, not thick, convex, then expanded or slightly depressed, dry, minutely tomentose, brown, sometimes with a small umbo, often with the margin wavy-lobed; lamellæ distant, yellowish; stipe equal, rather long, stuffed, concolorous; flesh white; milk white.

Height 2′–4′, breadth of pileus 2′–3′, stipe 3″–4″ thick.

Woods and groves. Adirondack Mountains and Sandlake. July – October.

Pileus sometimes rugose-wrinkled.

17. LACTARIUS GRISEUS *n. sp.*

Pileus fleshy, thin, expanded and broadly umbilicate or subfunnel-form, most often with a small umbo or papilla, minutely tomentose, gray, becoming dingy-white with age; lamellæ narrow, close, white tinged with yellow: stipe rather long, equal or slightly tapering upward, brittle, stuffed above, hollow below, villous at the base; milk white.

Height 2′–3′, breadth of pileus 6″–18″, stipe 2″–3″ thick.

Swamps and low woods. Sandlake and Adirondack Mountains. August and September. Taste slightly acrid.

18. LACTARIUS GLYCIOSMUS *Fr.*

Pileus thin, fleshy, convex, then expanded or depressed, dry, minutely tomentose, cinereous, or grayish-brown, often with a small umbo and the margin distantly striate-marked; lamellæ narrow, close, yellowish; stipe short, nearly equal, pallid, stuffed; milk white.

Height 1′–2′, breadth of pileus 6″–18″ stipe 1″–2″.

Under pine and balsam trees on the ground or on rotten wood. Adirondack and Catskill Mountains. August – October. Taste acrid, unpleasant. Remarkable for, and easily distinguished by, its strong aromatic odor.

Genus — RUSSULA *Fr.*

Hymenophorum continuous with the vesiculose trama. Gills rigid, not milky; edge acute. Veil none.— *Berk. Outl.*

In size and shape the species of this genus resemble those of the preceding one, from which they are at once distinguished by the absence of a milky or colored juice. Some of them resemble the exannulate *Amanitæ*, from which the entire absence of a veil will serve to separate them.

SYNOPSIS OF THE SPECIES.

1. RUSSULA DECOLORANS *Fr.*

Pileus fleshy, firm, smooth, viscid when moist, at length expanded or depressed, the margin thin, even or obscurely striate-tuberculate, color various, orange, yellow or grayish-

brown, tinged with purple, becoming paler with age; lamellæ rather close, venose-connected, some of them forked, white, then yellowish; stipe cylindrical, solid, spongy, whitish or pinkish; spores yellow.

Height 3′–5′, breadth of pileus 3′–5′, stipe 6″–15″ thick.

Pine woods. West Albany. October.

A large species, with a mild taste.

2. Russula nitida *Fr.*

Pileus firm, fleshy, with a thin submembranaceous margin, at first convex, then expanded or depressed, viscid when moist, shining, the margin striate-tuberculate, color various, generally a dull or sordid purple, the disk darker; lamellæ close, subfree, narrowed toward the inner extremity, venose-connected, white, then yellow; stipe white, stuffed, equal or slightly tapering upward.

Height 2′–4′ breadth of pileus 2′–3′, stipe 4″–6″ thick.

Pine woods. West Albany. October.

Taste mild at first, then slightly disagreeable.

3. Russula fœtens *Fr.*

Pileus fleshy, with a wide thin margin, hemispherical or convex, then expanded or depressed, viscid when moist, widely striate-tuberculate on the margin, dull pale yellow or straw-color; lamellæ rather broad, close, venose-connected, some of them forked, whitish; stipe nearly cylindrical, whitish, hollow; spores white; plant sometimes cæspitose.

Height 2′–3′, breadth of pileus 2′–4′, stipe 4″–8″ thick.

Ground in woods and open places. Common. Sandlake, Albany, etc. July and August.

Taste acrid, odor strong. When young, the lamellæ are studded with drops of moisture.

Genus—CANTHARELLUS *Fr.*

Hymenophorum inferior, confluent with the floccose trama.

Gills thick, swollen, somewhat branched. Edge obtuse.—*Berk. Outl.*

The species of this genus are easily separated from all others by the obtuse edge of the narrow, more or less branching or anastomosing gills.

Synopsis of the Species.

Plants terrestrial, stem central..... a.

a. Lamellæ abundantly anastomosing, stem short..... 1.

a. Lamellæ irregularly branched or sparingly anastomosing..... b.

b. Pileus luteous or egg-yellow ..... c.
c. Stem thick, solid ..... 2.
c. Stem slender, stuffed or hollow ..... 3.
b. Pileus brownish-yellow ..... d.
d. Hymenium yellow, not pruinose ..... 4.
d. Hymenium becoming lilac-pruinose ..... 5.
a. Lamellæ repeatedly forked, regular ..... e.
e. Lamellæ orange-colored ..... 6.
e. Lamellæ white ..... 7.
Plant lignatile, stem lateral ..... 8.

1. Cantharellus floccosus *Schw.*

Pileus fleshy, elongated funnel-form or trumpet shape, floccose-squamose, ochraceous-yellow; lamellæ veinlike, close, much anastomosing above, long decurrent and subparallel below, concolorous; stipe very short, thick, rarely deeply rooting.

Height 2′–4′, breadth of pileus at the top 1′–3′.

Woods and their borders. Not rare. Utica, *Johnson.* Albany and Sandlake. July and August.

2. Cantharellus cibarius *Fr.*

Pileus fleshy, obconic, smooth, egg-yellow, slightly depressed; lamellæ thick, distant, more or less branching and anastomosing, concolorous; stipe firm, solid, often tapering downward, concolorous, flesh white.

Height 2′–4′, breadth of pileus 2′–3′, stipe 3″–6″ thick.

In open woods and grassy places. Common. July and August.

Edible. The smell of apricots is not always clearly perceptible in American specimens.

3. Cantharellus minor *n. sp.*

Pileus fleshy, thin, convex, then expanded and depressed, egg-yellow; lamellæ very narrow, distant, sparingly branched, yellowish; stipe slender, subflexuous, equal, smooth, hollow or stuffed, concolorous.

Height 1′–2′, breadth of pileus 6″–12″.

In open woods. Greenbush. July.

4. Cantharellus lutescens *Bull.*

Pileus thin, fleshy, convex, umbilicate, brownish-floccose, yellowish; lamellæ very distant, sparingly branched, arcuate-decurrent, pale ochraceous; stipe slender, slightly tapering downward, smooth, shining, bright orange-tinted yellow, stuffed or hollow.

Height 2′–3′, breadth of pileus 8″–15″.

Mossy ground in woods. Catskill and Adirondack Mountains, also Sandlake. August–October.

This is regarded by some as a variety of *C. tubæformis*.

5. CANTHARELLUS INFUNDIBULIFORMIS *Fr.*

Pileus fleshy, thin, umbilicate, then funnel-form, nearly smooth, dingy yellow; lamellæ thick, distant, dichotomously branched, sometimes anastomosing, yellowish, then dull lilac, pruinose; stipe equal, slender, smooth, hollow, pale yellow.

Height 1′–2′, breadth of pileus about 1′.

In swamps. Sandlake. August.

6. CANTHARELLUS AURANTIACUS *Fr.*

Pileus fleshy, obconic, nearly plane above, smooth or minutely tomentose, dull orange with the disk usually brownish, the margin decurved and sometimes yellowish; lamellæ narrow, close, repeatedly forked, orange, sometimes yellowish; stem inequal, generally tapering upward, colored like the pileus; flesh yellowish, taste mild.

Height 2′–3′, breadth of pileus 1′–3′, stem 2″–4″ thick.

Ground and very rotten logs in woods or in fields. Common.

7. CANTHARELLUS DICHOTOMUS *n. sp.*

Pileus fleshy, at first broadly convex, then expanded, obconic with a decurved margin, acutely umbonate, smooth or slightly silky, shining, steel-blue; lamellæ close, rather broad, repeatedly forked, white; stem long, soft, solid, silky, slightly tapering upward, whitish, usually tinged with the color of the pileus; flesh whitish.

Height 3′–6′, breadth of pileus 6″–12″, stem 2″–3″ thick.

Damp mossy ground in woods. North Elba. August.

The white mycelium at the thick base of the stem is abundant, and invests the surrounding mosses so closely that it is difficult to pluck the plant entire without taking with it a tuft of moss. The small but prominent acute umbo is rarely wanting.

Var. *brevior* is a smaller form, occurring in open, mossy places. It is grayish-brown with the umbo wanting or reduced to an acute papilla and the shorter stem equal and scarcely silky. North Elba and Catskill Mountains. August–October. (Plate 4, figs. 6–9.)

*8. CANTHARELLUS CRISPUS *Fr.*

Pileus thin, expanded, villous or pubescent, yellowish-brown, often lobed and cæspitose; lamellæ narrow, close,

dichotomously branched, sometimes anastomosing, crisped, glaucous-green; stipe lateral or none.

Pileus 4″–8″ broad.

Trunks of trees, etc. Common. September–November.

Genus — MARASMIUS *Fr.*

Hymenophorum confluent with the stem, though different in texture, descending into the floccose trama. Hymenium dry, covering the interstices as well as the gills. Gills or folds thick, tough and subcoriaceous. Edge acute.—*Berk. Outl.*

The tough subcoriaceous texture of the plant, and the dry, continuous hymenium are the chief characters in this genus. Specimens of these plants are easily preserved, being less fleshy, putrescent and perishable than the preceding. Most of the species grow upon wood, decaying twigs or leaves.

Synopsis of the Species.

Stem naked, solid ..... 1.
Stem velvety-tomentose or hairy ..... a.
a. Lamellæ narrow, crowded ..... 2.
a. Lamellæ not crowded ..... 3.
Stem smooth, shining, hollow ..... b.
b. Pileus even; plant fetid ..... 4.
b. Pileus distantly sulcate-striate ..... c.
c. Pileus whitish ..... d.
d. Lamellæ attached to a free collar ..... 5.
d. Lamellæ attached to the stem ..... 6.
c. Pileus subrufous ..... e.
e. Pileus expanded ..... 7.
e. Pileus campanulate or convex ..... 8.

*1. Marasmius oreades *Bolt.*

Pileus fleshy, firm, smooth, convex, then expanded, often irregular and broadly subumbonate, watery fulvous when moist, whitish or cream-colored when dry; lamellæ broad, distant, free, whitish or cream-colored; stipe equal, smooth, solid, concolorous, sometimes rooting.

Height 2′–3′, breadth of pileus 1′–2′.

Grassy ground and pastures. May–October. Very common.

The plant is described as growing in rings. I have never seen it forming a complete ring, but it often forms a part of one. Edible.

2. Marasmius velutipes *B. & C.*

Pileus thin, submembranaceous, smooth, convex or expanded, grayish-rufous when moist, cinereous when dry; lamellæ very narrow, crowded, whitish or gray; stipe slender,

equal, hollow, clothed with a dense grayish velvety tomentum; plant often cæspitose.

Height 3′–5′, breadth of pileus 8″–18″.

Woods. Sandlake and Adirondack Mountains. July–October.

*3. Marasmius plancus *Fr.*

Pileus thin, expanded or slightly depressed, sometimes uneven and striatulate, dull rufous when moist, paler when dry, the disk often a little darker; lamellæ distant, rounded at the inner extremity and separating from the stem, dull yellowish; stipe firm, often compressed, especially at the top, stuffed or hollow, concolorous, whitish-pubescent.

Height 2′–4′, breadth of pileus about 1′.

Woods. Common. June–August.

4. Marasmius scorodonius *Fr.*

Pileus thin, submembranaceous, expanded, subrugulose, grayish-rufous, the disk a little darker; lamellæ very narrow, close, rounded at the inner extremity, subfree, whitish or cream-colored; stipe slender, tough, smooth, shining, hollow, reddish-brown, paler at the top; plant with a fetid odor.

Height 1′–2′, breadth of pileus 4″–6″.

On sticks and decaying wood. Sandlake. August.

The odor resembles that of skunk-cabbage.

*5. Marasmius Rotula *Fr.*

Pileus membranaceous, dry, convex or expanded, umbilicate, smooth, radiate-sulcate, whitish; lamellæ few, distant, broad, whitish, attached to a free collar surrounding the stem; stipe slender, tough, smooth, shining, black, paler at the top, hollow.

Height 1′–2′, breadth of pileus 3″–6″.

On sticks, dead leaves, etc. Common. June–September.

6. Marasmius subvenosus *n. sp.*

Pileus membranaceous, dry, convex, subumbilicate, radiate-sulcate, smooth, white or yellowish; lamellæ few, distant, sometimes branched and subvenose, concolorous, attached to the stipe; stipe tough, smooth, shining, brown, paler above, hollow.

Height 8″–12″, breadth of pileus 2″–4″.

On dead herbaceous stems and leaves. Center. October.

Closely related to *M. epiphyllus*, from which it differs in its smooth stem. (Plate 6, figs. 15–21.)

7. Marasmius androsaceus *L.*

Pileus membranaceous, convex or expanded, subumbilicate, obscurely striate, brownish-red; lamellæ narrow, rather numerous, attached, whitish or subconcolorous; stipe tough, smooth, shining, black, whitish at the top, hollow.

Height 1′–2′, breadth of pileus 3″–5″.

On sticks and leaves in woods, especially of pine. June–September.

8 Marasmius campanulatus *n. sp.*

Pileus membranaceous, convex or campanulate, dry, smooth, radiate-sulcate, ochraceous-red, the disk a little darker; lamellæ few, distant, broad, narrowed toward the stem, free or slightly attached, whitish; stipe tough, smooth, shining, blackish-brown, hollow.

Height 1′–2′, breadth of pileus 3″–6″.

Dead leaves, etc., in woods. Common. July and August.

Allied to *M. siccus* but differing in the character of the lamellæ and the paler stipe.

Genus—LENTINUS *Fr.*

Coriaceous, fleshy and tough, at length hard, tough, dry. Gills tough. Edge acute, toothed. Hymenophorum homogeneous with the stem.—*Berk. Outl.*

The firm tough fleshy pileus, and the thin serrated lamellæ are the prominent characters of this genus. The stipe is often eccentric or lateral. The species generally grow on wood, in open places, persist for some time and become hard when dry.

Synopsis of the Species.

Pileus squamose-spotted..... 1.
Pileus smooth..... 2.

1. Lentinus lepideus *Fr.*

Pileus fleshy, firm, convex or expanded, nearly white, spotted with dark brown appressed scales; lamellæ rather broad, not crowded, attached, slightly emarginate and decurrent, white, the edge rough, eroded or torn; stipe firm, solid, equal or tapering downward, more or less scaly, whitish, sometimes eccentric, straight or curved.

Height 2′–4′, breadth of pileus, 3′–5′, stipe 4″–6″ thick.

Growing from crevices in old stumps, logs, etc., exposed to the full rays of the sun. Common. Albany, Sandlake, North Elba. June–August. Poughkeepsie. *Gerard.*

2. Lentinus cochleatus *Fr.*

Pileus fleshy, firm, expanded, irregular, sublobed, often umbilicate or depressed, smooth, dull grayish-rufous; lamellæ close, rather broad, serrated, dull flesh-colored; stipe central, eccentric or lateral, solid, slightly narrowed downward, distantly sulcate; plant densely cæspitose; pilei often growing together.

Height 1′–2′, breadth of pileus 6″–12″.

Decaying wood. North Elba. August.

Genus—BOLETUS *Fr.**

Hymenophorum quite distinct from the hymenium. Trama obsolete. Hymenium lining the cavity of tubes separable from one another and from the hymenophorum.—*Berk. Outl.*

The species of this genus are numerous, often large and fleshy, and readily known by the tubes being easily separable from the pileus. The flesh is soft and juicy and is very liable to be attacked by insects. In some species it changes color when bruised or cut.

Synopsis of the Species.

Pileus viscid when moist	a.
a. Tubes attached to the stem, without a stipal cavity	b.
b. Stem annulate	c.
c. Pileus scaly	d.
d. Stem long (4′–6′)	1.
d. Stem short (1′–3′)	2.
c. Pileus smooth	e.
e. Tubes small, simple	f.
f. Pileus yellow	3.
f. Pileus bay	4.
e. Tubes ample, compound	5.
b. Stem not annulate	g.
g. Pileus yellow, flesh yellow	6.
g. Pileus pallid, flesh white	7.
g. Pileus white, flesh white	8.
a. Tubes with a stipal cavity	9.
Pileus not viscid	h.
h. Tubes with a stipal cavity	i.
i. Flesh becoming blue where cut or bruised	k.
k. Tubes one color	10.
k. Tubes with the mouth differently colored	11.
i. Flesh not turning blue	l.
l. Tubes pale flesh-color	12
l. Tubes yellow	13
h. Tubes attached, with no stipal cavity	m
m. Pileus distinctly tomentose	n.
n. Pileus purplish-brown	14.
n. Pileus bright pinkish-red	15.
n. Pileus blackish-brown	16.
m. Pileus smooth, or most minutely tomentose	o.

* This genus belongs to the order *Polyporei.*

o. Stem reticulated..... 17.
o. Stem not reticulated..... p.
p. Tubes pale yellow..... 18.
p. Tubes fulvous, sinuate..... 19.

1. Boletus spectabilis *n. sp.*

Pileus broadly convex, viscid when moist, squamose, bright red, with brownish scales, sometimes pink with brownish-yellow scales; tubes convex, attached, large, angular, ochraceous; stipe nearly equal, solid, annulate, yellow stained with red or subconcolorous; veil membranaceous, red, viscid; flesh yellow; spores dark ferruginous.

Height 4′–6′, breadth of pileus 3′–5′, stipe 6″ thick.

Mossy swamps. North Elba. August. A large showy species.

The scales of the pileus are large and distant, except on the disk. (Plate 6, figs. 1–3.)

2. Boletus pictus *n. sp.*

Pileus broadly convex or expanded, viscid when moist, at first covered with a red tomentum, which soon breaks up into rather small close scales; tubes plane or convex, attached, large, angular, yellow; stipe equal, solid, annulate, subconcolorous; flesh yellowish.

Height 1.5′–3′, breadth of pileus 2′, stipe, 3″–5″ thick.

Woods and borders of swamps. Common. July and August.

The red tomentose scales give it a pretty spotted appearance. The stipe is slightly marked at the top by the decurrent walls of the tubes.

3. Boletus luteus *L.*

Pileus convex, sometimes expanded, smooth, dull yellow, when moist coated with a brownish gluten, streaked or obscurely reticulated with brownish-yellow; tubes plane or convex, short, attached, minute, subrotund, ochraceous yellow; stem equal, annulate, solid, scabrous with small reddish or brown dots; flesh whitish, inclining to dull yellow; annulus brownish.

Height 2′, breadth of pileus 2′–3′, stipe 3″–5″ thick.

Sandy soil. Center. October.

Our specimens, in color, vary somewhat from the type, and have the stem dotted its whole length. Edible.

4. Boletus Clintonianus *n. sp.*

Pileus thick, convex, viscid when moist, smooth, shining, bay-red, or chestnut-color; tubes nearly plane, attached, subdecurrent, small, nearly round, pale yellow, becoming darker:

stipe equal, stout, solid, annulate, subconcolorous, sometimes stained with yellow, slightly reticulated at the top; annulus and flesh yellow; plant sometimes cæspitose.

Height 4′–6′, breadth of pileus 3′–5′, stipe 6″–9″ thick.

Low woods. North Elba. August. A noble species.

Large specimens sometimes have a submarginal groove or concavity on the pileus. Dedicated to Hon. G. W. Clinton, than whom there is no more ardent lover of botany nor more devoted friend of science. (Plate 5, figs. 1–5.)

5. BOLETUS ELBENSIS *n. sp.*

Pileus convex, sometimes gibbous, smooth, viscid when moist, dingy-gray tinged with flesh-color, obscurely streaked and reticulated with darker hues; tubes nearly plane, attached, subdecurrent, rather large, angular, compound, whitish, becoming ochraceous-brown; stipe equal, solid, annulate, concolorous below, white above the annulus, the top slightly marked by the decurrent walls of the tubes; flesh white.

Height 4′–5′, breadth of pileus 2′–4′, stipe 4″–6″ thick.

Low ground in woods and their borders. North Elba. August.

Related to *B. laricinus*, but our plant is not at all squamose, nor does it have the stem pitted. The pileus, from its markings, sometimes has the appearance of being pitted or slightly eaten on its surface by insects.

6. BOLETUS FLAVIDUS *Fr.*

Pileus convex or expanded, viscid when moist, smooth, yellow; tubes plane or slightly convex, attached, rather large, angular, compound, honey-yellow; stipe rather slender, nearly equal, solid, dotted, not annulate, yellow or brownish; flesh whitish, inclining to yellow.

Height 2′–3′, breadth of pileus 2′, stipe 2″–4″.

Woods and open places. Common. August–October.

Sometimes the pileus is dotted and streaked with red. The veil is very fugacious, so that the stipe is seldom found with an annulus. Sometimes drops of juice or moisture are seen on the tubes and stipe. These turn black with age. The fingers are stained in handling the plant. Edible.

7. BOLETUS COLLINITUS *Schæff.*

Pileus convex, viscid when moist, grayish-white, more or less tinged with rusty-red or yellow; tubes plane, attached, not large, some of them, at least, divided, whitish, becoming yellow; stipe equal, solid, firm, not annulate, whitish, dotted with reddish-brown; flesh white.

Height 2′–3′, breadth of pileus 2′–3′, stipe 3″–6″ thick.

In pastures and borders of woods. Common. Albany. Sandlake, etc. September and October. Edible.

The plant is sometimes cæspitose.

8. BOLETUS ALBUS *n. sp.*

Pileus fleshy, smooth, convex, viscid when moist, white; tubes plane, attached, subrotund, medium size, compound, ochraceous-yellow; stipe equal or slightly tapering downward, white, tinged with pink, dotted, not annulate, slightly reticulated at the top; flesh white.

Height 3′–4′, breadth of pileus 2′–3′, stipe 3″–5″ thick.

Woods. Adirondack Mountains. August.

This species differs from *B. collinitus* in its white pileus, larger and differently colored tubes, etc.

*9. BOLETUS SCABER *Fr.*

Pileus convex, viscid when moist, variable in color, brick red, gray or brown; tubes convex, depressed about the stipe or free, small, rotund, white, then grayish-yellow; stem solid, slightly tapering upward, exannulate, white, rough with small, blackish, fibrous scales.

Height 4′–6′, breadth of pileus 3′–5′, stipe 4″–6″ thick.

Borders of woods and open places. Common. June–September

Edible. Variable. It sometimes attains a very large size, exceeding the dimensions given.

10. BOLETUS CYANESCENS *Bull.*

Pileus broadly convex or expanded, dry, densely yellowish-tomentose or floccose-squamose; tubes convex, free, small, round, whitish, then yellow; stipe firm, stuffed or hollow, tomentose-pruinose, rapidly tapering toward the top, ventricose-bulbous at the base, concolorous; flesh white, quickly turning blue and purple when cut or bruised.

Height 3′–5′, breadth of pileus 2′–4′.

Banks by roadsides and in woods. Sandlake and Adirondack Mountains. August and September.

The tomentum of the pileus generally breaks up into substellate areas or scales. The exterior of the stem is firm, the interior soft or spongy. When the flesh is bruised the purple tints generally appear first, then the blue.

11. BOLETUS VERMICULOSUS *n. sp.*

Pileus broadly convex, dry, smooth or most minutely tomentose, grayish-brown, tinged with red; tubes plane or

slightly convex, free, small, round, yellow, with the mouth brownish-orange, becoming almost black; stipe equal, solid, smooth, paler than the pileus; flesh whitish, changing to blue, as also do the tubes, when cut or bruised.

Height 3′–4′, breadth of pileus 3′–4′, stipe 6″ thick.

Ground in woods and open places. New Baltimore and Sandlake. July and August.

Near *B. luridus*. I have always found this plant much infested by the larvæ of insects, so that it is with difficulty a specimen can be dried before they destroy it.

*12. BOLETUS FELLEUS *Bull.*

Pileus broadly convex, soft, smooth, pale grayish-brown or brick-red, the margin thick; tubes convex, depressed around the stipe, very long, angular, not large, pale flesh-color; stipe equal or slightly tapering upward, smooth, solid, subconcolorous, reticulated above; flesh white, or pale flesh-color; spores rose-color.

Height 4′–6′, breadth of pileus 3′–5′, stipe 6″–12″ thick.

In pine or hemlock woods and groves. Common. July and August.

Our plant is a large and fleshy one, not agreeing closely with the published descriptions.

13. BOLETUS EDULIS *Bull.*

Pileus thick, broadly convex, smooth, grayish-red; tubes convex, nearly free, long, minute, round, yellow, at length tinged with green; stipe equal, firm, solid, dull ochraceous, finely reticulated its whole length; flesh whitish, not changing color.

Height 6′, breadth of pileus 4′–6′, stipe 1′ thick.

Banks by roadsides. North Elba. August.

It appears to be rare. Edible.

14. BOLETUS SUBTOMENTOSUS *L.*

Pileus broadly convex, or expanded, sometimes slightly umbonate, dry, squamulose-tomentose, pinkish-brown; tubes convex, attached or slightly decurrent, very large, angular, compound, yellow; stipe equal, solid, yellowish-brown, paler at the top and marked with the decurrent walls of the tubes; flesh whitish, tinged with yellow, unchangeable; spores pale ochraceous with a greenish tinge.

Height 3′–5′, breadth of pileus 3′–4′, stipe 3″–6″ thick.

Low mossy ground in woods. North Elba and Sandlake. August and September.

Edible. The pileus varies in the intensity of the color and the density of the tomentum.

15. BOLETUS PALUSTER *n. sp.*

Pileus fleshy, rather thin, convex, then expanded or slightly depressed, with a decurved margin, subumbonate, dry, floccose-tomentose, bright pinkish-red; tubes large, angular, slightly decurrent, formed by wider radiating lamellæ and more narrow transversely connecting and anastomosing dissepiments, yellow, becoming ochraceous; stem slender, solid, nearly smooth, red, yellowish at the top and marked with the slightly decurrent walls of the tubes; spores elliptical, dull pinkish or flesh-colored, $\frac{1}{3000}'$ long.

Height 2′–3′, breadth of pileus 1′–2′, stem 2″–3″ thick.

Wet places and swamps among mosses. North Elba. August. (Plate 6, figs. 4–7.)

Allied to *Paxillus porosus* Berk., with which, perhaps, it ought to form a new genus intermediate between Paxillus and Boletus, and from which it differs in its more slender habit, central stem, floccose-tomentose pileus, larger pores and elliptical spores.

16. BOLETUS STROBILACEUS *Scop.*

Pileus convex, densely clothed with a blackish tomentum which breaks up into thick erect tufts or scales; tubes plane or slightly convex, white becoming darker, not large, angular, stem solid, usually scaly and colored like the pileus, whitish at the top; flesh white, changing to red then to black when wounded.

Height 3′–6′, breadth of pileus 2′–4′, stem 4″–6″ thick.

Ground in woods and open places. Common. Buffalo, *Clinton.* Utica, *Johnson.* Poughkeepsie, *Gerard.* Albany and Sandlake. July and August.

17. BOLETUS RETIPES *B. & C.*

Pileus thick, firm, broadly convex, dry, smooth or very minutely tomentose, grayish-brown; tubes concave or plane, rarely convex, attached, small, round, bright yellow; stipe equal, solid, yellow, strongly reticulated its whole length, the reticulations formed by the anastomosing of distinct firm vein-like ridges; flesh yellow, not changing color.

Height 3′–5′, breadth of pileus 2′–3′, stipe 3″–5″ thick.

Banks by roadsides. North Elba. August.

B. retipes is said to have the pileus yellow, and the stem reticulated nearly to the base—particulars which do not agree with our specimens. It is possible that future inves-

tigation may prove our plant to be a distinct species; but at present I prefer to consider it only a variety of the above mentioned species.

18. Boletus auriporus *n. sp.*

Pileus broadly convex, dry, most minutely tomentose, grayish-brown, sometimes tinged with red; tubes plane or nearly so, attached, their walls slightly decurrent on the stem, medium size, round, bright golden yellow; stipe equal, firm, solid, smooth; flesh white, unchangeable.

Height 2′–4′, breadth of pileus 2′–3′, stipe 3″–5″ thick.

Banks by roadsides and open woods. North Elba and New Baltimore. July and August.

19. Boletus Sistotrema *Fr.*

Pileus convex or expanded, nearly smooth, dry, reddish-tawny; tubes plane, attached, sinuate, except the marginal ones, bright tawny or cinnamon-color; stipe slender, equal, solid, concolorous; flesh white or yellowish, not changing color.

Height 1′–2′, breadth of pileus scarcely 1′, stipe 1″–2″ thick.

Woods and bushy places. Albany. September and October. A very small species.

New Stations of Rare Plants and Notable Varieties.

Thalictrum anemonoides *Michx.*

A form with double flowers, was found near Poughkeepsie by Miss Shattuck. *Gerard.*

Alyssum calycinum *L.*

Newark, Wayne county. *E. L. Hankenson.*

Lepidium campestre *L.*

New Baltimore. *Howe.*

Dianthus Armeria *L.*

Abundant throughout the eastern part of Long Island.

Impatiens pallida *Nutt.*

A variety with spotless flowers. Newark. *Hankenson.*

Trifolium procumbens *L.*

This is not rare in the eastern part of Long Island. I have never seen it in the vicinity of Albany, where *T. agrarium* is common, and apparently becoming more plentiful every year.

Anethum fœniculum *L.*

Newark. *Hankenson.*

Aralia quinquefolia *L.*

Helderberg Mountains. This valuable plant has now become so rare that I know but one station in this part of the State where it still lingers.

Galium Mollugo *L.*

Danube, Herkimer county. *Austin.*

Eupatorium purpureum *L.*

A form with opposite leaves. Poughkeepsie. *Gerard.*

Achillea Millefolium *L.*

A pink flowered form. Trenton Falls. *Mrs. E. E. Atwater.*

Onopordon acanthium *L.*

Greenport and Shelter Island.

Taraxacum Dens-leonis *Desf.*

Two heads on one peduncle. Poughkeepsie. *Gerard.*

Campanula rotundifolia *L.*

With white flowers. Mount Wallface. Adirondack Pass.

Thymus Serpyllum *L.*

Cemetery at Williamsville, Erie county. *Clinton.*

Polemonium cæruleum *L.*

Found around Sand Pond in the western part of Ulster county, by Rev. A. P. Van Gieson. *Gerard.*

Sabbatia stellaris *Pursh.*

With white flowers. Greenport, *Mrs. E. E. Atwater.*

Chenopodium murale *L.*

Bath Island, Niagara Falls. *Clinton.*

Parietaria Pennsylvanica *Muhl.*

A dwarf form two or three inches high. Helderberg Mountains.

Lemna Torreyi *Austin.*
Riverhead, Long Island.

Spiranthes graminea *Lindl.*
Greenport. *Mrs. E. E. Atwater.*

Carex alata *Torr.*
Riverhead, Long Island.

Carex Grayii *Carey.*
New Baltimore. *Howe.* The specimens are remarkable for having the perigynia scabrous-pubescent.

Woodsia glabella *R. Br.*
Crevices of rocky ledges at Lake Avalanche and in the pass north of it. Found before in the State at Little Falls only.

In concluding this report, I would express my thanks to the botanists who have so generously aided me by furnishing specimens and information; also to Rev. M. A. Curtis, who has rendered much assistance in the determination of fungi. The continued co-operation of botanists is earnestly solicited.

When no name is added to the reported station or stations, the plant has been found therein by the writer. Dates signify the time of the occurrence of the plant, so far as determined by the observation of myself or correspondents.

Respectfully submitted.

CHAS. H. PECK.

Albany, *January* 8, 1870.

(D.)

ENTOMOLOGICAL CONTRIBUTIONS.

By J. A. LINTNER.

I. BIOGRAPHY OF HEMILEUCA MAIA (DRURY).

On the 11th of May (1869) there was found at Center, Albany county, N. Y., a belt of eggs encircling a small twig of *Quercus ilicifolia*, which was evidently the deposit of some species of Heterocera, but which, at the time, could only be referred problematically to the Bombycidæ.

The Egg. — Its form is obovate, laterally and apically compressed; its transverse diameter is .075 of an inch, its greater conjugate .06 of an inch, and its lesser conjugate .045 of an inch. Its color is reddish-brown on so much of its apical portion as is visible when observed in the belt, and yellowish-white on the remaining part. When examined with a high magnifying power, minute blackish dots are seen sparsely sprinkled over it, in each of which is a white central point, apparently papilliform.

During the ensuing two months, five additional clusters of the egg-shells (the larvæ having emerged) were found at the same locality, from which the following description is drawn:

Egg-belt (Plate 8, fig. 3). — The belts vary in length from .25 to .60 of an inch, and surround twigs of *Quercus ilicifolia* and *Q. prinoides* which range in diameter from .08 to .16 of an inch. The smallest number of eggs in a belt is seventy — the greatest number about one hundred and seventy. While resembling, in their arrangement, those of the Lackey Moth of Europe (*Clisiocampa neustria* Linn.), unlike these, they are not deposited in a continuous spiral, but in somewhat irregular rings. Those of the first ring (the first in order of deposit)

which is invariably placed the lowest on the twig, are attached to the bark by their sides; in the next ring they are somewhat inclined; those of the succeeding rings, including the last, are placed on end, perpendicularly, with their transverse diameter at right angles with the twig. A quincuncial order of arrangement is readily traceable, *i. e.*, any one of the interior eggs is central to four others, of which two are in the ring above and two below; to these it is cemented at points midway to the apices of the lesser and greater conjugates. When the regularity of deposit has been interrupted, the quincuncial order is not maintained: but, through the crowding together of the members of a ring, the assumed central egg may be united to one or two of the lateral ones, thus giving it five or six points of union with those surrounding it. From the above-described arrangement, it follows that an extension over all the rings, of the lines joining the eggs of one ring to those of another, will give us a succession of spiral bands crossing the stem at an angle approaching 45°, and making about one circuit around it. The belt is entirely free from any covering of down or other protecting material.

Egg Cement. — The eggs are firmly united to one another and to the twig by a glutinous matter,* in which they are enveloped as they pass from the oviduct. When, by the drying of the twig and its consequent shrinkage, the belt is loosened and capable of being withdrawn, this matter is seen as rings of a black substance surrounding the points of attachment of the egg to the twig; but around the points of union of the eggs to one another it assumes a reddish color.

For this difference of color, no ready explanation presents itself. Were its black hue owing to a thickening of the glutinous matter by its gravitative flow down the egg while in a semi-fluid state, then upon the lower side of a horizontal or inclined twig, it would be found either surrounding the points of union of the egg to the adjoining ones, or collected at the apex. If it were a special secretion, deposited upon the base of the egg on its expulsion from the oviduct, different from that enveloping it, then it should not occur on the sides of the horizontally-placed eggs of the first ring, as required by their exceptional position. That it is not a chemical change resulting from contact with the bark, appears from the fact that it assumes the same character in the oviposition of several of the Bombycidæ occurring in confinement within paper, wooden and metallic boxes.

* In many of the Lepidoptera this matter imparts to the eggs their color. Among a large brood of *Telea Polyphemus* (Linn.) reared by me, one individual, after having been pinned and poisoned as were all the others, was found to have strewn her eggs loosely about her; they were without the slightest degree of adhesiveness, and all were of an abnormal uniform white color.

Experiments instituted upon the solubility of this cement, show it to be unaffected by immersion for twenty-four hours in cold water, alcohol, ether or chloroform. Subjected to boiling water in a state of rapid ebullition for the space of one hour, it became softened sufficiently to allow the eggs which were still cohering to be separated by the point of a knife. Upon the subsequent drying of the belt, it was found to be as firmly bound together as at first.

Oviposition.—The eggs are deposited in the fall, probably in the month of October, soon after the emergence from the pupa, as in the neighboring sub-family of Attacinæ, in which the female comes from the cocoon with her abdomen distended with fully matured eggs, finds her mate the same evening if there be one in the vicinity, and deposits her eggs very soon thereafter,* or in some instances a portion even before mating.† While engaged in ovipositing, the head of the moth is directed toward the tip of the twig, and she probably performs successive circuits about the stem, corresponding in number to that of the egg-rings.

Hybernation.—How it is possible for eggs, wholly unprotected as are these, to endure the rigors of winter, is still a mystery. Their film-like shell, no thicker than a sheet of delicate note paper, seems wholly insufficient to preserve unharmed the principle of life which it is destined to protect against a temperature of zero, and even several degrees lower. It might justly be regarded as a wise provision in nature that so very few of the Lepidoptera are subject to the severe ordeal of hybernating in the egg; and in the few instances where this occurs, the coverings which we find thrown over the eggs by the instinct and ofttimes cunning skill of the parent moth, appear so admirably adapted to afford them the required protection, that we might be excusable if, from partial observation, we educed a law admitting of no exceptions. Thus, among the European moths the following instances occur: The Gipsy Moth (*Ocneria dispar* Linn.) has the extremity of the body of the female thickly clothed with downy hairs, which she employs for bedding, for singly enveloping, and for exteriorly coating, in beautiful regularity, her deposit of eggs intended to survive the winter. The *Cnethocampa processionea* (Linn.) deposits her eggs in July on the trunks of trees, first coating the bark with a gummy matter extruded from her abdomen, which she covers with hairs plucked from her terminal tuft, and upon these places, in regular order, her eggs, completing the operation by spreading over them additional hairs of a color so resembling that of the bark as to serve the additional pur-

* A *Telea Polyphemus* which emerged with me on the 18th June, coupled during the night, oviposited the following day, and died on the 22d June.

† Trouvelot, in the *American Naturalist*, vol. 1, page 36.

pose of eluding observation. *Oeneria salacis* (Linn.) employs for a protection a thick covering of a wool-like substance. *Dicranura verbasci* (Godt.) and *D. furcula* (Linn.) which place their eggs singly or in two's and three's, also cover them with hairs from their body. *Lozotænia rosana* (Stephens) whose eggs occur in oval clusters on trees or neighboring objects, guards them with a yellowish cement.

Of our moths, we have, unfortunately, but a very limited knowledge of their early history. Of two species, their hybernating clusters are familiar to us, viz., those of *Orgyia leucostigma* Harris, a moth which has abounded in Albany during the last and several preceding years to such an extent as to prove a serious nuisance, even defoliating some of our shade trees; and those of *Clisiocampa decipiens* Walker, the imago of the common apple-tree caterpillar, allied to the European *C. neustria*. Both of these seem admirably protected from cold and other exposure; the former — an oblong mass — by a bedding upon the cocoon from which the female emerged, and a thick covering of a tough, white, frothy secretion, as may be seen in numerous specimens on the trunks of the trees along our streets; the latter by a thick, compact, gummy substance entirely coating the belt and binding it to the twig of wild cherry or apple. We may venture to ascribe the same method of oviposition and protection to *Clisiocampa sylvatica* Harris, the eggs of which have never been observed by me, nor am I able to find any record of their observation.*

The eggs of the Catocalas also hybernate, as observed in Europe by

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* Since the above was written the egg-belt of this moth has been described and figured in the *American Entomologist*, vol. ii, p. 261. Mr. Riley states that "with each egg is secreted a brown varnish which firmly fastens it to the twig and to its neighbor, and which, upon becoming dry, forms a carinated net-work of brown over the pale egg-shell." In this thin covering of varnish over the eggs of this species, we may note a very near approach to the naked eggs of *C. neustria*, to which species our American moth is so closely allied in appearance, that were it not for marked larval difference, we might believe the two identical.

Mr. Riley has also communicated to me the interesting fact, that the egg-belts of *C. decipiens* occurring in Missouri, are covered with a coating of gum much thinner than are those which occur in New York, specimens of which were shown him. In this State, the eggs are entirely hidden beneath their smooth, thick coating, while in those of Missouri they are distinctly visible. A figure of one of these belts, from Missouri, is given in the *American Entomologist*, vol. i, p. 208, where the moth is referred to under its familiar synonymical name of *C Americana* Harris. The eggs are represented as so entirely destitute of any coating, that it may be questioned whether they were not figured from the shells after the larvæ had emerged and consumed most of the gummy matter, as they are accustomed to do, before commencing to feed upon the leaves.

This variation in the covering of these egg-belts presents the interesting subject of inquiry, whether it may not be the result of climatic causes, and an adaptation to the degree of protection required. If it be so, we shall find the covering diminishing in thickness as we follow the moth southward in its range from Maine to Georgia

Dr. Speyer, and in this country by Mr. Riley. They have been found by Mr. Riley, in clusters, beneath the bark of the trees upon which the larvæ feed, appressed closely together and partly overlapping, with no protection beyond that afforded by the shelter of the bark.

But that these coverings are not indispensable to a safe hybernation is shown by the entirely naked and exposed egg-belts of *H. Maia*, and of the Lackey Moth (*Clisiocampa neustria*) of Europe. The eggs of the former moth, from which emerged the larvæ which form the subject of this paper, endured a winter in which the thermometer in their immediate vicinity fell to 8° below zero of Fahrenheit.*

Some experiments which have been made to ascertain the effects of cold upon the eggs of insects have disclosed the fact that they possess a remarkable power of retaining their vitality under very low temperatures. The eggs of a Vanessa and of several other Lepidoptera, were exposed by Spallanzani for five hours to a freezing mixture indicating −22°, without the least injury resulting to them, for they all subsequently disclosed their larvæ.

It is probable that the eggs are in reality not frozen, but that their contents continue fluid under the greatest cold to which they may be subjected in their natural exposure. Some eggs of *O. leucostigma* before referred to, which I had divested of their covering and left exposed during a portion of the winter, were examined by me under a temperature of 18° below zero, and were found to be in their natural fluid condition.

For this extraordinary capability of resisting cold, no satisfactory reason has been assigned. Among other conjectures, it has been suggested that a spirituous or an oleaginous element might possibly enter into the composition of the eggs.

Hatching. — The larvæ emerged on the 27th of May, sixteen days after they had been brought within doors, and deposited in a glass-covered box. Their escape from the shell was, without a single exception, from the apex, through a regular elliptical opening eaten by the larvæ, corresponding in outline to a depression previously existing. A very few of the eggs did not develop.†

Egg-shell. — The shells are translucent, of a brownish-yellow color superiorly, and whitish on their basal half. No portion of the shells, beyond that above mentioned, was eaten by the larvæ.

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* The eggs of our November Moth (*Oporabia dilutata* Albin) — pronounced by Fitch identical with the European species — are doubtless deposited in the month of November, nakedly, upon the twigs or buds, as are those of its European allies.

† In the belts subsequently collected, there were found quite a number of undeveloped ova. In one belt, but one of the eggs composing the first ring had produced its inclosed larvæ.

Young Larvæ. — When first escaped from the shell, they are of a pale reddish-brown color, which gradually changes in the course of a few hours to fuscous. Their length is .13 of an inch. Under a high magnifying power, the larva appears as follows: The head is shining black and bears a few whitish hairs of the length of about one-half its diameter; its dimensions taken from the case after its molt are, length .032 of an inch, breadth .03 of an inch. The body is glossy black with minute granulations dorsally and laterally, reddish-brown and smooth ventrally. Its armature consists of eight rows of spines on the anterior segments (varying from five to eight rows on the other segments as stated hereafter) which are glossy black, subcylindrical, muricate, in length nearly equaling the diameter of the larva, giving out at the apex four diverging spinules and a curved ciliated bristle of nearly double the length of the spine. The spines of the three anterior segments in the six superior rows are forked at about their apical fourth, with each fork bearing its spinules and bristle as above. The anal plates of the larva have on them a few black hairs.

There being no food at hand, the larvæ collected in a body in an angle of the box in which they were confined. The following day the colony was several times observed in motion, probably in quest of food, in regular procession of two or three abreast. On the 30th, after their refusal of a half dozen species of leaves, oak-leaves were given them, and upon these they immediately commenced to feed vigorously. Beginning at the margin of a leaf, they ate inwardly, consuming in their progress even the larger veinlets, but not the midrib except at its tip. On the 2d of June, they had collected in three clusters — two on separate leaves and the third on a twig — and had assumed their position for molting on a slight web spun beneath them, in which the hooklets of their anal legs were firmly implanted.

First molt. — On the morning of the 4th of June, they were found to have undergone this change during the night. Their cast skins (exuviæ) were adhering to the surface to which the larvæ had been attached, and had not been fed upon by them; the detached head-cases were strewn over the bottom of the box. They now measure three-tenths of an inch in length. The head is shining black, with a few black hairs. The body is blackish, and when highly magnified, granulated. The spines are glossy black, with three or more branches, in the truncated tips of which are inserted a bristle of about one-third the length of the spine. The spines of the two anterior segments are longer than the others; on segments three to seven inclusive in the two superior rows, the main spine (which is trifid on segment three, bifid on segment four and simple on segments five to seven) is acutely ter-

minated, while its principal branches have the termination and armature of those elsewhere.

At this age, the larva was observed to carry a thread with it in all its movements over the leaf.

On the morning of the 9th, the larvæ had taken position for another molting, and were of the length of .45 of an inch.

Second molting. — Two and a quarter days from the time above noted, or at noon of the 11th, the first of the colony molted for the second time, and the entire number before the close of the day.* A half hour after the change, the head of the larva was of a rufous color. The body, fuscous with obscure red stigmatal spots, and sprinkled with rufous granulations, of which there is a larger one laterally on each segment below the subdorsal row of spines. Spines, rufous, with fulvous branches; those of the two superior rows tipped with a bristle, often black and numerously branched; the lateral spines less branching, and tipped with longer fulvous bristles. The legs and prolegs, rufous; the former with the tarsus black. Three hours after the molt the larvæ had changed to a uniform reddish-brown color.

During this stage of development, the larvæ disclosed characters in accordance with descriptions and representations of *H. Maia*, which enabled me to refer them to that species.

Third molting. — June 20th.† Length of larva, one inch. Color, fuscous. Spines of the two superior rows on segments 3 – 10 and the mesial one on segment 11, red with their terminal third black, simple, fasciculate, thickly radiating from a black, slightly elevated tubercle; the other spines are glossy black, sparsely branched, the branches cylindrical, whitish near their tips, and having inserted in them a delicate, acute black bristle. Stigmata linear, tawny colored.

Sting of larva. — Some experiments made with the larva subsequent to the molting above recorded, in examination of its stinging powers, which were first noticed at this stage of its growth, indicate its possession of this means of defense in a degree considerably exceeding that of the closely allied species, *Hyperchiria Io* (Fabr.).

A larva was dropped three or four times from a height of about ten inches upon the back of the first joint of the thumb. The sensation did not differ materially in kind from the sting of the nettle, but was more acute. In a few minutes the surface became reddened, and in a short time numerous slightly elevated whitish blotches made their appearance, accompanied with a burning and itching. The following

* Of their exuviæ, a small number had the head case attached; of those which were separated, nearly half had the collar, with its spines, united to the head-case.

† About one-half of the cast skins were separated from their head-cases, and nearly all of the cases had attached to them the collar, bearing its four spines.

day the thumb could not be bent without experiencing a sensible degree of pain, which was materially increased by an attempt to bring the joints to a right angle. This stiffness of the joint continued for four days. When the blotches subsided, small purplish spots of coagulated blood appeared in their place, which by degrees became more circumscribed, until after the lapse of a few days, when they presented an appearance similar to that of grains of gunpowder burned beneath the skin. These gradually disappeared; those nearer the surface by a scaling of the skin above them; those deeper, removed by the slower process of absorption, were visible at least two weeks.

When the larva was permitted to fall upon the thicker skin of the palm of the hand, a slight stinging sensation was experienced, and minute purple dots were developed, continuing a shorter time than the above.

The sting is doubtless the result, not of broken tips of the spines remaining in the flesh — for none such could be observed by careful scrutiny with a lens — but of a poison secreted by the larva, and probably injected through a minute aperture in the tip of the spine. Whether its excretion is voluntary or involuntary was not determined, it not having occurred to institute the simple experiment by which that point could readily have been ascertained. A slight motion of the larva, apparently a contractile one, was frequently observed to accompany the sting; but this may have been either defensive, or simply the consequence of alarm at being rudely touched.

Some tips of the spines clipped off and placed between slides under a high magnifying power, showed, under varying pressure, a motion of a fluid within them; but no apical opening could be discovered for its escape.

The ability to inflict a sting does not belong to all the spines of the larva, but only to those of the two subdorsal rows on segments three to ten, and the dorsal spine on segment eleven. These differ from those elsewhere on the body in their fascicular arrangement, their shorter length, the regular taper of the branches, and their tawny color, as appears in detail in the description given of the mature larva. With this interesting structural peculiarity in mind, the larva may be handled with impunity, as was repeatedly done with the fifty or more individuals composing the colony from which these notes were drawn, in the frequent transfers which they required as they approached maturity, to fresh food and cleansed quarters. With proper care, the thumb and fingers could safely be passed along their sides and beneath them, slowly raising them from the leaf or stem to which they were attached; but if attempted too hastily, the larva throws itself in a circle, projects its defensive armor, and inflicts a sting which effectually releases it from the grasp.

Fourth molting. — June 28–29. Length, one inch and one-tenth; diameter, two-tenths of an inch; including bristles, four-tenths of an inch. Upon first emerging from the old skin, the head and all the spines are pale red. After a few hours, the head becomes reddish-brown, and the spines of their normal color; the body is black with numerous small, whitish, oval papillæ, from each of which a short black hair proceeds. The stigmata are acutely ellipsoidal and white.

The head-cases of the larvæ with the spined collar adhering by one of its corners, with few exceptions remained attached to the cast skin, in this and in the following molting.

On transferring the larvæ to fresh leaves on the afternoon of the 9th July, five were found in position for molting, attached by their prolegs to the twigs, with their heads downward. On the morning of the 10th, nearly all had taken their position. Length, 2.5 inches; diameter, .28 of an inch.

Fifth molting. — July 11–12. Length, one inch and one-half; diameter, one-fourth of an inch. The superior spines on segment 2, have short, fascicular, tawny, black-tipped spinules, like those of the two dorsal rows, encircling their base; on segments 3–11, the lateral row of spines (second from above) have similar fascicular spinules bordering the upper half of their base, as have also the two ante-superior spines of segment 12 at their anterior basal half. This interesting impartation of the characteristic features of the seventeen dorsal fascicles to each one of the surrounding spines, to a greater or less extent, encircling some and bisecting others, is a feature developed at this molting.

At no stage of its growth, is the exuvia eaten by the larva, as is done by *Hyperchiria Io* at its first and second moltings, but probably not at those later.

On the 17th July several of the larvæ descended from the branches on which they had been feeding, and gave indications of having attained maturity.

Mature larva. — Length from one and three-fourths to two and one-half inches; diameter, three-tenths, or, inclusive of lateral spines, six-tenths of an inch. The head is round, depressed at the clypeus, with a few short, brown hairs. The collar is glossy and is bordered in front with four of the eight spines, directed somewhat anteriorly, with which the first segment is armed. The body tapers moderately at the extremities, is fuscous, sometimes black, sprinkled with numerous whitish, oval spots bearing each a short fuscous hair, which are confluent along the stigmata. The two superior rows of spines on segments three to ten inclusive are fascicular, spreading over the anterior half of the segment, thirty to forty in each fascicle, cylindrical, tawny-colored, tapering near their apex to an acute black tip; the spines of the

lateral row, the substigmatal and the ventral (the latter interrupted on the proleg-bearing and penultimate segments) are twice the length of the superior spines, of a glossy black color, with a tapering trunk, which gives off laterally and apically about twelve cylindrical branches of nearly equal length with the trunk; of these branches the lateral ones are white, translucent and mucronate, having the terminal spinule, black, slender, acute and of about one-half the length of the branch from which it proceeds. The number of spines borne by the several segments is from five to nine, as appears in the following formula: $\frac{1,2,3,4,5,}{8}$ $\frac{6,7,8,9,}{6}$ $\frac{10,}{8}$ $\frac{11,}{5}$ $\frac{12.}{7+2.}$ The stigmata are of the color of the abdominal spots, and acutely ellipsoidal in outline. The caudal plates and shield are deep red, with pitted surfaces and short hairs. The legs are glossy black, with black hairs. The prolegs are red, of the shade of the head, with black hairs exteriorly, granulated interiorly, a smooth glossy spot externally, and with fuscous terminal hooklets. Beneath, a median line of round red spots, of which there is one on the middle of each segment from five to eleven.

Food-plants. — The larva probably feeds on most, if not all, of our oaks. My colony, during its progress to maturity, partook of five species and was readily changed from one to another. Mr. Walsh states* that "the eggs of the moth are deposited, out west, on the scrub willow and different species of oak;" from which it may be inferred that the former (unknown to us under its local name) is the plant on which it more frequently occurs in that region. It has also been reported to Mr. Walsh as occurring on the wild cherry and on black walnut.

Parasites. — Although so enveloped in spines as scarcely to leave a space sufficiently exposed for other than a random thrust of an ovipositor, our larva does not enjoy entire immunity from parasitic attack. Of a colony of about thirty individuals found after their second molt, eight of the number proved to have been ichneumonized, and during the months of June and July, two species of parasites were obtained from them. Several days after the larvæ were collected, two of them, which had meanwhile increased very little in size, and had rested frequently from feeding, were found apparently affixed to a stem by their anterior and posterior legs, with the central portion of the body raised up and enfolding in its curve, a parasitic cocoon lying between it and the stem and closely clasped on each side by the prolegs. The cocoons disclosed their imagines on the 26th of June and 3d of July. They were submitted to Mr. E. T. Cresson for determination and were found to be the *Limneria fugitiva* (Say), which Mr. C. states "seems also to

* *American Entomologist*, 1868, vol. i, page 186.

be parasitic on *Dryocampa stigma*."* An examination of the remains of the larva showed that only the skin was left; the parasite through its consumption of the entire interior portions had attained such a size that in the contraction of its pupal change, it had broken through the larval skin ventrally, disclosing one-half of the cocoon, while the other half occupied all of the skin except the extremities. The cocoon is regularly oval in form, and measures .35 of an inch in length.

Of the second parasite twenty-five individuals were obtained from six larvæ between the 5th and 12th of July, the number from each larva varying from one to ten. Their small, white, elongate-oval cocoons were spun upon the outside of the larva, and after a few days of pupation (the period was not noted) gave out through their apical lid the imago, which, according to Mr. Cresson, is an undetermined species of Microgaster.

The editors of the *American Entomologist* have had sent to them a Maia larva with its body covered with the egg-like cocoons of some Hymenopterous Ichneumon, the species of which had not been ascertained by them, but which was probably the above Microgaster.

Pupation.—After about a day passed by the larvæ in traveling around the box in which they were inclosed, among and beneath the leaves with which the ground was strewn, they selected their positions for pupation. The larger number prepared for themselves a simple cell, by scooping out the ground from beneath a leaf, to the depth of the diameter of their body; a few buried themselves just beneath the surface, barely covered by a mantle of grains of earth, loosely spun together.

On the 22d of July occurred the first transformation to the pupa, and the last about August 1st. Several of the larvæ died without entering their pupal state, which may have been the result of transferring them too soon to the pupa-box. No change of color was perceived, indicating their having arrived at maturity;† but they were presumed to have attained that stage when they descended from the leaves, and seemed disinclined to remain upon them when replaced, or to partake of food. About forty of the colony passed safely through their moltings, and assumed their pupal form.

Pupa (Plate 8, fig. 2).—Color, black; cephalic and thoracic region uniformly rounded, with the exception of a slight sutural elevation between the first and second segments; antennæ-cases and leg-cases

* Some parasites, bred by Mr. Bassett of Waterbury, Ct., from larvæ which were identified by Mr. Riley as those of *Dryocampa senatoria*, were, upon examination, found to be identical with these. In the larval remains from which they had been procured, a similar cocoon had been formed, and occupying the same position in relation to the larva as those above described.

†Among the Sphingidæ, the readiness for pupation is unerringly indicated by a material change in color to duller and diffused shades.

showing no relief; their surface, as also that of the wing-cases, rough or crape-like; the abdominal portion, conical in the male, and slightly ovoid in the female. The margins of the three sutures pertaining to segments 4–7 have a plaited appearance; the next three sutures are regularly striated, as if milled on their anterior margin, as appears more distinctly when the pupa-case has been extended by the escape of the imago; the anterior margin of the eleventh segment is prominently plaited. The terminal spine is triangular, flattened, and ends in a number of short, brown, bristly fibres. Length of the male pupa, .80 to .95 of an inch; of the female, from .95 to 1.10 of an inch; diameter of male, .31 to .38 of an inch; of female, .38 to .42 of an inch.

The pupa may be readily separated from that of *Hyperchiria Io* (Fabr.) by the absence of the short ferruginous hairs which characterize the latter.

Imago.—The moth has been described and figured by various authors from the time of Fabricius to Harris, and its description at the present would, therefore, be quite unnecessary. In the last edition of Harris' *Insects Injurious to Vegetation*, an excellent figure is given of it. Its translucent crape-like wings, the white mesial band traversing the black wings, the conspicuous red anal tuft of the male—combine to render it one of the most beautiful of our moths, and a valued addition to entomological collections.

The first imago from the above pupæ emerged on September 18th, a second on the 24th, a third on the 29th, a fourth on the 30th, and the last for the season on October 4th. Of these six individuals, only one was a female.

Metamorphoses.—For convenience of reference, the time required for the several changes embraced in the transformation of *H. Maia* are herewith tabulated:

From hatching to first molt	8 days.
" first molt to second molt	7 "
" second molt to third molt	9 "
" third molt to fourth molt	8 "
" fourth molt to fifth molt	13 "
" fifth molt to maturity	6 "
" maturity to pupa	5 "
" pupa to imago	58 "
Duration of larval state	56 "
Duration of pupa state	58 "
From the egg to the imago	114 "

Discrepancies.—The published accounts of this moth are so uncertain and conflicting as to show a very imperfect knowledge of its larval state, and of the method and duration of its pupation. The figures given by Abbot of the larvæ are quite inaccurate; and he also

states that they enter the ground for their transformation. Harris says that the moth has been reported to him as occurring in July and the beginning of August. The description of the larva given in Morris' Synopsis is also inapplicable to it. In a notice of a communication read by Mr. Wood before the Entomological Society of Philadelphia,* it is asserted that the larvæ "went into the ground the last of August, 1859, and became perfect insects on October 10th, 1860." We believe this statement to be an error, which may have occurred either in inserting in the report the supposed years not mentioned in the communication, or the transformation of the August (1859) larvæ into imagines in October of the same year may have escaped the observation of Mr. Wood "near the sea-shore;" and he would, therefore, naturally refer the moths observed by him in October, 1860, to the larvæ of the preceding year. It is very improbable that a transformation, requiring less than two months of a cool, within-door temperature during the latter part of summer, would, under natural conditions, be extended over an entire summer and prolonged to fourteen months. (See note appended.)

Mr. Walsh writes of it:† "The larvæ are at first entirely black. When full grown they have a yellow band, variegated with short black lines on each side of the body; the head and collar are chestnut-brown. During the month of August they descend into the ground, where they change to chestnut-brown chrysalids." Our larvæ were without the band and short black lines, and the pupæ were chestnut-brown only in the brief interval between the casting of the larva-skin and their assumption of their normal color.

Rarity.— The moth is quite rare in the State of New York. It had never been taken by me during fifteen years of collecting; and I have heard of its capture but once in this State, an individual having been caught a few years since in the vicinity of Albany. The number of clusters of its eggs found at Center, without search having been made for them, would indicate a greater frequency of its occurrence.

Its rarity may find an explanation in the social habit of the larvæ during the first half of their existence. Unfortunately possessing a color in marked contrast with the leaves on which they feed, even a solitary individual would be but illy fitted to escape the searching eye of bird or parasite that preys upon it; but assembled in a compact mass, and feeding without the slightest attempt at concealment, it is simply impossible for it to elude detection. Its formidable array of spines undoubtedly induces many of the insectiverous birds to pass it by

* *Proc. Ent. Soc. Phil.*, 1867, vol. 1, p. 46.

† *American Entomologist*, 1868, vol. 1, p. 186.

unmolested. A more courageous bird, venturing an experimental taste, may find in the stinging bristles, as it passes down its throat, no inducement to repeat the experiment. But as our cross-bills (*Curvirostra Americana* and *C. leucoptera*) are furnished with a mandibular structure peculiarly adapted to opening the cones of hemlock and pines and extracting their seeds, so there are probably birds specially fitted by formation of beak or method of feeding to find in our repellant *Maia* a harmless and attractive morsel. To such an one, the discovery of a colony of the larvæ would be equivalent to the destruction of each individual member. From a belt of eggs now in my possession, a brood of larvæ, numbering over one hundred, had emerged at Center, and were feeding socially on a small bush of *Q. prinoides*. Desirous of instituting a comparison between their development under the conditions there existing, and my colony being reared in confinement, I observed them on several occasions until after their second molting. Returning after an interval of three days, not an individual remained on the bush, nor was I able by a rigid search to discover a single one on any of the several oaks surrounding it. They had not scattered, as they probably do when further advanced; but the entire colony had without doubt been destroyed.*

Habits of the Imago.— The moths reared by me manifested a great degree of restlessness upon their emergence from pupa, and an apparent disinclination to accept the provision made for the suspended position assumed by them during the expansion of their wings, viz., a thin, coarse-threaded muslin covering of the pupa-box, which had been found well adapted to the wants of large numbers of newly-emerged Lepidoptera. A small branch of oak placed in the box

* From an observation subsequently made, we have reason to believe that very efficient destroyers of these colonies of larvæ are to be found among the "bugs" of the order of Hemiptera, especially in the family of Pentatomidæ. In the early part of June, a small number of these larvæ were discovered on their usual food-plant, and near them was the egg-belt, of about the ordinary size, from which they had emerged. Thinking that the colony might, from some cause, have separated, the bush and the adjoining ones were examined in search of the remainder, without finding any trace of them. Returning to the larvæ to secure them for rearing, the explanation of their reduced number was disclosed in the discovery of an Arma in proximity to them, with one of them impaled upon his beak (rostrum of Fabricius). Finding the locality a favorable feeding ground, he had no doubt selected it for his abode, taking one from the company as often as his appetite demanded, until their original number of one hundred and ten, as indicated by the egg-shells of the belt, had been reduced to twenty-two (they were at this time between their second and third moltings). In a few days the last one of the brood would doubtless have been appropriated by the intrusive guest. To the kindness of Mr. Uhler, I am indebted for its determination as the *Arma modesta* of Dallas — congeneric with a valued ally, as shown by Riley, in our contests with *Doryphora 10-lineata* Say, for the preservation of our potato-vines, viz., *A spinosa* Dallas, and also nearly allied to another friend, *Podisus placidus* Uhler, which preys upon the current-worm.

proved no more acceptable; nor were they satisfied with any of the several objects or surfaces offered them. Their singular activity at this stage suggested the suspicion that the expenditure of a liberal amount of physical energy must necessarily precede their perfect development.

The same disposition was again manifested very soon after the full expansion of their wings. A large proportion of the Bombycidæ, and all of the subfamily of Ceratocampinæ with which *Maia* is grouped, so far as we are acquainted with their habits, are characterized by a prolonged state of inactivity, or lethargic condition, following their imaginal development, from which they are not readily aroused in the process of pinning, or even by two or three unsuccessful efforts properly to insert the pin. But so marked is the contrast presented by *Maia* that, unless its apparition be carefully watched, and the individual pinned within an hour after attaining its full development, a perfect specimen can rarely be obtained. It resumes its movements over the sides of the breeding cage, and the continual fluttering of its wings, although comparatively moderate, suffices very soon to divest it of many of its slightly attached wing-scales; the attempt to pin it while in this excited condition is rarely accomplished without seriously marring its beauty.

The flight of the moth has been observed by Mr. William Calverley, of Utica, N. Y. He informs me that numbers were seen by him from the 18th to the 25th of October, in oak openings, at Kankakee, Indiana, where they were commonly known as the "deer moth." Their flight was short, and usually terminated by their suddenly dropping in the grass, where they could very seldom be found, although the spot of their fall was carefully noted, and immediate search instituted. Several were taken by him, by striking them down during flight with his hat.

Geographical range. — Our knowledge upon this point is not very full. It is known to extend from Maine through each of the sea-board States to Georgia. In its western distribution, we have it reported from Indiana, Illinois,* Missouri† and Iowa.‡

Synonymy. — In the following table the principal authors only, who have described or written of this species, are cited, omitting several minor references occurring in our scientific journals and other publications:

Phalæna (Bombyx) Maia Drury. Illus. Nat. Hist., 1773, II, p. 42, pl. 24, f. 3, ♂.
Bombyx Proserpina Fabr. Syst. Ent., 1775, p. 561, n. 17.
Phalæna Maja Cramer. Pap. Exot., 1776, II, pl. 98, p. 3, f. A. ♂.
Bombyx Proserpina Gmel. Linn. Syst. Nat., 1788–93, n. 2407.
Bombyx Proserpina Fabr. Spec. Ins., 1781, II, p. 173, n. 31.

* The *American Entomologist*, vol. i, p. 186. † Ib. p. 246. ‡ Ib. p. 252.

Bombyx Proserpina Fabr. Mant. Ins., 1787, II, p. 110, n. 35.
Bombyx Proserpina Fabr. Ent. Syst. em., 1792, III, p. 419, n. 40.
Bombyx Proserpina Pal. Bauv. Ins. Af. Amer. Lep., 1786–97, pl. 24, figs. 2, 3.
Bombyx Proserpina Olivier: in Enc. Method. Hist. Nat. Ins., 1789, V, p. 37, n. 48.
Phalæna Proserpina Smith. Sm.–Abb. Lep. Ins. Geor., 1797, II, p. 99, pl. 50, ♂, ♀
Saturnia Maia Hübner. Verz. Schm., 1816, p. 157.
Saturnia Proserpina F. Harr. Cat. An. and Pl. Mass., 1835, p. 72.
Saturnia Maia Westw.–Drur. Illus. Exot. Ent., 1837, II, p. 45, pl. 24, f. 3, ♂.
Saturnia Maia Drur. Harr. Rep. Ins. Mass., 1841, p. 285.
Saturnia Maia Duncan. Nat. Lib., 1845, XXXII, p. 154, pl. 16, f. 1.
Saturnia Maia Drur. Harr. Treat. Ins. New Eng., 1852, p. 305.
Saturnia Maia Emm. Agric. N. Y., 1854, V, p. 231, pl. 39, figs. 2, 3, ♂, ♀.
Hemileuca Maia Walker. Cat. Lep. Br. Mus, 1855, v. VI.
Saturnia Maia Drur. Morr. Synop. Lep. N. A., 1862, p. 221.
Saturnia Maia Drur. Harr. Ins. Inj. Veg., 1862, p. 396, f. 193, ♂.
Euchronia Maia Packard: in Proc. Ent. Soc. Ph., 1864, III, p. 383.
Hemileuca Maia Gr. and Rob: in Ann. Lyc. Nat. Hist. N. Y., VIII, p. 376.

NOTE.—Since the above was written, I observe that Mr. P. S. Sprague reports* that from a brood of *H. Maia* which he reared from the larvæ, a portion emerged in October, and one deformed specimen in the following May, and that according to Miss C. Guild, "of the same brood of larvæ all going into the chrysalis at the same time, part came out in October and others not until the following October, some lying in chrysalis one year longer than others." This statement of Miss Guild conforms to that of Mr. Wood, previously cited, but it seems so remarkable that a moth should have three distinct periods of emergence, viz., September–October, May–June and October of the following year, that we are not prepared to receive it as an accepted portion of the history of our insect, without additional confirmatory evidence. It is not very rare among the Sphingidæ to have a pupa pass over one spring to emerge the following year, but in these instances, there is not, to our knowledge, a regular previous late-summer or early-fall brood, as with *H. Maia*.

From my observations it appears that a limited number of the moths emerge after a pupation of about two months. Much the larger portion of the pupæ of my colony survived the winter. On June 4th, one produced the moth; thence to July 4th, five additional ones emerged. An examination of the pupæ a month or two thereafter, showed the remaining ones to be dead. While the number of moths produced as above in the summer was the same as the number in the fall (six in each instance), yet the fact of most of the pupæ continuing alive during the winter, would indicate the summer as the regular period of appearance. This, however, seems to be at variance with Mr. Sprague's observations.

* *Canadian Entomologist*, 1859, vol. i, p. 41.

I embrace the present opportunity to record the additional fact, that, at Center on Sept. 19, 1870, I saw four specimens of *H. Maia* in flight at midday; and, at a distance not permitting of positive identification, what I believed to be three others. Its occurrence was in a portion of the Center locality which I visited on this occasion only, and am therefore without knowledge of its appearance at this place at other seasons or of its abundance. The flight was rapid, in a direct line, and disclosed the same phenomenon of sudden disappearance as noticed by Mr. Calverly, so that I was unable to effect a capture. Its midday flight is undoubtedly voluntary, for in most of the above instances the moth was first observed so remote from me as to exclude the idea of its being disturbed at my approach.

Of the larvæ referred to in the foot note of page 150, a small number were successfully carried through their several transformations to their perfect state. On the 30th of September, a moth presenting a remarkable and beautiful variety was disclosed, which will be found faithfully represented on Plate 8, fig. 1.

The anterior wings above are wholly black, with the exception of some orange scales on the discal cross-vein and submedian nervules. Beneath is a faint whitish band, one-half line in diameter, consisting of rather long and delicate hairs, implanted among the black scales; if the surface of the wing be brought in plane with the eye and observed from its outer margin, the white hairs then appear as a distinct white band. In normal specimens of the species, this band on the lower surface is usually about double the width of that of the upper.

On the posterior wings, the band is quite narrow and only extends to the subcostal nervure, instead of reaching the costal margin as ordinarily. The black of the basal region unites with the discal spot, and the white band is not elbowed behind the cell. Beneath, the band corresponds in outline with that of the upper surface, and at a point on the costa, which it would reach if extended, are a few white hairs. Expanse of wings, 2.6 inches.

II. OBSERVATIONS ON MELITÆA PHAETON. (FABR.)

There were taken at Center, July 6th, two males and one female of the above species, which, from their worn appearance, had evidently been abroad for several days. Owing to frequent rains and unusually cold weather, the locality had not been visited during the preceding four weeks, except on the 15th and 22d of June — the latter a very unfavorable day for the flight of diurnals: the first apparition of the species, therefore, for the present year (1869) could not be noticed. In a record kept by Mr. Otto Meske, of Albany — an enthusiastic student of entomology, who for several preceding years had diligently collected the Lepidoptera of this vicinity — the first capture of this butterfly is noted on June 30, 1868, and June 19, 1867.

Observing the abdomen of the above female to be much distended, apparently with eggs, she was pinned (otherwise uninjured) in a box. Upon opening the box on the 9th of July, a cluster of eggs was found deposited therein, numbering about one hundred.

The eggs were of a pale orange-color, smooth, moderately pyriform, with a slight apical concavity. On the 12th they were observed to have changed to a brownish color. On the 13th, they were of a reddish-brown, and had developed some coarse ribs. By the 17th, they had passed into a purple shade, and were flattened apically. On the 28th, they had assumed a grey shade, and were marked with a black spot at the apex, indicating the position of the head of the inclosed larva.

The larva emerged from the eggs July 29th. Their length was six-hundredths of an inch. The head was round and of a glossy black; the body of a dull, pale green, bearing some short, whitish hairs. Their motions were very sprightly. Showing a disposition to leave the stem of *Chelone glabra* on which they had been placed and commenced to feed, they were inclosed in a small tin box, with a few of the tender, terminal leaves.

On the 6th of August occurred their first molting. The larvæ now measured one-tenth of an inch in length. The head was shining black, and bilobed, and the collar was also black; the body of a pale brown shade, with rows of short black spines, and with scattered whitish hairs. Of the large number of eggs deposited, but twenty larvæ remained at this date, and the dead bodies of several others were lying in the box.

The larvæ fed on the lower portion of the leaf (leaving the upper cuticle), within a web which they had spun beneath it and extending thence a short distance to the side of the box, within which they could be seen at rest or diligently employed in adding to the web.

The second molting commenced on the 12th of August, and was completed on the 14th. The length of the larvæ was now one-fourth of an inch. Head black, subcordate, with black hairs; the body yellow-brown, darker at the extremities, with seven rows of black spines having conical trunks and numerous fine branches.

When about in readiness for their third molting, they had attained a length of four-tenths of an inch, and a diameter of seven-hundredths of an inch centrally, with attenuated extremities. The anal and the two anterior segments are now black, and the third partially so; the rest of the body is of a clear brown, with the incisures and two narrow bands on each segment, black. The spines of the dorsal row are small; in the next row (subdorsal) they are large and placed on an extended black base; in the next (lateral) they are slightly larger than the dorsal, and like them, are located on the anterior of the segment; those of the next (substigmatal) row are of the size of the subdorsal and correspondingly located on the posterior of the segment. Some of the spines of the posterior extremity of the body are branchless.

August 20th, the larvæ were transferred to stems of *Chelone* within a glass jar, when they at once commenced spinning a web between some leaves, but not drawing them together. On the 22d, some of their exuviæ were observed in the web, indicating a molting (the third) of some of their number. Although fresh leaves were several times given them, they partook of no food after their removal to the jar, nor, judging from the condition of the leaves, had they eaten for a few days prior to their removal — perhaps not after they had attained the period just preceding their third molt. Toward the last of the month, some of the larvæ died, and by the middle of September none remained alive.

From the above observations, and from similar ones on *M. Nycteis*, we may conclude that these two Melitæas, at least, hybernate without attaining any considerable size, and probably after their third molting. It would seem, that, in preparing for their hybernation, they collect within a slight web spun between a couple of leaves, in which shelter they remain, and fall with the leaves to the ground. An additional covering of leaves above them would secure the amount of moisture necessary for their preservation, and serve to shield them from the winds and frosts of autumn, until the snows of winter throw over them its protecting mantle. About the 20th of May (inferring from larval observations on *M. Nycteis*) the larva awakens from its protracted repose of from eight to nine months duration, and seeks its food. As

its proper food-plant can hardly have made its appearance thus early in the season, some other plant probably serves its purpose.*

Very many of the larvæ inevitably perish during the long period of their lethargic condition and consequent abstinence from food, in which interval they are necessarily subjected to trying vicissitudes of temperature, to various hygrometrical conditions, and to destruction from many foes. When to these we add the increased danger to which they are exposed during the earlier stages of their existence, it will not be a matter of surprise, that, of the eggs deposited, so small a proportion — estimated at from one to four per cent, as the seasons may prove more or less favorable — attain the perfect state.

In localities where the butterfly occurs in any considerable numbers, the young larvæ could doubtless be easily found upon its food-plant. On some stems of *Chelone glabra* gathered on the 28th of July, at Center, from the ditch beside the New York Central Railroad, and placed beneath an inverted jar to retain them in condition for food, eight days thereafter six of the larvæ, in readiness for their first molting, were discovered feeding on the lower surface of a leaf where it rested against the glass.

This species presents a notable illustration of the localization of certain insects, several other examples of which, in connection with the Center locality, although less marked, will be referred to in future notes. While this prolific collecting field, as limited by almost fruitless explorations of adjacent territory, embraces a tract of about three-fourths of a mile square, the Phaeton habitat proper has a radius of but one-eighth of a mile, with an occasional elliptical extension to one-fourth of a mile in diameter. Its central point is the extension of a swamp over a seldom traveled road, where a few inches of water is found throughout the summer. Upon the wet sands adjacent, the butterfly can usually be met with during its season, often in little companies, sipping the moisture from the ground, after the habit of *C. Philodice*, and, when alarmed, flying for a short distance and then alighting in the surrounding bushes. Beyond these limits the species

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* It has been reared by Mr. Scudder on the black currant, and has been taken by him on the barberry (*Berberis Canadensis*). He also records it as having been seen by Dr. A. S. Packard, Jr., feeding on *Aster*, *Viburnum dentalium* [dentatum?] and *Corylus Americana*.

It is also reported in the *Canadian Entomologist*, vol. ii, p. 36, as having been found in West Virginia by Mr. J. L. Mead, within close webs, attached to Iron weed (*Veronica*) [Vernonia?] and a species of *Solidago* — in one instance a web being attached to the two plants.

The English Melitæas feed on various species of germander (*Teucrium*), speedwell (*Veronica*), cow-wheat (*Melampyrum*), plaintain (*Plantago*), and other low-growing plants; most of them are confined to one food-plant, but others are equally common on three or four different species. — Newman's *British Butterflies*.

has not been observed, during five years of frequent visits to this locality by Mr. Peck and Mr. Meske. One specimen has been taken by the former in Sandlake, N. Y. It has also been captured near Utica, N. Y. I have not met with it at Schoharie, N. Y., nor in the neighborhood of Albany except at Center, although its favorite food-plant is of common occurrence in this vicinity.

While the genus Melitæa, as recently restricted by Edwards,* is only represented east of the Mississippi river by the single species *Phaeton* (our smaller Melitæas being placed by him in the genus Phyciodes of Hübner), it is interesting to note, as illustrative of faunal distribution, its full representation in our western States and territories. Of the seventeen other species recorded as congeneric, one is from Texas, one is credited to Colorado only, one to Oregon only, one to Alaska, and thirteen occur in California (of which number three are also found in Colorado, in Nevada and in Oregon).

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* *Synopsis of North American Butterflies*, pp. 15, 16.

III. NOTES ON MELITÆA NYCTEIS. (DOUBL.)

On June 15th two larvæ of this species were collected in different localities at Center feeding on *Helianthus divaricatus* L. They were of the length respectively of .75 and .80 of an inch. The head was cordate, broadest at the summit, of a glossy black shade, with numerous blackish hairs of unequal length. The body was reddish-brown, with a few gray dots; laterally with a broad testaceous stigmatal stripe, embracing the stigmata and the substigmatal row of spines. The spines were rufous, black-tipped, thickly verticillated with black bristles: on the first segment, three dorsal granulations, clusters of short hairs projecting over the head, and a substigmatal spine; on segments 4 to 11, a dorsal row of spines, the latter segment bearing two dorsal spines; on segments 2 to 11, a subdorsal, a lateral and a substigmatal row of similar spines; on segment 12, two subdorsal spines and an anal, ovate, blackish tubercle; above the legs and prolegs, a row of short spines, with sparse tawny hairs. Stigmata oval, blackish. Legs black; prolegs rufous.

On the morning of the 18th one of the larvæ was found resting on the upper surface of a leaf in position for molting. The following morning (19th) it was observed to have molted during the night, and had resumed its feeding. Instead of the broad stigmatal stripe, there was now a narrow substigmatal one, embracing the substigmatal row of spines; above, in range with the stigmata, some scattered rufous dots. Body superiorly fuscous; spines reddish-brown. Prolegs rufescent; legs black.

The mature larva measures .95 of an inch. Its color is fuscous, with white dots on the annulet. The bases of the spines are glossy black. The substigmatal stripe is rufous; and the stigmatal rufous spots, with the adjacent papillations, form an interrupted stripe. The stigmata are black and broadly oval. On the 21st of June, the more advanced of the two larvæ (the other was sent to a correspondent that a drawing might be made of it) was found changed to a chrysalis, attached by its terminal spine to the margin of the under side of a leaf.

The chrysalis (Plate 8, fig. 14) was .44 of an inch in length. Color fuscous, with white markings on the wing-cases, especially at their bases, and at the bases of the spines posteriorly, covering most of the 4th and 5th segments; on the thoracic projection which is rounded

and moderately elevated, are five subtriangular white spots (of which two mark protuberances), radiating from its center; stigmatal region rufescent. The head-case is slightly excavated in front. The spines are short, not acute, three each on the 6th, 9th, 10th and 11th segments, and five on the 7th and 8th; terminal segment recurved, so that the body of the chrysalis forms a right angle with the short spine by which it is suspended.

The imago from the above emerged July 1st, after a pupal period of ten days.

On the 20th of August some young larvæ (a colony) were found at Center clustered on a leaf of *H. divaricatus*, of which they had eaten the upper portion. From their appearance, they doubtless pertained to Melitæa, and may have been of the above species. When alarmed by a sudden motion of the plant, they immediately loosened their hold to the leaf and suffered themselves to fall to the ground, with their bodies bent in a circle. After lying motionless for a few minutes, if not again disturbed, they would arouse themselves and travel rapidly away to some place of concealment.

When about to transfer them to fresh leaves on the 23d, they were found to have molted, and to have left their exuviæ with attached head-cases, within a slight web which they had spun on a leaf. From a comparison of the size of the head-cases with those of *M. Phaeton* which were being reared at the same time, this was their second molting. They subsequently fed moderately on the surface of the leaves, which becoming dried were removed and pinned to a fresh stem of the *H. annuus*. Without leaving their position, and after several days' cessation from feeding, they underwent their third molting on the 29th.

Although fresh leaves of *H. divaricatus* were provided for them, they could not be induced to resume feeding, but one after another died and fell from the plant. It is probable that at this stage of their growth the larvæ habitually cease from feeding, and assume the lethargic condition in which they pass the winter—which some of this colony would doubtless have done, had they been favored with the conditions to which they are ordinarily subjected.

The butterfly has occurred abundantly at Center during the two years of my collecting there, appearing from the middle of June until about the 20th of July, its period of greatest abundance being about the 1st of July. At Bethlehem (an excellent collecting locality three miles south of Albany) it has not been seen. It is quite rare at Schoharie, where only two individuals have been taken by me.

IV. NOTES ON PIERIS OLERACEA (HARRIS).

Fifty eggs of this butterfly were collected at Schoharie, N. Y., on the 22d August from a small patch of turnips of perhaps twenty square feet. A small bed of cabbage plants adjoining, yielded none of the eggs, indicating a marked preference by the insect for the former plant.

With few exceptions, the eggs were placed on the under side of a leaf, so near the edge as to render it probable that the butterfly in ovipositing alights on the margin of the upper surface, and bends her body over its edge to place her egg on the less exposed under surface. Usually but one occurs on a leaf, but occasionally two or three are found so near together, as to indicate their having been deposited at the same time.

The eggs are ovoid in form, corresponding with the familiar representation of those of *Pieris brassica* of Europe; they are of a yellow-green color, and measure .047 of an inch in length (average of three), with a diameter of about one-third their length. They are fluted longitudinally, presenting fourteen ribs in two specimens examined and sixteen in a third, which unite in about half the number near the apex. The ribs are sharp-edged, while the intervening flutings show about forty transverse lines.

Ten eggs disclosed their larvæ during the night of August 24–25. The larvæ were pale green, cylindrical, with some short, whitish hairs, and measured .075 of an inch long.

The emergence of a larva from the shell was observed, and for a half hour it was seen to be vigorously plying its black-tipped mandibles on the interior surface near the apex, before it effected an opening. The opening made with so much labor was rapidly enlarged by the larva eating a sufficient portion of the shell to permit its egress. Immediately upon having wholly withdrawn itself, it resumed its feeding upon the shell, nearly all of which it consumed. It increased rapidly in size; on the morning of the 26th (twenty-four hours after its disclosure) it measured .13 of an inch in length.

On the 27th P. M. four larvæ had molted for the first time, and four more on the 28th A. M. (two were missing.)

On the morning of the 30th the larvæ were found to have molted for the second time; probably some of the number underwent their change

the preceding afternoon when they were not observed. The length of the smallest was .23 of an inch. They now showed numerous dark colored dots, which were more contiguous on the dorsal region, where they define a vascular line of pale green.

August 31st, A. M., the first of the six larvæ now remaining, molted for the third time; its length, after its change was .31 of an inch. A second one molted in the afternoon of the same day, and the four others, by noon of the day following, September 1st.

On September 3d, A. M., the first of the larvæ molted for the fourth and last time, when it measured .45 of an inch; three were in position for molting, which occurred on the following day.

On the 7th two of the larvæ suspended themselves for their pupal change, and the other three (one having died) on the morning of the 8th. Later in the day they had all changed to pupæ. On the 15th the first imago emerged, a second on the 18th, and of the others no note was made.

The transformations of the butterflies of this brood are completed in remarkably short periods of time. The intervals between the hatching of the egg and the first molting, and that between the two following moltings, are each but two days, and a period of three days carries it to its last molt. Thence to its pupal change requires but five days, and the brief space of seven days suffices for converting the pupa into the perfect insect. The entire conversion of the egg into the imago is effected in the space of three weeks. I have elsewhere shown (*Proc. Ent. Soc. Ph.*, vol. iii, p. 52), that there are at least three annual broods of *P. oleracea*, viz., the last of April, the early part of July, and last of August. In favorable seasons, a fourth apparition may be added to the above, in the latter part of September. From the observations recorded below, it is possible that this last appearance is but a portion of the spring brood brought forth by an unusually warm autumn.

On the 19th of September I obtained, from the same small bed of turnips from which the former collection of eggs was made, fifty-three *P. oleracea* larvæ, most of which were nearly of full size. By the 25th, all had transformed to pupæ, and on the 27th one made its appearance as an imago. During the following two weeks several others emerged. Some weeks having passed without further developments, the box containing the pupæ was removed to a cold room for the winter. In early March it was returned to a warm apartment, and on the 6th of April an imago was disclosed, and others continued to appear during the remainder of the month. It was observed that all those given out during the first week were of the male sex.

V. DESCRIPTION OF NEW SPECIES OF NISONIADES.

Nisoniades Icelus nov. sp.* Plate 7, figs. 5, 6, ♂.

Head and palpi dark brown, the latter lighter beneath, and interspersed with gray or gray-tipped hairs. Antennæ brown, annulated with white obscurely above, with the club orange-tipped. Thorax dark brown, with scattered scales of lighter brown. Abdomen dark brown, with some gray scales, especially at the posterior margin of the segments.

Anterior wings above dark brown, basally mottled with umber, and sprinkled with yellow-brown and bluish-gray scales. A continuous dark brown discal band (interrupted or much constricted below the cell in *N. Martialis*, Plate 7, fig. 7) crosses the cell from the end of the costal fold in the ♂ to the submedian nervure, with fuscous borders usually obscure, and having on its superior half some bluish hairs; in *N. Brizo* (Plate 7, fig. 9) the borders are well-defined, black, and the bluish hairs are continued over the entire length of the band. The submarginal band, consisting of bluish hairs, is regularly curved, parallel to the hind margin, or sometimes, as in the figure, slightly receding from it as it approaches the internal margin: its borders are well-defined in fuscous, the anterior one but moderately sinuate on its superior half, the posterior one with six sagittate spots superiorly (the second and third apical ones more elongate than in *N. Brizo*), thence reaching the submedian nervure in three curves similar to the corresponding ones of the anterior border; upon the band, between the subcostal nervules, an indistinct elongated whitish spot (not in *N. Brizo*). Intermediate to the two bands, resting on the costa and extending to the second median nervule, a patch of bluish scales, interspersed with umber-colored ones; thence to the inner margin, the space is umber brown, similar to the shade of the posterior wings. Along the hinder margin is a series of umber spots, usually crescentic in the females, surrounded by bluish scales; behind these, a narrow dark brown marginal line. Fringe, of the color of the preceding spots, with short basal bluish hairs.

Posterior wings above, umber-brown, with two marginal rows of brownish-yellow spots, usually eight in each, and two contiguous smaller discal ones (not existing in *N. Brizo*), separated by the cellular fold; the first costal spot of each row is nearly as distinct as the others (in *N. Brizo*, obsolete).

* A description of the male genital armature of this and the following species, has been published by Messrs. Scudder and Burgess in their paper on "Asymmetry in the Appendages of Hexapod Insects" (*Proc. Bost. Soc. N. H.*, 1870, vol. xiii, pp. 287, 288).

Beneath (Plate 7, fig. 6), on the superiors, touching the discal cross-vein and separated by the disco-central nervule, are two elongate, sometimes indistinct, yellow-brown spots. Between the subcostal nervules, resting on elongate dark-brown spots, of which the second and third are usually forked posteriorly, are three grayish quadrangular spots; behind the cell are two smaller ones (sometimes obsolete) surrounded by brown; between the median nervules are two quadrangular gray spots of larger size than the preceding, and shaded behind with brown: the above seven spots which form a less regular curve than in *N. Brizo* ♀ beneath (Plate 7, fig. 10), with the spots less conspicuous and not so uniform in size, correspond in position to the submarginal band of the upper surface. Posterior to these is a row of grayish spots running from an apical patch of pale blue scales; there is also a row of elongate whitish spots resting anteriorly on a black terminal line.

On the inferiors are two discal, yellow-brown, rounded spots, and the two rows of similar spots of the hind margin, the anterior one of which is preceded by a row of elongate dark-brown spots. Cilia of the color of the ground of the wings, with a few of the shorter scales grayish. Described from 11 ♂, 6 ♀.

N. Icelus is readily distinguished from *N. Brizo*, to which it is closely related, by its uniformly smaller size, its expanse varying from 1.20 to 1.40 of an inch, while the smallest *Brizo* in my collection measures 1.50 of an inch. A marked characteristic feature is the costal patch of bluish scales between the bands.

The egg is of a pale green color. In shape it is a semi-ellipsoid; its base is flat and its apex depressed between the tips of the ribs which terminate exterior to the depression. It is distinctly fluted even to the naked eye, and with an one inch lens, the ribs may be seen of the number usually of eleven, but not uniformly, for of nine specimens examined, one was observed with ten ribs and one with twelve. Connecting the ribs are from thirty to thirty-five transverse striæ. The diameter of the egg is .031 of an inch, and its height .028 of an inch. The larva has not been observed by me.

The imago was captured for the first time the present year (1869), on the 25th of May. The second week of June — from the 9th to the 15th — it was found abundantly at Center, resting with outspread wings on damp sand in the road. A female Nisoniades, taken on the 7th of July, differing in the much greater width of the submarginal band at the inner margin, I have referred to the same species. I have taken it at Schoharie, N. Y., on the 14th of June.

Icelus (Ic'-e-lus), in mythology, was a son of Somnus, the god of sleep, associated with his brothers, Morpheus and Phantasos, in the

government of the palace of sleep, their principal duty being to inspire dreams in mortals. To Morpheus was committed dreams relating to men; to Phantasos those concerning inanimate objects; while Icelus was charged with such as relate to animate objects, through a personation of bird, insect, or other form. Brizo was a divinity of the island of Delos, where she was worshipped as the goddess of sleep.

The above described butterfly having heretofore been confounded with *N. Brizo*, the mythological name selected for it is deemed so appropriate as to warrant a departure from the established custom of naming the species of this genus after celebrated Roman poets.

Nisoniades Lucilius nov. sp. Plate 7, fig. 1, ♀; 2, ♂.

Thorax, abdomen and palpi dark brown with a red lustrous reflection, the latter tipped beneath with gray. Antennæ reddish brown, with white annulations which are obsolete superiorly.

Anterior wings of a lighter shade of brown than the body, and giving the same reflection. Discal band interrupted, fuscous, obscurely defined except at its hind margin where it crosses the cell; its course, as in the other species of the genus; in the ♀, and occasionally in the ♂, resting upon the outer one of the two cellular teeth formed by this band, is a white hyaline spot, sometimes obsolete. The submarginal band consists of interspaceal sagittate fuscous spots, which are somewhat squarely truncated anteriorly, and have umber-colored scales centrally; its course is direct from the submedian nervure to the subcostal nervules, whence it is broadly reflected anteriorly to the costal margin, embracing in this portion four interspaceal minute white hyaline spots, of which the first, third and fourth are nearly in line, the second and largest lying behind (in one specimen but three spots are seen); between the median nervules there are two hyaline spots, of which the inner one is sometimes obsolete in the ♂, or wholly absent. Between the bands the ground is umber-brown, with a few bluish-gray scales toward the submarginal band, and a larger number between the subcostal nervules. The sagittate spots of the submarginal are bordered behind with gray (not in *N. Persius*), followed by a series of rounded umber spots, having a few gray scales resting on obscure yellowish spots (these spots not in *N. Persius*) between them and the brown marginal line. The cilia are umber-colored with a very few basal gray scales.

Posterior wings, of a more uniform brown than the anterior, and more shaded with red. The two marginal rows of spots are usually obscure, and of a yellow-brown; the discal spots, which in *Persius* are ordinarily visible as a transverse line across the extremity of the cell, are barely seen. The cilia are grayish-brown.

Beneath, reddish-brown; the anterior wings conspicuously so at

the apex; the posteriors are darker and lustrous; the terminal margins are but a shade lighter than the rest of the wings. On the anteriors, in some specimens, is a small white cellular spot. The four subapical hyaline spots are constant. The median spots are larger than the subapical, and are subquadrangular in form; rarely, the inner spot is obsolete. The secondaries are without discal spots. Of the two rows of the hind margin, the outer one is the most distinct; in some of the darker-colored males these spots are scarcely visible. The cilia are of the color of the wings, with their base of a paler brown.

The coloring and markings of the sexes are very nearly alike. Expanse of wings from 1.10 to 1.25 of an inch. Length of body of ♂, .44; of ♀, .50 of an inch.

The female of this species has so strong a resemblance to *N. Persius* female, of Scudder, that the two are not readily separated by those not familiar with them. It is of a smaller size (the figure is from an individual of extreme size), and in addition to the differences above referred to, the following may be noted:

It is without the bluish-gray hairs which sprinkle the upper surface of the primaries of *N. Persius* (and the bands of *Brizo* and *Icelus*), and is also destitute of the bluish-gray scales of the hind margin above, and apex beneath, of that species. The submarginal band, in its course toward the inner margin, recedes less from the hind margin than in *Persius;* hence it follows, that, while the fourth apical hyaline spot and the first median one are equidistant from the hind margin, or the latter is the nearer in this species, in *Persius* the latter is always relatively the furthest removed. The sagittate spots of the submarginal band in this are shorter and less acute.

The males of the two species are not liable to be confounded. In *Persius* the anterior wings are of almost an uniform fuliginous hue, and consequently much less conspicuously marked than those of *Lucilius*. The hyaline spots are smaller and less constant. Very rarely are there two of these spots present between the median nervules; often the apical ones only appear, and occasionally these are obsolete. The male of *Persius* is figured for comparison in fig. 3 of Plate 7, and in fig. 4 the upper and lower wing surfaces of the ♀ are given. Fig. 3 is from a very distinctly marked individual, but is represented with too light a shade upon the terminal half of the anterior wings.

N. Lucilius would appear to be the common Nisoniades at Schoharie, as among my collections made several years since at that place, a number of specimens of the species occur, with two or three each of *Juvenalis* and *Icelus*, but none of *Persius*. At Center, where the other species of the genus are abundant, it has not been seen. A

single individual of it was taken by me last season, in Bethlehem, on the 30th of July. The Schoharie specimens, as they appear in my collection, differ from this, in being less shaded with red; but it is probable that their colors have become somewhat impaired, through a partial exposure to the light during my earlier collections. The colors, as above given, are from the perfectly fresh Bethlehem specimen.*

Nisoniades Ausonius nov. sp. Plate 7, figs. 11, 12, ♂.

Head, palpi, thorax and abdomen reddish-brown; the latter with a few grayish scales at the margins of the segments, and with yellow-brown hairs bordering the genital organs, less conspicuously so than in *N. Martialis;* antennæ red at tip, annulated with a clearer white than in the other species, having the joints beneath almost entirely white.

Anterior wings above, pale umber-brown with grayish scales sprinkled over most of their surface (more diffused than in the other species) except on the fuscous bands, showing especially behind the submarginal band. There are two brown basilar spots resting on the subcostal and median nervures, not so dark as those of the disc. The discal band usually continuous in this genus, here consists of three elongate fuscous dashes (appearing to the unaided eye as a single spot) resting on the subcostal near the discal cross-vein, extending nearly half-way to the median, the intervening space having merely an indication of the spot which appears distinctly in most of the species as the inner cellular tooth of the discal band; following this is an obscure fuscous spot at the fork of the first and second median nervules, and beyond, the usual hour-glass shaped spot extending from the second median nervule to the submedian with its constriction on the interspaceal fold. The discal cross-vein is quite curved and is conspicuously marked in brown. The submarginal band of fuscous spots is doubly curved, being convex toward the hind margin, from the costa to the third median nervule, thence concave to its termination at the submedian. It consists of four acutely ellipsoidal fuscous spots between the subcostal nervules, which are wholly destitute of the usual hyaline spots, followed by three others of similar form but of greater breadth, the next subacute posteriorly, and the last, similar in outline to the corresponding one of the discal band. There is a marginal row of interspaceal brown spots, the first four of which are surrounded with gray scales and lie near the margin, and the remaining four more remote from it than in *N. Martialis;* also, an obscure row of brown spots resting on the tips

* The delay in the publication of this report has permitted a revision of the description of this species, from the inspection of thirty specimens subsequently collected, and of a few reared from the larvæ. Notes upon the earlier stages of the insect (egg, larva and chrysalis) have been made, and will be given in a future paper.

of the nervules and extending on the cilia. The cilia are of the color of the ground of the wings, with a few of the basilar scales gray.

Posterior wings above, of a darker ground than the anterior, sprinkled with blackish scales, darker basally, and with pale yellow-brown spots, of which the discal spot (conspicuous in *N. Persius* ♀), is obsolete; the spots of the submarginal row are crescentic in form; those of the marginal row are obsolete; between these two series, and nearly inclosed by them, is a range of oval fuscous spots, and anterior to the submarginal row is a similar range of sub-connected spots. Cilia light brown, with dark brown basilar scales.

Beneath (Plate 7, fig. 12), reddish-brown with the terminal margin gray. The anterior wings have the fuscous spots of the submarginal band and marginal row as on the upper surface; of the discal band, the cellular spots are alone obscurely visible; the basal ones are lost in the color of the ground; the marginal interspaceal brown spots below the subcostal nervules rest centrally on elliptical gray patches, while those of the posterior wings approach a semi-oval form, and are preceded by conspicuous gray crescents which nearly inclose them by uniting with some marginal gray scales; at the tips of these crescents, a submarginal row of fuscous spots is obscurely seen; the discal spots, so distinct on the secondaries of *N. Martialis*, are here obsolete. Cilia of the wings, reddish brown; those of the anteriors are somewhat encroached upon by the gray of the margin.

Expanse of wings 1.06 of an inch. Length of body, .45 of an inch.

This interesting species was taken at Center on the 12th of May, 1871.* It may be known by its small size, being the smallest yet discovered of the genus; by the entire absence of the usual white apical spots pertaining to all the other known species except *N. Brizo;* by the quite curved submarginal band of elongate black dashes; by the peculiar cellular spot and the brown scales covering the discal cross-vein. In its markings it approaches *N. Martialis* more nearly than any other of our species.

Only a single individual was obtained. The time of its appearance another season will be awaited with no little anxiety, in the hope that it will prove another instance of a solitary capture being the precursor of many others the ensuing year. Thus, it had excited much surprise

* If an apology is due for embodying in a "report for 1869" a few observations made during the two following years, it may be found in the temptation to embrace the earliest favorable opportunity for publication, in consideration of the unavoidable delays which sometimes occur in the issue of the State Cabinet reports, as in the case of the present one, which, when nearly all in type and within, perhaps, two weeks of its completion, was destroyed by fire, in the burning of Weed, Parsons & Co.'s printing house in April of the present year (1871).

that *N. Brizo* during several years of thorough collecting had not occurred at Center where *N. Icelus* was found so abundantly, the two being associated in about equal numbers in New England, and elsewhere. In 1870, an individual, believed to be *Brizo*, was inclosed in the net, but escaped therefrom before it could be positively identified. The following spring the species was not at all rare, and several pairs were taken *in coitu*. In 1869, a single ♂ *Hesperia Logan* was secured at Center, followed the ensuing season by several of each sex. Previous to the present year (1871), Messrs. Tepper and Graef of Brooklyn had obtained but one specimen of the rare *H. Massasoit*, while this season they report it as not uncommon on Long Island.

VI. DESCRIPTION OF A NEW SPHINX.

Ellema pineum nov. sp. Plate 8, figs. 12, ♂, 13, ♀.

Male. — Head and collar, umber; palpi brown; thorax umber at the sides, and brownish-cinereous on the middle. Abdomen immaculate, brownish-cinereous. Legs brown, with white scales on the femora and at the joints. Anterior wings as long as the body, umber colored, dusted with grayish at the base, along the terminal margin and on the principal nervures and their branches; within the cell is a subquadrangular blackish-brown spot; an umber-brown shade is placed over the base of the nervules, filling the lower half of the post-apical interspace * half way to the hinder margin, entirely filling the disco-central interspace within one-third of the margin, the middle portion of the medio-superior, the base of the central and posterior interspaces; the outer margin of this shade is doubly curved, convex toward the hinder margin, becoming concave from the medio-superior nervule; the inner margin of the wing beneath the submedian nervure, is brownish from the base to its middle; the tips of the nervules are touched with umber-brown. Cilia umber-brown, spotted with white on the interspaces. Posterior wings above and beneath, ochreous-gray, lighter at the base. Expanse of wings 1.75 of an inch; length of body .80 of an inch.

Female. — Head and thorax umber-brown, the latter grayish at the sides and in the middle, with a short white line on the upper edge of the wing-covers. Anterior wings broader than in the male, and longer than the body; color umber-brown, with a darker brown costo-basal spot, another on the internal margin near the base, which is continued in a dark shade along the internal margin; a similar colored spot occupies most of the apical interspace, and there are two within the post-apical; within the cell, a subquadrangular blackish-brown spot; of the umber-brown shade which in the male rests on the base of the nervules, scarcely more than its hinder margin is visible, and that indistinctly; middle of the wing at the base dusted with grayish scales, and the nervules are also more or less dusted with grayish, especially the branches of the subcostal vein. Posterior wings above,

* For the sake of better comparison, the names by which the veins and interspaces are designated in this description are those used by Dr. Clemens in his *Synopsis of North American Sphingidæ.*

darker upon the apex and upon the hind margin than in the male; and beneath, without the obscure band which crosses the middle of the nervules in *E. Harrisii*. Cilia white, spotted with dark umber on the ends of the nervules. Expanse of wings, 2.10 inches; length of body .90 of an inch.

The species is readily distinguished from *E. Harrisii* (Plate 8, figs. 10, ♂, 11, ♀), by the darker ground of its wings, the absence of the gray shades, and its much less distinct markings.

Larva. — Length two inches. Color, grass-green. Head subtriangular, green, bordered with bright yellow, within which at the apex is a ∧ of black. Body subcylindrical, tapering at the extremities, and without a caudal horn. Dorsally, a reddish-brown line interrupted on the hinder portion of each segment by a square of green traversed by diagonal lines; a subdorsal yellow line borders the above: lateral stripe yellow; substigmatal stripe white, interrupted at the sutures by light green; ventral stripe and prolegs, rose-red. Feeds on the white pine, and matures about the middle of September, when it enters the ground and forms a cell for pupation.

Several of the larvæ were taken by me at Schoharie, N. Y., in the years 1858 and 1859, but, unfortunately, I succeeded in rearing but a single individual of each sex. The larva, with the exception of its characteristic feature — the dorsal row of squares — resembles so closely that of *E. Harrisii* (Plate 8, fig. 8), that, meeting with the latter for the first time in 1860, I believed the two identical, and accordingly appended to my notes of the former, "In those taken this year the dorsal squares are not visible." Since then I have not met with it, although the same locality has continued to give me *Harrisii*, and in another favorable locality recently found at Bath, Rensselaer county, N. Y., I was able to procure of the latter species between the 7th and 24th of September of last year (1869), from the trunks and branches of *Pinus strobus*, twenty larvæ, while as many more were taken at the same time by Mr. Meske.

E. Harrisii is, by Mr. Grote (*Trans. Amer. Ent. Soc.* vol. II, p. 115), referred to the genus Sphinx, and subgenus Hyloicus of Hübner, of which *S.* (*Hyloicus*) *pinastri* of Europe is cited as typical. In the absence of reasons advanced for such a reference, it is not easy to surmise why it has been made. The style of ornamentation in *E. Harrisii* and *E. pinetum* differs very materially from that of *S. pinastri*, especially in their immaculate abdomens. In the earlier stages of the insects the differences are still more marked, and would seem effectually to remove them from a generic relationship with the species to which Mr. Grote would ally them. The pupæ in Ellema

(Plate 8, fig. 9, pupa of *E. Harrisii*) are without an exserted tongue case, for the short tongue, not exceeding the length of the palpi, does not require such a provision; in *pinastri*, the tongue-case is long and elevated in its middle above the thorax.* The larval states are very dissimilar, the former being without a caudal horn, and the latter provided with a conspicuous one. The larvæ also differ in several particulars in their habits.

Mr. Grote (loc. cit.) expresses his opinion that the *Lapara bombycoides* of Walker will prove to be identical with *E. Harrisii*. It has also been suggested to me that *E. pineum* might be equivalent to Walker's species. Accepting his diagnosis as, at least, approximately correct, I cannot believe that the species described in this paper has been anticipated, or that *L. bombycoides* will be found to be a synonym of *E. Harrisii*. Walker states that his species "has much outward resemblance to the Bombycidæ," but neither of our Ellemas would even remotely suggest such a comparison.

The statement of Mr. Grote, that Walker's description was drawn "from a Canadian specimen in Mr. Saunders' collection," led me to communicate with Mr. Wm. Saunders of London, Ontario, with a view of ascertaining what the specimen really was. He informed me that it had never been in his possession, but that he had ascertained, after considerable effort, that the insect in question had been received by Mr. Saunders of London, England, from a correspondent in Canada, from whom it was procured by Walker for description.

From Mr. Wm. Saunders I have received specimens of the larva and imago of *E. Harrisii*, taken in his vicinity — the larva within five days of its pupation at the date of its transmission, September 6th.

It is probable that *E. pineum* occurs also in Canada, for having (in 1864) transmitted my specimens to Mr. W. H. Edwards for his inspection, he informed me that he had just received, in a box from Mr. Saunders, an individual seemingly identical with those sent by me.

Harris, in his *Insects injurious to Vegetation*, p. 328, speaks of "the curiously checkered caterpillar of *Sphinx coniferarum* on pines." It is possible that this may have been the larva of *E. pineum* which may have fallen under his observation, associated in the Eastern States with *E. Harrisii* (his *S. coniferarum*), yet it is more probable that it is simply a reference to the representation as given by Abbot of the *coniferarum* larva of the Southern States.

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*Each of the species, of which the pupation is known to me, which Mr. Grote refers to the genus Sphinx proper, viz.: *chersis, drupiferarum, kalmiæ, Gordius, eremitus (luscitiosa* and *lugens* unknown), has an exserted tongue-case for the tongue, which latter is nearly or quite as long as the body

VII. LIST OF SPHINGIDÆ OCCURRING IN THE STATE OF NEW YORK.

MACROGLOSSINÆ.

Sesia Fabricius.

1. **diffinis** Harris. Id. Walk., Clem. *Macroglossa diffinis* Boisd. *Sphinx fuciformis* Smith.
2. **gracilis** Gr. & Rob.; in Proceed. Ent. Soc. Ph., 1865, V, p. 174, pl. 3, figs. 1, 2, ♂ (*Hæmorrhagia gracilis*).
3. **Buffaloensis** Gr. & Rob.; in Ann. Lyc. Nat. Hist. N. Y., 1867, VIII, p. 437, pl. 16, fig. 18 ♂, 19 ♀.
4. **Thysbe** Fabr. Id. Clem., Gr. & Rob. (in List). *Sphinx pelasgus* Cram. *Sesia pelasgus* Harr. *Cephonodes pelas.* Hübn. *Sesia cimbiciformis* Steph. *Hæmorrhagia thysbe* Gr. & Rob.
5. **uniformis** Gr. & Rob. Trans. Am. Ent. Soc., 1868, II, p. 181. *Sesia ruficaudis* Walk.

Thyreus Swainson.

6. **Abbotii** Swainson. Id. Harris, Walker, Clemens.

Amphion Hübner.

7. **Nessus** (Cram.) Hübn. Id. Gr. & Rob. (in Cat.) *Sphinx Nessus* Cram., Fabr. *Thyreus Nessus* Harr., Walk., Clem. *Macroglossa Nessus* Harr. (in Cat.)

Deidamia Clemens.

8. **inscripta** (Harr.) Clem. *Pterogon? inscriptum* Harr. *Thyreus? inscriptus* Walk.

CHŒROCAMPINÆ.

Darapsa Walker.

9. **Chœrilus** (Cram.) Walk. Id. Clemens. *Sphinx Chærilus* Cram. *Chærocampa Chærilus* Harr. *Sphinx Azaleæ* Smith. *Otus Chærilus* Hübn., Grote.
10. **Myron** (Cram.) Walk. Id. Clem., Gr. & Rob. (in List). *Sphinx myron* Cram. *Sp. Pampinatrix* Smith. *Chærocampa Pamp.* Harr. *Otus myron* Hübn., Grote. *Otus Chotus* Hübn.
11. **versicolor** (Harr.) Clem. Id. Gr. & Rob. *Chærocampa versicolor* Harr., Walk. *Otus versicolor* Grote.

Chœrocampa Duponchel.

12. **tersa** (Linn.) Harr. Id. Walk., Clem., Her.-Sch., Grote. *Sphinx t.* Linn., Drury, Fabr., Cram., Smith. *Deilephila t.* Westw.-Drur. *Metopsilis t.* Duncan. *Philampelus t.* Burmeister.

Deilephila Ochsenheimer.

13. **chamænerii** Harris. Id. Grote. *Sphinx epilobii* Harr. (in Cat.) *D. Galii* Clem. *? D. intermedia* Kirby.

14. **lineata** (Fabr.) Harris. Id. Clem., Grote. *Sphinx lineata* Fabr. *Sphinx daucus* Cram. *D. daucus* Steph., Wood, Walk., Her.-Sch.

Philampelus Harris.

15. **Pandorus** (Hübn.) Walk. Id. Gr. & Rob. *Sphinx Satellitia* ? Fabr., ? Drury. *Philampelus Satellitia* Harr., Clem., Fitch, Grote. *Daphne Pandorus* Hübn.

16. **achemon** (Drury) Harris. Id. Clem., Fitch. *Sphinx achemon* Drury. *Sp. Crantor* Cram., Smith. *Pholus Crantor* Hübn.

17. **vitis** (Linn.) Harris. *Sphinx vitis* Drury, Fabr., Cram., Smith. *Dupo jussieuæ* Hübn. *Philampelus fasciatus* Her.-Sch.

SMERINTHINÆ.

Smerinthus Latreille.

18. **geminatus** Say. Id. Walk., Clem., Gr. & Rob. *Smerinthus geminata* Harris. *Sphinx ocellatus Jamaicensis* Drury, Gr. & Rob. *Smerinthus Cerisyi* Kirby.

19. **excæcatus** (Smith) Walk. Id. Clem., Fitch. *Sphinx excæcata* Smith. *Smerinthus excæcata* Harr. *Paonias excæcatus* Hübn.

20. **myops** (Smith) Harr. Id. Walk., Clem., Fitch. *Sphinx myops* Smith. *Paonias myops* Hübn. *Sm. rosacearum* Boisd.

21. **Astylus** (Drury) Westw. Id. Harr., Walk., Clem. *Sphinx Astylus* Drury. *Sphinx Io* Boisd. *Smerinthus Io* Wilson. *Sm. integerrima* Harr. (in Cat.)

22. **modestus** Harr. Id. Walk., Clem. *Smerinthus princeps* Walk.

Cressonia Gr. & Rob.

23. **juglandis** (Smith) Gr. & Rob. *Sphinx Juglandis* Smith. *Amorpha dentata Juglandis* Hübn. *Smerinthus Juglandis* Harr., Walk., Clem., Fitch.

SPHINGINÆ.

Ceratomia Harris.

24. **Amyntor** (Hübn.) Gr. & Rob. *Agrius Amyntor* Hübn. *Ceratomia quadricornis* Harr., Walk., Clem.

Daremma Walker.

25. **undulosa** Walk. Id. Gr. & Rob. (in List). *Sphinx Brontes* Boisd. *Macrosila Brontes* Walk. *Ceratomia repentinus* Clem. *Daremma repentinus* Gr. & Rob.

Diludia Gr. & Rob.

26. **jasminearum** (Boisd.) Gr. & Rob. *Sphinx jasminearum* Boisd., Wilson, Clem.

Macrosila Walker.

27. **Carolina** (Linn.) Clem. Id. Gr. & Rob. *Sphinx C.* Linn., Drur., Fabr., Smith, Steph., Harr., Her.-Sch., Fitch. *Manduca obscura C.* Hübn. *Phlegethontius C.* Hübn.

28. **quinquemaculata** (Steph.) Clem. *Sphinx Carolina* Donovan, Harr. (in Sill. Jour.) *Phlegethontius Celeus* Hübn. *Sphinx quinquemaculata* Steph., Wood, Walk., Harr., Fitch.

29. **cingulata** (Fabr.) Clem. Id. Gr. & Rob. (in List). *Sphinx cingulata* Fabr., Drur., Harr., Walk., Burm., Grote. *Sphinx convolvuli* Drur., Cram., Smith. *Sphinx Drurœi* Donov., Steph., Wood. *Agrius cingulata* Drur.

Sphinx Linnæus.

30. **chersis** (Hübn.) Gr. & Rob. *Lethia chersis* Hübn. *Sphinx cinerea* Harr., Walk., Clem.

31. **drupiferarum** Smith. Id. Harr., Walk., Clem., Fitch. *Lethia drupiferarum* Hübn.

32. **kalmiæ** Smith. Id. Harr., Walk., Clem., Fitch. *Lethia kalmiæ* Hübn.

33. **Gordius** Cram. Id. Harr., Walk., Clem., Fitch. *Lethia Gordius* Hübn. *Sphinx poecila* Steph., Wood.

34. **luscitiosa** Clem. Id. Gr. & Rob.

35. **plebeia** Fabr. Id. Steph., Harr., Clem. *Ancryx plebeia* Walk. *Sphinx* (*Hyloicus*) *plebeia* Gr. & Rob.

Agrius Hübner.

36. **eremitus** Hübn. *Sphinx eremitus* Gr. & Rob. *Sphinx sordida* Harr., Walk., Clem. *Sphinx* —— ? (larva) Lint., Proc. Ent. Soc. Ph. III, p. 652.

Ellema Clemens.

37. **Harrisii** Clem. *Sphinx coniferarum* Harr., Fitch. *Ancryx coniferarum* Walk. *Sphinx* (*Hyloicus*) *Harrisii* Grote.

38. **pineum** Lintner.

Dolba Walker.

39. **Hylæus** (Drury) Walk. Id. Clem., Gr. & Rob. *Sphinx Hylæus* Drur., Cram., Fabr., Harr. *Sphinx Prini* Smith. *Hyloicus Hylæus* Hübn.

Dilophonota Burmeister.

40. **ello** (Linn.) Burm. Id. Gr. & Rob. (in List). *Sphinx Ello* Linn., Drur., Fabr., Cram., Harr. *Erynnis Ello* Hübn., Grote. *Anceryx Ello* Walk., Clem.

VIII. LIST OF BUTTERFLIES OCCURRING IN THE STATE OF NEW YORK.

PAPILIONIDÆ.

Papilio Linn.

Turnus Linn.
Glaucus Linn.
Ajax Linn.[1]
Marcellus Cramer.
Asterias Fabr.
Calverleyi Grote.[2]
Troilus Linn.
Philenor Linn.

PIERIDÆ.

Pieris Schrank.

oleracea (Harris).
rapæ (Linn.).
protodice Boisd.-Lec.

Anthocaris Boisd.

Genutia (Fabr.).[3]

Callidryas Boisd.

Marcellina (Cramer).
Eubule (Linn.).[4]

Colias Fabr.

Philodice Godart.
Keewaydin Edw.

Terias Swainson.

lisa (Boisd.-Lec.).[4]
Nicippe (Cramer).[4]

NYMPHALIDÆ.

Danais Latreille.

Plexippus (Linn.).
misippus (Fabr.).

Euptoieta Doubl.

Claudia (Cramer).
Argynnis columbina Fabr.

Argynnis Fabr.

Aphrodite Fabr.
Cybele Fabr.
Atlantis Edw.
Idalia (Drury).
Bellona Fabr.
Myrina (Cramer).

Melitæa Fabr.

tharos (Drury).
Selenis Kirby.
Marcia Edw.[5]
Batesii (Reakirt).
Harrisii Scudd.
Nycteis Doubl.
Phaeton (Drury).

Grapta Kirby.

Progne (Cramer).
C-argenteum Kirby.
comma (Harris).
Dryas Edw.[6]
Faunus Edw.

[1] Mr. Graef of Brooklyn, reports this species as having been taken on Long Island.

[2] This is by many supposed to be merely a suffused variety of *Asterias*. The capture of another individual in Florida — a female — (Mr. Grote's type was a male) reported by Mr. T. L. Mead in the *American Naturalist*, vol. iii, p. 332, is favorable to its specific distinction.

[3] Taken by Mr. Edwards in Newburgh.

[4] Taken by Mr. Tepper on Long Island, who reports *T. lisa* as occasionally occurring there in abundance.

[5] The validity of this species is not fully established. Its author now deems it possible that it may be but a variety of *tharos*. It has not, however, been found to occur in New England associated with *tharos*.

[6] It is thought that this will prove to be a dimorphic form of *comma*.

interrogationis (Fabr.?, Godt.).[1]
J-album (Boisd.-Lec.) Lintn.

Vanessa Fabr.

Milbertii Godart.
Antiopa (Linn.).

Pyrameis Hübn.

huntera (Fabr.).
cardui (Linn.).
Atalanta (Linn.).

Junonia Hübn.

Lavinia (Cramer).[2]
Orythia (Smith).
cœnia (Boisd.-Lec.).

Limenitis Fabr.

misippus (Fabr.).
Disippe (Godart).
Arthemis (Drury).
Proserpina Edw.
Astyanax (Fabr., 1775).
Ursula (Fabr., 1793).

Apatura Fabr.

clyton Boisd.-Lec.[2]
Proserpina Scudd.

SATYRIDÆ.

Neonympha Hübn.

Canthus (Linn.).
Hip. Boisduvalii Harris.
Eurytus (Fabr.).

Satyrus Latr.

Portlandia (Fabr.).
Oreas mar. Andromacha Hübn.
Alope (Fabr.).
Nephele (Kirby).

LIBYTHEIDÆ.

Libythea Fabr.

Bachmannii Kirtland.[3]

ERYCINIDÆ.

Charis Hübn.

borealis Gr.-Rob.

LYCÆNIDÆ.

Thecla Fabr.

niphon (Hübn.).
Irus (Godart).
Arsace Boisd.-Lec.
Henricii Gr.-Rob.
Augustus Kirby.
Calanus (Hübn.) Westw.
Falacer Godt., B.-L., Gr.-Rob.
inorata Gr.-Rob.
Edwardsii Saunders.
Falacer Harris.
Calanus Gr.-Rob.
Acadica Edw.
Læta Edw.
Clothilde Edw. ♀
liparops Boisd.-Lec.
strigosa Harris.
Auburniana Harris.
smilacis Boisd.-Lec.[4]
Mopsus (Hübn.).
Melinus (Hübn.).
Favonius Boisd.-Lec.
Hyperici Boisd.-Lec.
Humuli Harris.

Lycæna Fabr.

Scudderii Edw.
Pembina Edw.
violacea Edw.
neglecta Edw.
pseudargiolus Harris.
pseudargiolus Bois.-Lec., Edw.
argiolus (Smith).
Lucia (Kirby).
comyntas (Godart).

Chrysophanus Hübn.

Hyllus (Cramer).
Thoe (Boisd.-Lec.).
Americana (Harris).
phlœas (Boisd.-Lec.).
epixanthe (Boisd.-Lec.).

[1] The two forms of this species, viz., that designated as *Fabricii* by Mr. Edwards (Trans. Am. Ent. Soc., vol. iii, p. 5), and that described by me as *umbrosa* (Trans. Am. Ent. Soc., vol. ii, p. 313), have recently been ascertained by Mr. Edwards to be dimorphic forms of equal value of the same species. They are faithfully figured in "The Butterflies of North America" as *G. interrogationis* var. *Fabricii*, and *G. interrogationis* var. *umbrosa*.

[2] Taken by Mr. Edwards in Newburgh.

[3] Mr. Graef reports this species as having been once captured on Long Island by Mr. Grote.

[4] Edwards, in his Synopsis of N. A. Butterflies, p. 30, cites this as a distinct species.

Feniseca Grote.

Tarquinius (Fabr.).[1]
Pol. cratægi Boisd.-Lec.
Pol. Porsenna Scudd.

HESPERIDÆ.

Eudamus Swains.

Tityrus (Fabr.).
Lycidas (Smith).[2]
Bathyllus (Smith).
Pylades Scudd.[3]

Nisoniades Hübn.

Persius Scudd.
Lucilius Lintner.
Brizo (Boisd.-Lec., Harr.).
Icelus Lintner.
Martialis Scudd.
Ausonius Lintner.
Juvenalis (Fabr.).[4]
Catullus (Fabr.).

Thymelicus Hübn.

Numitor (Fabr.).
puer Hübn.
Het. marginatus Harris.

Hesperia Fabr.

Centaureæ Ramb.
Wyandot Edw.
Mandan Edw.[5]
? Mesapano Scudd.
vialis Edw.
Metea Scudd.
Samoset Scudd.[5]
alternata Gr.-Rob.
nemoris Edw.
Massasoit Scudd.
Logan Edw.
Delaware Edw.
conspicua Edw.
Zabulon Boisd.-Lec.[6]
Hobomok Harris.
Pocahontas Scudd.
Quadaquina Scudd.
Phylæus Drury.
Sassacus Harris.
Huron Edw.[7]
Leonardus Harris.
Peckius Kirby.
Wamsutta Harris.
Olynthus (Boisd.-Lec.).[7]
maculata Edw.[8]
Hianna Scudd.
Metacomet Harris.
rurea Edw.
verna (Edw.).
Ætna Boisd.
Egeremet Scudd.
Mystic Edw.
bimacula Gr.-Rob.
Acanootus Scudd.
Manataaqua Scudd.
Taumas (Fabr.).
Ahaton Harris.
cernes Boisd.-Lec.

The above list, embracing one hundred and thirteen species, can only be regarded as a preliminary one, although surpassing in number the list of New England butterflies, published by Mr. Scudder, in 1868,

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[1] Of this rare species, two individuals were taken a few years since by Mr. C. H. Peck, at Bath, opposite to Albany. It has also been observed by him at Sandlake, Rensselaer county, and at Elizabethtown, Essex county; in each instance flying about bushes of Alder (*Alnus serrulata* Ait) indicating it as the food-plant of the larva.

[2] Taken by Mr. Edwards at Newburgh, and by Mr. Tepper on Long Island.

[3] Mr. Scudder has found this to be a distinct species from *Bathyllus* of the Southern States (figured and described by Abbot and Smith), with which it has been hitherto confounded.

[4] *Ennius*, of Scudder and Burgess, regarded by them as the northern representative of *Juvenalis*, has not occurred among my collections.

[5] Included in this list upon the authority of Mr. Edwards.

[6] *Pocahontas* and *Quadaquina* are dimorphic forms of this species.

[7] Included in this list upon the authority of Mr. Scudder.

[8] One specimen of this southern species (Louisiana to Florida) was taken by Mr. Meske at Center, Albany county, in 1866.

in which ninety-four species are catalogued, inclusive of two (perhaps three) which are cited above as synonyms, and two southern forms (*H. Oneko* and *H. Panoquin*) erroneously reported from New England. The Scudder list contains several species which have not yet been detected within the limits of the State of New York, most of which, together with others occurring in neighboring States and in Canada, will undoubtedly be found among us, when more faithful and general explorations shall have been made. *Grapta gracilis* Gr.-Rob.,[1] and *Argynnis Montivus* Scudd., will probably be taken in the Adirondack mountains. We may also expect to have the following species included in our future lists:

Pieris vernalis Edw. New Jersey and Pennsylvania.
Pieris Virginiensis Edw. West Virginia and Ontario.
Colias Eurytheme Boisd. Vermont and Connecticut.
Terias Delia Boisd. Southern New England (Scudder).
Thecla Ontario Edw. Port Stanley, Ontario.
Eudamus Proteus (Linn.). Eastern N. Amer. to Conn. (Scudder).
Nisoniades Horatius Scudd.-Burg. New England.
Nisoniades Virgilius Scudd.-Burg. New England.
Hesperia viator Edw. Illinois and Massachusetts.
Hesperia Wingina Scudd. Southern New England to Florida.
Hesperia Monaco Scudd. Connecticut and Massachusetts.
Hesperia punctella Gr.-Rob. Connecticut to Louisiana (Scudder.)
Hesperia Uncas Edw. Pennsylvania and Ohio.

Information of the capture of any of the above, within the limits of New York, or of any other diurnals not included in the list, would be gratefully received.

[1] Said by Mr. Scudder to be a dimorphic form of *Faunus*, thus giving two forms (a dark-winged form having been found by him in *Progne*) to each of our Graptæ.

IX. CALENDAR OF BUTTERFLIES FOR THE YEAR 1869.

Thecla Irus (*Godart*).— April 27th, one ♂ taken at Center, N. Y., — a remarkable locality for this species, usually so rare elsewhere. On the 11th of May, at the next visit made, both sexes were found abundantly, most of them somewhat worn. Sixty individuals were taken in about three hours' collecting. Previous to 11 o'clock, much the larger proportion of captures consisted of females; subsequent to that hour, the males were the more numerous. On the 25th, they were still abundant. June 7th and 9th, a few much worn were seen; on the 15th it was observed for the last time for the season, it being single-brooded. Its flight is short and rapid, frequently alighting on the hot sands in the roads. The ♂ was often taken while resting on bushes by the roadside. This species has not been observed at Bethlehem, nor at Schoharie.

Pieris oleracea (*Harris*). — May 9th, a couple were observed by me at Schoharie, N. Y., where they were reported as having occurred about two weeks previously. August 30th, they were abundant at the same place, and their eggs were found on turnips. September 13th they were still abundant.

Thecla Melinus (*Hübn.*). — May 11th, two males taken; on the 21st six of ♂ and ♀. On the 15th of July, two of a second brood were obtained, and on the 23d six of ♂ and ♀ in good condition; on the 28th two were taken. August 6th, it occurred for the last time. At Center only.

Thecla niphon (*Hübn.*). — May 11th, four were taken, associated with *Irus;* on the 14th seven were taken at Bethlehem in a grove of varied timber.

Thecla Augustus *Kirby.* — May 11th, two specimens somewhat worn, associated with *Irus*, at Center; none others were found.

Nisoniades Juvenalis (*Fabr.*). — May 11th, first observed: on the 15th, several males collected. June 9th, two males, and on the 11th the first ♀; on the 15th, worn specimens only were abroad. Taken resting on wet sand in the roads.

Nisoniades Persius *Scudder.* — May 11th, the ♂ occurred, and on the 21st the ♀; was taken for the last time on the 27th. Abundant at Center, alighting on the wet sands.

Colias Philodice *Godart.* — Observed for the first May 11th, and thence continuously to October 1st. The white variety of the ♀ was taken August 24th.

Chrysophanus Americana (*Harris*). — May 13th, ♂, and on the 27th ♀. Observed frequently up to September 30th. On the 8th of September fresh specimens were obtained, and on the 14th it was seen in greater abundance than at any time during the year.

Vanessa Antiopa (*Linn.*). — May 13th, several of this butterfly were seen, which, from their worn appearance, had evidently hybernated. June 8th, one emerged from its chrysalis. On the 15th, a colony of the larvæ, after the second molting, showing the dorsal row of red spots, was observed on willow. A number of them were removed and placed on elm, upon which they readily fed. July 2d, two imagines emerged from chrysalis, the larvæ of which had suspended for their pupal change on the 20th ult., and transformed on the 21st. July 20th, the butterfly was abundant. September 8th, it was observed, and for the last time on the 30th.

Grapta comma (*Harris*). — A worn specimen (hybernated) taken at Bethlehem, May 13th. It occurred with me but once subsequently during the year, on August 23d.

Lycæna neglecta *Edwards.* — May 21st, the ♂ abundant at Center, collecting in companies on damp places, and on excremental matter in the roads; three of the ♀ were taken at this date. June 1st, the ♀ was still infrequent; on the 7th of June, the butterfly occurred in flocks, and several of the ♀ were obtained; on the 9th, it was very abundant, and four pairs were captured *in coitu;* on the 22d, the ♀ was of frequent occurrence. By the 7th of July, only two or three battered specimens were seen. On the 30th of July, one ♀ was taken in Bethlehem, where, on the 17th of June, a very few of the ♂ had been obtained. This species appears to have but one brood.

Lycæna comyntas (*Godart*). — May 21st, a few ♂, and one ♀. June 9th, none were found. July 7th to 23d, it again appeared, and again from August 20th to September 8th, unless different species are included under this appellation, which, from the variations in the specimens secured, seems quite probable.

Papilio Turnus *Linn.* — May 21st, reported by Mr. Peck; on the 25th, it occurred on lilac blossoms. June 1st, five males were taken at one cast of the net, on a damp patch of earth by the road side; on the 7th of June several were observed, also on the 15th and 17th. July

12th, two were seen; August 20th, the larva was found on the wild cherry (*Prunus Pennsylvanica.*)

Hesperia Metea *Scudd.* — May 21st, two males, the first Hesperian observed this season; on the 25th two females were obtained, and on June 3d, additional ones of the same sex. Not rare; occurring usually among shrubbery.

Papilio Troilus *Linn.* — May 25th, on lilac blossoms, ♂; June 1st, the ♀ appeared; on the 15th and 17th, several were seen. July 7th, fresh specimens were taken; 15th and 20th, several; on the 30th, only worn specimens were abroad.

Nisoniades Icelus *Lintn.* — May 25th, 1 ♂. June 1st, several of ♂ and 1 ♀; from the 9th to the 15th, it was abundant at Center. On the 7th of July, it was observed for the last time. *N. Brizo*, with which this species has hitherto been confounded, and which occurs in New England associated with *N. Icelus*, has not been taken here.

Hesperia vialis *Edw.* — May 25th, 2 of ♂ and 1 ♀; additional males on the 25th and 27th. On June 9th, some females were collected. July 7th, one torn ♀ was taken.

Lycæna Scudderii *Edw.* — May 27th, 1 ♂; June 1st, males abundant, and three females; on the 6th, six females; on the 9th, still abundant; on the 15th, diminishing; on the 22d, several of each sex were seen. On the 15th of July, a fresh ♂ of the second brood was captured. On the 23d of July, males abounded in flocks, with a very few females among them. August 6th, both sexes were abundant; no other Lycæna abroad at this time. August 20th, but a few of each sex were observed, as also on the 27th. This butterfly sits at rest, with its wings partly open over the back. It was met with only at Center this season, and does not occur at Schoharie.

Lycæna violacea *Edw.* — May 27th, 1 ♀ at Center, and the only individual of the species taken.

Melitæa tharos (*Drury*). — June 1st, three males; 7th, seven males and one female; on the 15th, abundant. July 7th, none were seen at Center, but on the 15th both sexes occurred. On the 30th of July, at Bethlehem, eighteen males and two females, all apparently just from chrysalis, were taken on the damp stones of a little stream of water in a pasture. August 6th, 20th, 24th, 27th, September 1st and 8th, captures recorded.

Eudamus Tityrus (*Fabr.*). — June 1st, both sexes, about lilac blossoms; on the 7th, three were taken, flying over flowers in a wood

July 12th, they were abundant; on the 20th several were seen, and on the 30th a few, they having continued without intermission for two months. On the 20th of August and 1st of September, the larvæ well advanced toward maturity, were found abundantly at Center on *Lespedeza capitata*. September 14th, twenty larvæ, nearly full grown, were taken in a few minutes' search concealed between leaves of locust (*Robinia pseudacacia*) at Bethlehem.

Eudamus Pylades *Scudd.*—June 1st, three taken of an unusually small size; on the 7th, a few seen, but too wild to capture; on the 9th, some were observed resting on excrement in the road; on the 25th they were quite abundant at Bethlehem. July 7th, diminishing in numbers; on the 12th, few were seen, and they were observed the latest on the 20th.

Pyrameis Atalanta (*Linn.*). —June 1st, both sexes on lilacs at Center; 3d and 9th at Bethlehem. August 23d, the larvæ were found abundantly on nettle (*Urtica gracilis*) at Schoharie, varying from their first molt to full size; thirty individuals were taken.* On the 30th of August others were collected at the same locality, from half-grown to mature size.

Nisoniades Martialis *Scudd.*—June 1st, ♂; on the 7th, seven of the ♂, but no ♀; on the 9th, the ♂ abundant and a few of the ♀; on the 15th, good specimens of each sex, but the ♀ rare. July 7th, a few old ones were seen, and, on the 15th, a worn ♀ was taken. On the 23d of July a fresh ♂ was captured, indicating a second brood. Another ♂, seemingly fresh from chrysalis, was taken August 20th. September 8th, a worn ♂ occurred.

Hesperia Zabulon *Boisd.-Lec.*—June 1st, five males were collected at Center, and several others were seen, which darted quickly from the damp earth, on which they were resting, into the neighboring bushes; on the 3d several males were taken; on the 7th observed, flitting about flowers in a wood with *E. Tityrus;* on the 15th a ♀ of the "*Pocahontas*" type was obtained; observed for the last time on the 17th. An abundant species at Center, Bethlehem and Schoharie.

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* All the larvæ which had not attained their last molt were found concealed, singly, within a leaf spun together at its edges, of which the tip had, in most instances, been eaten away. The greater number of the nearly mature larvæ were hidden in a shelter made by spinning together several of the leaves at the tip of the plant, after the stalk had been partially eaten through at a suitable height so as to permit it to be readily bent downward among the leaves beneath, where a thicker shelter could be constructed. Notwithstanding these careful provisions for concealment, each one of the larvæ collected at this time proved to have been ichneumonized.

Hesperia Hianna *Scudd.* — June 1st, ♂; on the 9th, both sexes. Occurred only at Center, and rarely.

Hesperia Taumas (*Fabr.*). — June 3d, both sexes taken, and four specimens on the 25th. Bethlehem.

Hesperia Mystic *Edw.* — June 3d, ♂; 17th, not rare at Bethlehem; rare at Center. July 7th, last capture recorded. Occurs also at Schoharie.

Hesperia Peckius *Kirby.* — June 3d; on the 17th both sexes abundant. July 15th and August 27th, captures recorded. September 14th, both sexes occurred; an abundant species.

Neonympha Eurytus (*Fabr.*). — June 3d, several specimens, and on the 17th, common. Center and Bethlehem; usually in shady woods.

Limenitis misippus (*Fabr.*). — June 7th, a pair taken by Mr. Meske *in coitu* at Center; observed feeding on excrementitious matter in the road on the 9th; 15th, two females taken. July 7th, August 20th and 27th, September 1st and 8th, observed.

Melitæa Batesii (*Reakirt*). — June 7th, fifteen males and one female collected; on the 15th the female was not rare; last on the 22d at Center; found at Schoharie on the 14th of June; none at Bethlehem.

Argynnis Myrina (*Cram.*). — June 9th, 1 ♂ at Center; 17th, both sexes at Bethlehem; 25th, several. Fresh individuals observed July 30th. September 8th, fresh specimens again appeared; on the 14th several were seen.

Hesperia Sassacus *Harr.* — June 14th, two males were captured on the Western mountain at Schoharie; not observed elsewhere.

Thymelicus Numitor (*Fabr.*). — June 17th, sixteen males and one female, all perfectly fresh specimens, collected from a swamp at Bethlehem; on the 25th several good females and worn males were taken. July 30th, males of a second brood appeared. August 20th, a third (?) brood occurred at Center; on the 24th, abundant at Castleton; on the 27th, took a ♀ at Center, the last recorded. This species is not rare at Utica; it has not occurred at Schoharie.

Chrysophanus Hyllus (*Cramer*). — June 17th, 1 ♀ at Bethlehem, in a swamp, and on the 25th, two others in the same locality. This species has never occurred among my Schoharie collections.

Grapta interrogationis var. **umbrosa** — June 25th, a fresh individual was seen at Bethlehem.

Argynnis Aphrodite *Fabr.* — June 25th, the ♂ occurred and until July 28th, being most abundant July 15th. The ♀ was observed July 23d and 30th. Center, Bethlehem and Schoharie.

Argynnis Cybele *Fabr.* — June 25th to August 6th, males; females July 20th. Less numerous than the preceding species; occurs at the same localities. *A. Atlantis* was not taken.

Limenitis Astyanax (*Fabr.*). — June 28th, from pupa, after ten days of pupation; July 5th, a second from pupa after the same period of pupation; July 7th, it was observed at Center; on the 12th, ♂ and ♀ were taken in Bethlehem, and, on the 20th, several were seen at the same place; observed also on the 30th of July. The larvæ feeds on apple, and constructs for itself a hybernaculum similar to *misippus*.*

Melitæa Nycteis *Doubl.* — July 1st, obtained an imago from a larva which had transformed to a pupa June 21st. July 7th at Center, took twelve males but no female; on the 15th four females were taken and a few fresh males, but most of the latter were worn; on the 23d, ♂ worn, ♀ fresh. This species occurs rarely at Schoharie.

Melitæa Phaeton (*Drury*). — July 7th, two of ♂ and one ♀ considerably worn; on the 15th, two additional females. Less abundant than reported in former seasons.

Argynnis Bellona *Fabr.* — July 12th a few seen; August 24th, observed at Castleton; September 9th, the ♀ at Center.

Satyrus Nephele (*Kirby*). — July 12th and 20th in Bethlehem on the borders of woods.

Thecla Calanus (*Hübn.*). — July 7th, one ♀; on the 12th, eleven males and ten females were collected, and on the 15th, it was abundant at the same place; on the 20th, some worn specimens were found at Bethlehem; 23d, a few at Center; 30th, worn specimens at Bethlehem.

Thecla Edwardsii *Saund.* — July 12th, at Bethlehem, both sexes; 15th, at Center, sixteen males and one female; 20th, at Bethlehem, only worn specimens; on the 23d, at Center, eleven males and two females in good condition, and again on the 28th, when a few good males and several females were secured. The above species of Thecla

* On the 19th of June, a Limenitis larva, nearly mature, was found feeding on *Quercus ilicifolia*. It suspended itself for its pupal transformation, but died while in the act of withdrawing itself from its larval skin; the species, therefore, could not be ascertained.

were usually captured when resting on bushes after a short and rapid flight in the warm sunshine.

Thecla liparops *Boisd.-Lec.* — July 12th, the ♂ and ♀ taken at Bethlehem, and on the 23d, one ♀ at Center. Occurs rarely.

Satyrus Alope (*Fabr.*). — July 12th, ♂ at Bethlehem, and on the 20th abundant, when a pair was taken *in coitu*.

Hesperia bimacula *Gr.-Rob.* — July 12th, a single ♀ taken at Bethlehem; no other capture of the species during the season.

Hesperia Metacomet *Harr.* — July 12th to 20th; the ♂ abundant at last date at Bethlehem, by the roadside on flowers of peppermint (*Mentha piperita*); from the 15th to the 30th, the ♀ occurred. Taken also at Schoharie.

Hesperia Ætna *Boisd.* — July 15th to 28th, the ♂ occurred, and from the 20th to the 30th, the ♀ at Bethlehem. Equally abundant with the preceding species, and associated with it.

Hesperia Manataaqua *Scudd.* — July 15th, taken at Center, and, on the 23d, at Bethlehem. A rare species.

Thecla Acadica *Edw.* — July 20th, a ♂ at Bethlehem; on the 23d, at Center; on the 28th, three worn individuals, one a ♀. August 6th, a few worn ones were collected.

Thecla Mopsus (*Hübn.*). — July 23d, three males; on the 28th, four males and two females, taken in company with *Acadica*, *Edwardsii* and *Calanus* on blossoms of Jersey-tea.

Hesperia verna (*Edw.*). — July 25th, a ♀ at Bethlehem, the only capture made of this species.

Hesperia Logan *Edw.* — July 28th, a ♂ taken at Center on damp sand in the road.

Grapta J-album (*Boisd.-Lec.*). — July 28th, one worn individual taken at Center.

Hesperia Leonardus *Harr.* — August 20th, three males of this late Hesperian were captured, and, on the 27th, six males and two females. September 1st, two additional females were obtained; on the 8th, four worn specimens were collected from asters. Only at Center.

Danais Plexippus (*Linn.*). — August 24th, several were seen flying about the dock at Castleton; September 8th, observed.

Pyrameis huntera (*Fabr.*). — Only one capture of this species was made, on the 24th of August at Castleton.

Limenitis Arthemis (*Drury*). — This butterfly, which in some years has appeared abundantly in the vicinity of Albany, was not once observed the present season.

Papilio Asterias *Fabr.* — Of this species, usually so common in most localities, not an individual was seen by me in Albany or Schoharie counties.

X. DATES OF COLLECTION OF NEW YORK HETEROCERA.

I. COLLECTIONS DURING THE YEAR 1869.

SPHINGIDÆ.

Sesia diffinis *Harris*			May	25.
Sesia uniformis *Gr.-Rob.*			May	25.
Sesia gracilis *Gr.-Rob.*			May	25.
Sesia Thysbe *Fabr.*			June	1.
Sesia Buffaloensis *Gr.-Rob.*,	larva, mature, on	Viburnum	Sept.	19.
Amphion Nessus (*Cramer*)			May	25.
Darapsa Myron (*Cramer*) [1]	larva, last molt,	grape	Sept.	7.
Philampelus Pandorus (*Hübn.*)	" "	"	Sept.	9.
Smerinthus excæcatus (*Smith*) [2]	" "	wild cherry	Sept.	9.
Ceratomia Amyntor (*Hübner*)	"	linden	Sept.	15.
Sphinx chersis (*Hübner*)	" "	ash	Sept.	7.
Sphinx drupiferarum *Smith*	" "	plum	Aug.	30.
Sphinx drupiferarum *Smith*			June	14.
Sphinx kalmiæ *Smith*,	larva, last molt,	ash	Sept.	16.
Ellema Harrisii *Clemens*	" "	pine	Sept.	7.

THYRIDÆ.

Thyris maculata *Harris*	June	17.

ZYGÆNIDÆ.

Alypia octomaculata (*Fabr.*)	June	13.
Eudryas grata (*Fabr.*), larva, last molt, grape	Sept.	7.
Acoloithus falsarius (*Clem.*)	July	12.
Acoloithus Americanus (*Boisd.*)	July	12.
Ctenucha virginica (*Charp.*)	June	22.
Ctenucha fulvicollis (*Hübn.*)	June	22.

[1] Of the eight Darapsa larvæ taken from one vine at Bath, from the differences presented, some were thought to be *Chærilus*. Unfortunately the moths were not obtained from any of the number, for each one had been ichneumonized; only one attained the pupa state.

[2] Four larvæ occurred at this time on the wild cherry (*Prunus Pennsylvanica*), and on the 24th of September two others on a species of Cratægus; the latter bore the marks of parasites inclosed within their bodies.

Bombycidæ.

Hyphantria textor *Harr.*	June 1.
Euchætes egle (*Drury*)	June 25.
Euchætes collaris (*Fitch*)	May 25.
Orgyia leucostigma (*Smith*)[1]	July 23.
Lagoa crispata *Pack.*, larva, last molt, on oak, etc	Sept. 8.
Lagoa crispata *Pack*	Nov. 4.
Euclea querceti (*Her.-Sch.*)	June 14.
Limacodes scapha *Harr.*	July 7.
Lithacodes fasciola (*Boisd.*)	June 17.
Ichthyura albosigma (*Fitch*)	June 17.
Ichthyura inclusa *Hübn.*[2] larva, third molt, on aspen	Sept. 7.
Apatelodes Angelica *Grote*, larva, last molt, on ash	Sept. 9.
Datana ministra (*Drury*), larva, last molt	Sept. 16.
Edema albifrons (*Smith*), larva, last molt, on oak	Sept. 1.
Cerura borealis (*Boisd.*), larva, last molt, on aspen	June 22.
Telea Polyphemus (*Linn.*), larva, last molt, on maple	Sept. 9.
Actias Luna (*Linn.*)	June 17.
Callosamia Promethea (*Drury*), larva, last molt, ash and lilac,	Sept. 24.
Platysamia Cecropia (*Linn.*), larva, last molt	Sept. 9.
Hemileuca Maia (*Drury*), larva, 2d-3d molt, on oak	June 15.
Hemileuca Maia (*Drury*)	Sept. 18.
Hyperchiria Io (*Fabr.*)[3]	Sept. 23.
Hyperchiria Io (*Fabr.*), larva, last molt	Sept. 16.
Eacles imperialis (*Drury*), larva, last molt, on pine	Sept. 7.
Anisota senatoria (*Smith*), larva, last molt, on oak	Aug. 20.

[1] The larvæ of this species were so abundant in Albany during the summer as to prove a serious annoyance, by nearly defoliating many of the shade trees. At the time when they were seeking suitable places for their transformation, a person could scarcely walk a block without treading several of them under foot.

[2] Other colonies of this larva were found on willows within nests composed of several leaves spun together. The last of February, within a box which had been standing in a moderately warm room, the moths commenced emerging from the slight cocoons which they had constructed between the leaves at the bottom of the breeding cage. The insect seems unusually hardy (unlike *L. crispata*), for the number of imagines disclosed proved nearly equal to that of the larvæ which had been secured. They continued to emerge during the month of March, and all, it was observed, escaped from the cocoons in the day time.

[3] A colony of about twenty of these larvæ, measuring four-tenths of an inch in length, was found July 15th on *Populus tremuloides*. They were reared to pupæ, from which three imagines were disclosed between the 17th and 23d of September and others the following Spring.

Anisota senatoria (*Smith*)[1] ..... June 15.
Anisota stigma (*Smith*), larva, last molt, on oak ..... Sept. 7.
Xyleutes robiniæ (*Peck*)[2] ..... June 17.

NOCTUIDÆ.

Thyatyra cymataphorides *Guen*..... ..... May 25.
Acronycta Americana (*Harris*), larva, on oak ..... Sept. 1.
Aplecta latex *Guen*..... June 18.
Chamyris cerintha (*Treits.*)..... July 12.
Acontia candefacta (*Hübn.*)..... May 27.
Xylina Bethunei *Gr.-Rob*..... Sept. 17.
Eriopus monetifera *Guen*..... June 7.
Eriopus mollissima *Guen*..... June 29.
Abrostola urentis *Guen*..... Aug. 24.
Plusia festucæ (*Linn.*)..... Aug. 4.
Plusia balluca *Hübn*..... July 14.
Plusia ampla *Walk*..... July 14.
Deva purpurigera *Walk*..... July 3.
Gonoptera libatrix (*Linn.*)..... Aug. 24.
Syneda limbolaris (*Hübn.*)..... July 12.
Catocala piatrix *Grote*..... Sept. 9.
Catocala cara *Guen*..... Sept. 7.
Catocala concumbens *Doubl*..... Sept. 9
Catocala amatrix *Hübn*..... Sept. 12.
Catocala parta *Guen*..... Sept. 24.
Ophiusa bistriaris *Hübn*..... June 17.
Drasteria erechtea (*Cram.*)..... May 15.
Euclidea cuspidea *Hübn*..... June 17.
Poaphila quadrifilaris (*Hubn.*)..... May 21.

[1] In the capture of a male of this species on the wing at Center, the same sweep of the net inclosed a second male united to a female in copulation, and a specimen of *Sesia diffinis*, which were doubtless resting unobserved on some leaves against which the net had accidentally brushed. Three of *S. diffinis* had a short time before been observed flying together in the bright sunshine, one of which had been taken. The larvæ of *A. senatoria* occur so abundantly at Center as wholly to defoliate numbers of the smaller oaks. On the 7th of July the female moths were seen to have commenced the deposition of their eggs on the under side of oak leaves in patches often nearly covering the entire surface. On the 11th of July some newly-hatched larvæ were observed.

[2] This rare moth was found resting on the dust in the middle of a road near Albany over which vehicles were frequently passing. It was not easily alarmed, but gave ample opportunity for the observation of its appearance, attitude, etc., after having been covered by the net. In the only other instance in which I have met with it, the moth (a female, the other a male) was brought to me at Schoharie, with its abdomen partially crushed from being stepped upon on a sidewalk, where it was found.

Phalænidæ.

Angerona crocataria (*Fabr.*)	June 3.
Endropia marginata *Minot*	June 3.
Amphidasys cognataria *Guen.*	April 8.
Cleora pulchraria *Minot*[1]	Sept. 7.
Tephrosia cribrataria *Guen*	April 17.
Aplodes mimosaria *Guen.*	June 9.
Acidalia enucleata *Guen.*	July 12.
Corycia vestaliata *Guen*	May 25.
Lozogramma defluaria *Walk.*	May 25.
Numeria obfirmaria (*Hübn.*)	May 21.
Fidonia Faxonii *Minot*	May 27.
Fidonia bicoloraria *Minot*	June 1.
Aspilates dissimilaria (*Hübn.*)	July 7.
Zerene catenaria (*Cram.*)[2]	Sept. 8.
Cidaria diversilineata (*Hübn.*)	July 12.

Deltoidæ.

Hypena elegantalis *Fitch*	June 9.
Rivula propinqualis *Guen*	June 17.

Pyralidæ.

Pyralis olinalis *Guen*	July 15.
Ennychia octomaculalis (*Linn.*)	June 15.
Desmia maculalis *Westw.*	June 26.

II. COLLECTIONS DURING YEARS PRECEDING 1869.

Sphingidæ.

Sesia diffinis *Harris*	May 12.
Sesia Thysbe *Fabr.*	May 25.
Sesia gracilis *Gr.-Rob.*	June 1.
Thyreus Abbotii *Swains.*	May 25.

[1] Occurs abundantly on the trunks of pines during most of the month of September at Bath; abundant also at Schoharie.

[2] Very abundant at Center at this date, where at least a dozen could be seen from one point, resting on the upper surface of leaves of shrubbery. The conspicuously marked larvæ had, during the summer, been very common on Vaccinia and other plants. September 1st, its peculiar cocoon of strong and very open meshes showing plainly the pupa suspended within, was found spun between leaves of willow (*Salix humuli*). The imago was last seen September 30th. It has not been observed at Schoharie.

Amphion Nessus (*Cram.*) ..... June 17.
Darapsa Chœrilus (*Cram.*)..... June 28.
Darapsa Myron (*Cram.*) ..... June 18, Aug. 23.
Deilephila lineata (*Fabr.*), of second brood..... Sept. 2.
Deilephila lineata, larva[1] ..... Oct. 6.
Deilephila chamænerii *Harr*..... May 25.
Deilephila chamænerii, larva..... Aug. 8.
Philampelus Pandorus (*Hübn.*) ..... June 27.
Philampelus achemon (*Drury*), larva..... Aug. 14, Sept. 4.
Smerinthus geminatus *Say*..... Aug. 16.
Smerinthus excæcatus (*Smith*)..... June 29.
Smerinthus myops (*Smith*)..... June 18.
Cressonia juglandis (*Smith*) *Gr.-Rob*..... July 3.
Ceratomia Amyntor (*Hübn.*)..... June 5, July 4, Aug. 17.
Ceratomia Amyntor, larva ..... Aug. 24, Sept. 17.
Daremma undulosa *Walk*..... July 6.
Macrosila quinquemaculata (*Haw.*), of a second brood..... Sept. 2.
Sphinx chersis (*Hübn.*), larva, on lilac..... Aug. 21.
Sphinx drupiferarum *Smith*, larva on plum..... Aug. 26.
Sphinx kalmiæ *Smith* ..... July 6, July 28.
Sphinx Gordius *Cram*..... June 27.
Agrius eremitus *Hübn*..... July 2.
Agrius eremitus, larva, on spearmint..... Aug. 5, Sept. 22.
Ellema Harrisii *Clem*..... June 22.
Ellema pineum *Lintn.*, larva, on pine..... Sept. 14.

ÆGERIDÆ.

Trochilium marginitum *Harris*[2]..... Aug. 21.
Trochilium tibiale *Harris*..... Aug. 16.
Ægeria caudata *Harris*..... Aug. 8.
Ægeria tipuliformis (*Linn.*) ..... June 23.

THYRIDÆ.

Thyris maculata *Harris*..... Aug. 1.

ZYGÆNIDÆ.

Alypia octomaculata (*Fabr.*)..... June 2.
Eudryas grata (*Fabr.*) ..... July 13, Aug. 1.

[1] The dates assigned to the larval collections, in most instances, are those of the full maturity of the larva and preparation for pupation by the commencement of its cocoon or of its ground cell.

[2] A pair of these moths was taken *in copula* on the trunk of a sumach (*Rhus typhina*). After having been pinned, the female deposited a number of dark-brown eggs of an oval form.

Eudryas unio (*Hubn.*)[1]	July	8.
Acoloithus falsarius *Clem.*	June	25.
Scepsis fulvicollis (*Hübn.*)	Sept. 4, Sept.	14.
Ctenucha virginica (*Charp.*)	June 4, June	23.
Lycomorpha pholus (*Drury*)[2]	July 15, Aug.	16.

Bombycidæ.

Euphanessa mendica (*Walk.*)	June 21, July	10.
Callimorpha Lecontii *Boisd.*	July 23, Aug.	2.
Arctia virgo (*Linn.*)	July	16.
Arctia Saundersii *Grote*	Aug.	20.
Arctia arge (*Drury*), larva	Feb.	28.
Pyrrharctia isabella (*Smith*) *Pack.*	June	30.
Spilosoma virginica (*Fabr.*)	May 7, June	19.
Hyphantria cunea (*Drury*)	June	3.
Hyphantria textor *Harris*	May	19.
Ecpantheria scribonia (*Hübn*) larva	Oct.	6.
Halisidota tessellaris (*Smith*)	July	2.
Orgyia leucostigma (*Smith*)	Aug. 4, Oct.	6.
Parorgyia cinnamomea *Gr.-Rob.*	June	20.
Parorgyia parallela *Gr.-Rob.*	July	21.
Nadata gibbosa (*Smith*), larva[3]	Sept.	20.
Œdemasia concinna (*Smith*) *Pack.*	May	12.
Cœlodasys unicornis (*Smith*) *Pack.*, larva	Aug.	1.
Heterocampa marthesia (*Cram.*)=*Lochmæus tessella* Pack.	July	25.
Platycerura furcilla *Pack*[4]	June	12.
Cerura borealis *Boisd.*, larva, on willow	Aug. 22, Sept.	2.
Dryopteris rosea (*Walk.*)	June	30.
Telea Polyphemus (*Linn.*)	June 17, July	28.
Actias Luna (*Linn.*)	May 7, July	2.
Callosamia Promethea (*Drury*) *Pack.*	June	27.
Platysamia Cecropia (*Linn.*) *Grote.*	May 20, June	27.
Hyperchiria Io (*Fabr.*)	July	9.
Anisota rubicunda (*Fabr.*), larva	Aug.	9.
Gastropacha Americana *Harr.*, larva, on birch	July 14, Sept.	12.
Tolype laricis (*Fitch*)	Sept.	1.

[1] The larvæ have been collected from willow herb (*Epilobium coloratum*) but have not been observed by me on grape.

[2] Occurs frequently at Schoharie on blossoms of golden rod (Solidago). On one occasion six individuals were seen feeding together on a single plant, upon a hillside among evergreens.

[3] Feeds on maple and changes to a pupa beneath a leaf fastened by some threads to the ground. The imago is disclosed in June.

[4] The larva feeds on the pine, and attaining maturity about the middle of September, pupates in a slight cocoon among leaves on the surface of the ground

Tolype velleda (*Stoll*)..... Sept. 10.
Tolype velleda, larva, on elm..... July 26.
Clisiocampa sylvatica *Harr*..... July 11.
Xyleutes robiniæ (*Peck*)..... June 18, July 9.
Xyleutes querciperda (*Fitch*)..... June 27.

NOCTUIDÆ.

Thyatyra abrasa *Guen*..... June 25.
Thyatyra cymataphorides *Guen*..... July 11.
Lacinia expultrix *Grote*..... July 9.
Leptina ophthalmica *Guen*..... June 12.
Bryophila palliatricula *Guen*..... July 20.
Microcœlia diphteroides *Guen*..... July 21.
Microcœlia vinnula *Grote*..... May 25.
Diphtera deridens *Guen*..... May 25.
Diphtera deridens, larva..... Sept. 10.
Acronycta dissecta *Gr.-Rob*..... July 2.
Acronycta superans *Guen*..... July 16.
Acronycta brumosa *Guen*..... July 18
Acronycta oblinita *Smith*, larva, on Polygonum..... Sept. 12.
Acronycta occidentalis *Grote*, larva, on apple..... Sept. 20.
Leucania pallens *Linn*..... June 22, July 8.
Leucania pseudargyria *Guen*..... July 12, July 30.
Leucania unipuncta *Haworth*..... Aug. 30, Oct. 1.
Gortyna nitela *Guen*..... Sept. 14.
Gortyna nebris *Guen*..... Sept. 28.
Hydrœcia sera *Gr.-Rob*..... July 22.
Nephelodes violans *Guen*..... Aug. 27.
Xylophasia apamiformis *Guen*..... June 19.
Xylophasia lignicolora *Guen*..... July 15.
Mamestra devastator (*Brace*)..... Aug. 15.
Mamestra dubitans *Walk*..... Aug. 6.
Mamestra picta *Harr*., larva, on turnip..... Sept. 19, Oct. 12.
Mamestra adjuncta *Boisd*., larva, on Solidago..... Oct. 9.
Apamea finitima *Grote*..... June 3.
Apamea iaspis *Guen*..... July 12.
Celæna herbimacula *Guen*..... Aug. 1.
Agrotis c-nigrum (*Linn*.)..... June 23.
Agrotis venerabilis *Walk*..... Sept. 9.
Agrotis collaris *Gr.-Rob*..... July 3.
Agrotis Cochranii *Riley*..... Sept. 20.
Noctua clandestina (*Harr*.)..... July 1.
Noctua bicarnea *Guen*..... July 27.

Noctua baja *W.-V.*		Aug. 10.
Noctua plecta *Linn.*		June 30.
Cirrœdia pampina *Guen.*		Sept. 5.
Phlogophora Iris *Guen.*		June 28.
Aplecta herbida *W.-V.*	July 18,	Aug. 11.
Aplecta nimbosa *Guen.*		June 19.
Hadena xylinoides *Guen.*	May 20,	Aug. 18.
Hadena distincta *Hübn.*		May 7
Hadena badistriga *Grote.*		July 26.
Cucullia convexipennis *Gr.-Rob.*		July 21.
Cucullia convexipennis, larva, on Solidago		Oct. 10.
Cucullia intermedia *Speyer.*	May 27,	Aug. 10.
Cucullia intermedia, larva		Sept. 14.
Xylina cinerea *Riley*	April 8,	Oct. 10.
Xylina petrificata (*W.-V.*)		May 6.
Xylina Bethunei *Gr.-Rob*	March —, Sept. 12,	Oct. 7.
Rhodophora florida *Guen.*		July 17.
Anthœcia bina *Guen.*		June 16.
Chamyris cerintha (*Treits.*)		July 2.
Erastria synochites *Gr.-Rob.*		June 12.
Erastria muscosula *Guen.*	June 14,	June 20.
Erastria nigritula *Guen.*	June 8,	Aug. 30.
Erastria carneola *Guen.*		June 9.
Leptosia concinnimacula *Guen.*		May 18.
Eriopus monetifera *Guen.*		July 7.
Plusia precationis *Guen.*		June 3.
Plusia balluca *Hübn.*	July 14,	July 23.
Plusia æroides *Grote*	July 8,	July 28.
Plusia festucæ (*Linn.*)	July 25,	Aug. 1.
Plusia simplex *Guen.*		Sept. 8.
Plusiodonta compressipalpis *Guen*		June 13.
Deva purpurigera *Walk.*		July 3.
Gonoptera libatrix (*Linn.*)[1]	May 6,	Aug. 3.
Catocala piatrix *Grote*		Aug. 20.
Catocala amatrix *Hübn.*		Sept. 12.
Catocala briseis *Edw.*		Aug. 10.
Catocala relicta *Walk*	Aug. 9,	Sept. 14.
Catocala unijuga *Walk.*		Aug. 15.

[1] The larva is of a bright velvety green color, having on each side a yellow stripe, shaded beneath with brown; longitudinally on the head is a black stripe. At maturity it measures one inch and a half in length by one-eighth of an inch in diameter. It is very sprightly in its movements. It feeds on willow, and pupates among some of the leaves drawn together by silken threads to which the pupa is attached by an anal spine. Pupation of the fall brood, from fifteen to twenty days.

Catocala parta *Guen.*, larva, on willow,..... July 7.
Erebus odora (*Linn.*)..... Nov. 2.
Ophiusa bistriaris *Hübn.*..... Aug. 15.
Drasteria erechtea (*Cram.*)..... April 22.
Euclidia cuspidea *Hübn.*..... May 16, June 17.

PHALÆNIDÆ.

Eutrapela transversata (*Drury*)..... July 25, Aug. 18.
Priocycla armataria (*Her.-Sch.*)..... June 26.
Angerona crocataria (*Fabr.*)..... July 10.
Hyperetis alienaria (*Her.-Sch.*)..... June 3.
Nematocampa filamentaria *Guen.*..... Aug. 8.
Endropia hypochraria (*Her.-Sch.*)..... June 3, June 22.
Endropia pectinaria (*W.-V.*)..... June 1.
Ellopia fiscellaria *Guen.*..... Sept. 15.
Caberodes imbraria *Guen.*..... July 10.
Eurymene phlogosaria *Guen.*..... April 30, May 8.
Metanema inatomaria *Guen.*..... July 16.
Amphidasys cognataria *Guen.*..... July 28.
Amphidasys cognataria, larva, on plum..... Aug. 19.
Boarmia sublunaria *Guen.*..... June 5.
Tephrosia Canadaria *Guen.*..... May 23.
Nemoria chloroleucaria *Guen.*..... June 5.
Aplodes mimosaria *Guen.*..... June 5.
Acidalia enucleata *Guen.*..... Aug. 15.
Acidalia persimilata *Grote*..... Aug. 20.
Stegania pustularia *Guen.*..... Aug. 17.
Cabera intentata..... Sept. 15.
Corycia vestaliata *Guen.*..... May 22.
Corycia albata *Lef.*..... May 30.
Macaria 4-signata *Walk.*..... July 25.
Abraxas ribearia *Fitch*..... July 14.
Anisopteryx vernata (*Peck*)..... April 5.
Hybernia tiliaria *Harr.*..... Oct. 28.
Oporabia dilutata (*Albin*)..... Nov. 6.
Melaraippe lacustrata *Guen.*..... June 6.
Coremia propugnata (*W.-V.*)..... July 9.
Cidaria gracilineata *Guen.*..... Aug. 1.
Cidaria hersiliata *Guen.*..... June 23.
Heterophleps triguttaria *Her.-Sch.*..... July 10, Aug. 2.
Odezia albovittata *Guen.*..... Aug. 2.

MICROLEPIDOPTERA.

Hypena humuli *Harris*	May 7,	July 12.
Hypena elegantalis *Fitch*		July 7.
Hypena scabralis (*Fabr.*)		Sept. 10.
Hypena erectalis *Guen*		Sept. 14.
Herminia morbidalis *Guen*		July 31.
Herminia pedipilalis *Guen*		June 21.
Herminia cruralis *Guen*		July 31.
Helia æmulalis (*Hübn*)		July 30.
Pyralis farinalis *Linn*		July 12.
Botys elealis (*Walk.*)=*B. adipaloides* Gr.-Rob		May 22.
Pionea stramentalis (*Hübn.*)		Aug. 20.
Argyrolepia quercifoliana *Fitch*		July 1.

XI. LIST OF NORTH AMERICAN LEPIDOPTERA CONTAINED IN "SPECIES GÉNÉRAL DES LÉPIDOPTÈRES." BY A. GUENÉE.

The following list embraces above six hundred species of moths, of which, with the exception of some identical European species which have been frequently described and figured by the earlier authors, descriptions are given in the six volumes (V. to X.) of the *Species Général des Lépidoptères par M. A. Guenée*, forming a portion of the *Suites à Buffon.*

The species which are credited by Guenée to the State of New York are indicated by an asterisk (*). Elsewhere, when no *habitat* is given, it is to be understood as "North America." Species known to the compiler to occur in New York, in addition to those designated by Guenée, are marked in the list with a dagger (†).

NOCTUÉLITES.

Noctuo-Bombycidæ BOISD.

	Vol	V. pa.	No
*Thyatyra abrasa *Guen.*	..	12	2
Thyatyra pudens *Guen.*		13	5
*Thyatyra cymatophoroides *Guen.*		13	6
*Leptina dormitans *Guen.*		15	7
*Leptina ophthalmica *Guen.*		15	8
†Leptina Doubledayi *Guen.* North. States		15	9

Bryophilidæ GUEN.

*Bryophila palliatricula *Guen.*		26	26
Bryophila corticosa *Guen.*		30	32
Grammophora hebræa *Guen.*		31	33
Grammophora cora *Hübn.* Georgia		31	34

Bombycoidæ BOISD.

*Microcœlia fragilis *Guen.*		34	35
*Microcœlia diphteroides *Guen.*		34	36
†Diphtera deridens *Guen.*		35	37
Diphtera jocosa *Guen.*	...	37	40
Acronycta tritona *Hübn.* Georgia, Florida	...	42	45
Acronycta psi *Linn.* North Amer., Europe	...	43	47
Acronycta lobeliæ *Guen.*		44	49
†Acronycta furcifera *Guen.*		44	50
†Acronycta hasta *Guen.*		45	51
Acronycta telum *Guen.*		45	52
*Acronycta spinigera *Guen.*		45	53
Acronycta interrupta *Boisd.* North Amer. [Georgia?]		46	54

[1] Identical with *Agrotis telifera* Harris.

Orthosidæ GUEN.

Cosmidæ GUEN.

Hadenidæ GUEN.

[1] Very near to *Noctua clandestina* Harris, but in all probability distinct.

	Vol. VI, pa.	No.
*Phlegophora periculosa *Guen*	65	755
†Euplexia lucipara *Linn.* North Amer., Europe	68	758
Polyphænis herbacea *Guen*	73	764
†Aplecta herbida *W.-V.* North Amer., Europe	75	765
*Aplecta imbrifera *Guen*	76	768
†Aplecta nimbosa *Guen*	77	769
†Aplecta latex *Guen*	78	771
*Aplecta condita *Guen*	78	772
*Hadena miselioides *Guen*	89	791
Hadena distincta *Hübn*	91	795
†Hadena chenopodii *Albin.* North Amer., Europe	97	807
*Hadena pisi *Linn.* North Amer., Europe	101	817
†Hadena w-latinum *Hufn.* North Amer., Europe	104	822
*Hadena grandis *Boisd.* Lapland and Greenland	105	823
†Hadena xylinoides *Guen*	106	825

Xylinidæ GUEN.

†Cloantha ramosula *Guen*	114	831
†Xylina petrificata *W.-V.* North Amer., Europe	121	844
†Cucullia asteroides *Guen*	133	858
Cucullia postera *Guen*	133	859
*Cucullia florea *Guen*	134	860
Cucullia umbratica[1] *Linn.* North Amer., Europe	146	885
†Crambodes talidiformis *Guen*	152	896

Heliothidæ BOISD.

Oria sanguinea *Hübn*	167	913
Rhodophora gauræ *Abb.* Georgia, Florida	170	917
*Rhodophora florida *Guen*	171	918
Lepipolys perscripta *Guen.* Florida	174	921
Aspila rhexiæ *Abb*	175	922
Aspila virescens *Fabr.* West Indies [North Amer. *Grote*]	175	923
Aspila subflexa *Guen*	175	924
Tamila nundina *Drury*	176	925
†Heliothis marginata *Kléem.* Europe	178	927
†Heliothis armigera *Hübn.* [=*H. umbrosus* Grote.] North Amer., Eur.	181	933
†Heliothis spinosæ *Guen.* Canada	182	937
†Anthœcia rivulosa *Guen.* [=*Crambus marginatus* Haworth]	184	938
†Anthœcia arcifera *Guen*	184	939
Anthœcia jaguarina *Guen*	184	940
†Anthœcia lynx *Guen*	185	942
Anthœcia tuberculum *Hübn*	185	943
†Anthœcia bina *Guen*	186	944

See Addenda.

Hæmerosidæ GUEN.

*Lepidomys irrenosa *Guen*	202	966

Acontidæ BOISD.

Agrophila leo *Guen*	205	968
Agrophila dama *Guen*	205	969
Agrophila onagrus *Guen*	205	970

[1] This species does not occur in North America. *C. intermedia* of Speyer has been mistaken for it.

	Vol. VI, pa.	No.
Plusia ni *Engr.* North Amer., Europe	349	1178
Plusia oxygramma *Hübn.*	350	1181
†Plusia mortuorum *Guen.*	353	1187
Basilodes pepita *Guen.* Florida	358	1199
†Plusiodonta compressipalpis *Guen.* ——?	359	1200

Hemiceridæ GUEN.

Hemiceras cadmia *Guen.*	383	1240

Gonopteridæ GUEN.

Cosmophila erosa *Hübn.*	395	1255
Anomis fulvida *Guen.*	397	1259
†Anomis bipunctina[1] *Guen.*	401	1267
Anomis luridula *Guen.*	401	1268
Monogona hormos *Hübn.* Pennsylvania, Georgia	403	1270
†Gonoptera libatrix *Linn.* North Amer., Europe	405	1273

Amphipyridæ GUEN.

†Amphipyra pyramidoides *Guen.*	413	1278

Homopteridæ BOISD.

	Vol. VII, pa.	No.
Phæocyma lunifera *Hübn.*	3	1320
†Homoptera lunata *Drury*	12	1335
Homoptera exhausta *Guen.* North Amer.?	14	1337
†Homoptera edusa *Drury*	14	1338
Homoptera minerea *Guen.*	15	1339
Homoptera calycanthata *Abb.*	15	1340
Homoptera obliqua *Guen.*	16	1341
Ypsia æruginosa *Guen.*	17	1342
†Ypsia undularis *Drury*	18	1343
Anthracia coracias *Guen.*	19	1344
Anthracia cornix *Guen.*	19	1345

Hypogrammidæ GUEN.

Campometra amella *Guen.* North Amer. [Georgia?]	25	1352
Hypogramma Andromedæ *Guen.* North Amer. [Georgia?]	36	1368
†Allotria elonympha *Hübn.* Georgia, Florida	37	1369

Bolinidæ GUEN.

Panula inconstans *Guen.*	59	1392
Panula remigipila *Guen.* Florida	60	1393
Bolina cinis *Guen.*	62	1395
†Syneda limbolaris *Hübn.*	71	1416
†Syneda graphica *Hübn.* Georgia	71	1417

Catocalidæ BOISD.

†Parthenos nubilis *Hübn.*	80	1427
Catocala fraxini *Linn.* North Amer., Europe	83	1428

[1] This is said by Mr. Grote to be *Anomis Xylina*, described by Say in 1827.

	Vol. VII, pa.	No.
Poaphila erasa *Guen.*	301	1751
Poaphila herbicola *Boisd.*	301	1752
Poaphila contempta *Boisd.*	302	1753
Poaphila flavistriaris *Hübn.*	302	1754
Poaphila perplexa *Boisd.* Savannah	302	1755
Poaphila bistrigata *Hübn*	303	1756
Poaphila herbarum *Guen.*	303	1757
Phurys vinculum *Guen.*	304	1758
Phurys lima *Guen.* North Amer.?	305	1759
Celiptera frustulum *Guen.*	308	1767

Remigidæ GUEN.

Remigia latipes *Guen.*	314	1774
Remigia marcida *Guen.* Savannah	317	1777
Isogona natatrix *Guen.*	323	1786
Panopoda rubricosta *Guen.*	324	1788
Panopoda roseicosta *Guen.*	325	1789
Panopoda carneicosta *Guen.* United States	325	1790

Thermesidæ GUEN.

Thermesia gemmatalis *Hübn.* United States, Brazil	355	1828
Marmorinia epionoides *Guen.* Georgia	371	1853
Marmorinia geometroides *Guen.*	371	1854

ADDITIONS.

Cerastis adulta *Guen.* Georgia	393	633 bis
Hoporina hesperidago *Guen.* Georgia	393	644 bis

DELTOIDES LAT.

Hypenidæ H.-S.

	Vol. VIII, pa.	No.
†Hypena Baltimoralis *Guen.* United States	34	31
Hypena madefactalis *Guen.*	35	33
*Hypena scabralis *Fabr.* Pennsylvania, Canada, etc	40	45
†Hypena erectalis *Guen.* Pennsylvania	40	46

Herminidæ DUPON.

‡Rivula propinqualis *Guen.*	49	54
†Herminia morbidalis *Guen.*	56	60
*Herminia pedipilalis *Guen.*	57	62
†Herminia cruralis *Guen.*	58	65
Nodaria Hispanalis *Guen.* North Amer.?	64	77
Bleptina caradrinalis *Guen.*	67	84
Bleptina? madopalis *Guen.* North Amer.?	69	89
‡Helia phæalis *Guen.*	76	96
†Helia Americalis *Guen.*	78	100
-Helia æmulalis *Hübn.*	78	101
Helia lituralis *Hübn.* Georgia	79	102
†Renia discoloralis *Guen.*	82	107
†Clanyma angulalis *Hübn.*	95	128
Clanyma asopialis *Guen.*	96	130

PYRALITES.

Pyralidæ Guen.

Ennychidæ Dupon.

Asopidæ Guen.

Steniadæ Guen.?

Spilomelidæ Guen.

Margarodidæ Guen.

Botydæ Guen.

	Vol. VIII, pa.	No.
Botys flavidalis *Guen.*	329	358
Botys extricalis *Guen.*	338	382
Botys argyralis *Hübn.*	341	388
Ebulea fumalis *Guen.* Georgia	358	430
Ebulea tertialis *Guen.*	364	446
Homophysa glaphyralis *Guen.*	366	450
Homophysa sesquistrialis *Hübn.* Georgia	366	451
Pionea rimosalis *Guen.*	371	460
†Pionea stramentalis[1] *Hübn.* Europe	373	465
†Pionea scripturalis *Guen.* Brazil, [North Amer., *Walker*]	373	466
Scopula illibalis *Hübn.*	395	509
Scopula rubigalis *Guen.*	398	516
Nymphula similalis *Guen.*	403	524
Mecyna reversalis *Guen.*	409	531

PHALÉNITES.

Urapterydæ GUEN.

	Vol. IX, pa.	No.
Chœrodes tetragonata *Guen.* Brazil, [North Amer. in exp. of plates]	36	16
Chœrodes incurvata *Guen.*	37	21
†Chœrodes transversata *Drury.* United States	38	22
*Chœrodes goniata *Guen.*	38	24
Eutrapela clemataria *Abb.*	47	42
Crocopteryx martiata *Guen.* North Amer.?	74	100

Ennomidæ GUEN.

Apicia spinetaria *Guen.* North Amer., Brazil	85	123
Apicia juncturaria *Guen.* North Amer.? Brazil?	88	132
*Priocycla armataria *Her.-Sch.*	91	136
Epione serinaria *Her.-Sch.* Cincinnati	98	149
Sicya truncataria *Guen.* Canada	104	159
*Sicya solfataria *Guen.*	104	160
Sycya sublimaria[2] *Harris.*	105	161
†Angerona crocataria *Fabr.*	114	175
Hyperetis nyssaria *Abb.*	118	178
Hyperetis exsinuaria *Guen.* Pennsylvania	118	179
Hyperetis amicaria *Her.-Sch.* Cincinnati	118	180
Hyperetis insinuaria *Guen.*	119	181
Hyperetis persinuaria *Guen.* Near Baltimore	119	182
*Hyperetis subsinuaria *Guen.*	119	183
†Hyperetis alienaria *Her.-Sch.* Near Baltimore	120	184
†Nematocampa filamentaria *Guen.*	121	185
†Endropia pectinaria *W.-V.*	122	186
Endropia tigrinaria *Guen.* Canada	123	187
Endropia obtusaria *Hübn.*	123	188
†Endropia amœnaria *Guen.*	124	190
†Endropia hypochraria *Her.-Sch.*	125	191
*Endropia refractaria *Guen.*	125	192

[1] An Orobena, identical with the German species, but somewhat darker in color.—SPEYER.

[2] This is *Ennomos macularia* of Harris (Lake Superior, page 392), the specific name being changed by Guenée, from having been previously used.

Amphidasydæ GUEN.

Boarmidæ GUEN.

[1] Guenée's description so accurately conforms to the New York species that it is not improbable that the locality assigned by him is an erroneous one.—SPEYER.

Larentidæ Guen.

	Vol. X, pa.	No.
†Oporabia dilutata *Alb.* Europe, [New York, *Fitch*]	262	1333
Larentia implicata *Guen.* California	284	1367
Eupithecia subapicata *Guen.* California	331	1438
Eupithecia coagulata *Guen.* Pennsylvania	339	1451
Lepiodes scolopacinaria *Guen.* United States	360	1484
Ypsipetes pluviata *Guen.*	378	1505
Melanthia albicillata *Linn.* Europe	382	1510
†Melanthia rufiscillata *Guen.* Canada	382	1511
†Melanippe gothicata *Guen.* [=*M. hastata* Linn]	388	1521
*Melanippe lacustrata *Guen.* Canada	395	1535
*Melanippe intermediata *Guen.* Canada, Pennsylvania	395	1536
Melanippe iduata *Guen.* Canada	403	1548
Anticlea vasiliata *Guen.* Canada	407	1557
Coremia convallaria *Guen.* California	410	1561
Coremia defensaria *Guen.* California	411	1562
†Coremia propugnata *W.-V.* Europe, North Amer	412	1567
*Coremia ferrugata *Alb.* Europe	413	1568
Coremia orthogrammaria *Led.* Georgia	417	1574
Coremia plebeculata *Guen.* California	419	1580
Camptogramma fluviata *Hübn.* Europe, North Amer	429	1601
†Camptogramma gemmata *Hübn.* Europe	430	1602
†Phibalapteryx intestinata *Guen.* Canada	432	1605
Scotosia hæsitata *Guen.* California	444	1629
†Scotosia undulata *Linn.* Canada	449	1640
Spargania magnoliata *Guen.* Canada	455	1653
†Cidaria hersiliata *Guen.* Canada	464	1672
†Cidaria russata *W.-V.* Europe, Canada	464	1673
Cidaria mancipata *Guen.* California	468	1674
†Cidaria diversilineata *Hübn.*	475	1689
†Cidaria gracilineata *Guen.*	476	1690

Eubolidæ Guen.

Eubolia custodiata *Guen.* California	491	1715

Sionidæ Guen.

†Heterophleps triguttaria *Her.-Sch.* Pennsylvania	514	1751
*Odezia albovittata *Guen.* Canada	520	1757

ADDENDA.

	Vol. V.	
Nephelodes rubeolans *Guen.* New Holland? [Halifax, N. S., *Bethune*]	130	205
	Vol. VI.	
Aspila virescens *Fabr.* West Indies, [North Amer., *Grote*]	175	923
Tamila nundina *Drury*	176	925
Anarta melanopa *Becklin.* Lapland, Alps of Switz., [N. Amer., *Grote*]	190	950
Anarta funebris *Hübn.* Chamouni, [North Amer., *Grote*]	191	952
Anarta amissa *Lef.* Lapland, [North Amer., *Grote*]	192	953
Anarta algida *Lef.* Norway, Sweden, Lapland, Greenland	192	954
Anarta melaleuca *Becklin.* Lapland, [North Amer., *Grote*]	193	956
Anarta cordigera *Scbaldt.* Lapland, Switzerland, [N. Amer., *Grote*]	194	957
Anomis grandipuncta *Guen.* Brazil, [Canada, *Bethune*]	400	1266
Mania typica *Linn.* Europe, [Canada, *Bethune*]	417	1286

XII. NOTES ON CUCULLIA INTERMEDIA SPEYER.

In the reference made in the following paper by Dr. Speyer* to a manuscript description received from me of the larva of *Cucullia intermedia*, an error has occurred in the translation of the description sent to him, whereby the dorsal and lateral spots, which constitute the entire colorational marking of the larva, are designated as "reddish" instead of *orange*, as originally written. The figure of the larva, to which he also refers, was a copy by a friend from a colored figure made by me. Upon reference to my original figure, the spots were found to be inaccurately colored, being represented as reddish, instead of conforming to the description. In the copy taken from it, it is possible that a still further variation from the true color may have occurred, warranting its indication by Dr. Speyer as "lilac." These errors may seem quite trivial: they would not be deemed of sufficient importance to demand a formal correction at the present time were it not that the color of the larval spots is introduced by Dr. S. as a prominent specific feature in his comparison of *C. intermedia* with *C. lucifuga*. A few omissions and other minor differences appear in the following paragraphs in the translation, as compared with my notes; the latter read as follows: "Larva shining black, covered closely with minute granulations; sides with thirteen orange spots, one on each segment except the twelfth, which has two small ones; the first four are quadrangular, and the next seven are semicircular or triangular." The representation of the larva on plate 8, fig. 7, is from my original figure, but does not faithfully portray the form of the spots.

The larva, in all probability, occurs on the common burdock (*Lappa officinalis*), as I found, several years ago (as appears from notes made in 1857), three crushed larvæ upon a sidewalk at Schoharie, by the side of which a number of burdocks were growing, with their leaves much eaten. In two or three instances in which I have taken the larvæ after their last molt and matured them on burdock, I am unable, in the absence of memoranda, to recall positively the circumstances under which they were found, but my impression is, that they occurred on the sidewalk at an early hour of the day. The habit of the larva, we may presume, is to conceal itself during the day beneath stones or other objects lying on the ground, and to come forth after dark to take its food.

As the closely allied European species, *C. umbratica*, feeds on the leaves of lettuce (*Lactuca virosa*), and on several species of sowthistle

*A. Speyer, M. D., of Rhoden, Fürstenthum Waldeck, Prussia.

(*Sonchus arvensis*, *S. oleraceus* and *S. palustris*),* it is probable that *C. intermedia* is not confined to the burdock, but may be found on others of the Compositæ.

The larvæ taken by me were fed in a box containing a few inches of earth, in which it was presumed that they would bury themselves for their transformation, but, instead of doing so, they were found to construct their cocoons upon the surface. In one instance in which the commencement of the operation was observed, the larva was seen to attach its thread to the side of the box, at a height of about an inch from the ground, and to carry it thence outwardly to the ground, at an angle of about 45°. A number of threads were thus spun backward and forward within the space of perhaps an half-inch laterally, to which other threads were attached, running in different directions beneath. When these last had been made to define somewhat of an oval form, inclosing the larva, particles of earth were taken up in its mouth, as the operation of spinning continued, and deposited on the viscid thread, until a wall was built up around it, entirely hiding it from view.

In this manner, a firm cocoon is constructed, which, to ordinary observation, appears simply as a ball of earth, but which, under a lens, shows clearly the silken threads traversing every portion of it. The cocoons rested with one end on the surface of the ground, with a side, somewhat flattened, attached to the box. One in my possession is ellipsoidal in form, and measures six-tenths by nine-tenths of an inch in diameter.

A pupa-case of *C. intermedia* in my collection (Plate 8, fig. 6), in which the abdominal rings have been contracted in the escape of the imago, so that the anal spine is opposite the tip of the extended tongue-case, measures seven-tenths of an inch in length. The free end of the tongue-case extends fifteen-hundredths of an inch beyond the wing-cases, at which point it is enlarged, and, apparently, has its apical portion recurved and folded upon itself for about one-third its length. The anal spine is smooth, short, curved, rounded at tip, and hollowed beneath. The shell is thin, translucent, of a testaceous color, with the stigmata, a mesial line on the apical portion of the tongue-case and tip of the anal spine, black.

There are two annual broods of *intermedia*. In addition to the August brood mentioned by Dr. Speyer, they have been observed by me during the latter part of May, taking their food upon the wing, at the hour of twilight, from lilac blossoms (*Syringa vulgaris*), associated with *Deilephila chamanerii*, *Amphion Nessus*, *Thyreus Abbotii* and *Sesia Thysbe*, and imitating very closely these sphinges in their method

* *Newman's Natural History of British Moths*, p. 436. 1869.

of feeding and in their flight. Fig. 5 of Plate 8 represents the female moth.

The larva of *Cucullia convexipennis* Gr.-Rob. (conspicuously marked with a dorsal stripe of brick-red on a ground of black, and with a broad lateral stripe of yellow, broken transversely into lines resembling Roman letters), which I have taken during the months of September and October, feeding first on the leaves and later on the flowers of the golden rod (*Solidago canadensis*), also constructs a cocoon of earth and silk; but, unlike that of *intermedia*, it is placed beneath the surface of the ground. Although not so firmly built as that of its congenor, it is sufficiently compact to admit of the escape of the imago through an opening made in the end, without destroying its ellipsoidal form.

We are indebted to Mr. E. L. Graef, of Brooklyn, L. I., for the able translation of the following paper of Dr. Speyer, which may justly be regarded as a model of entomological criticism. The thirty years of close study which its author has given to the Lepidoptera of Europe, have made him so thoroughly conversant with the European forms, that he is now prepared to continue their investigation with unfailing interest to himself, and greatly to the advancement of science, through their comparison with representative and allied species from other portions of the globe. The opportunity of very favorable comparison with many of the New York species has been afforded him through large collections reared from the larvæ, or carefully made in the field, and subsequently prepared in a superior manner by Mr. Meske, to whom reference has been made in these pages less frequently than his labors deserve, or my obligations to him demand.*

*Mr. Meske's field collections are made with unusual care. A gauze net is used by him, of so delicate a texture that the captured insect, in its efforts to escape, may brush against its sides without the loss of any of its cilia. As quickly as possible it is withdrawn from the net in a wide-mouthed bottle, and speedily quieted by a few drops of chloroform, poured on some cotton contained in a glass tube passing through the cork. When the insect is dead, or nearly so, it is carefully turned out on the palm of the left hand, and in that position pinned, without taking it, as is usually done, between the fingers. In this manner, even the strong-winged Hesperians may be secured without the least injury to their thoracic garniture, or to their slightly attached cilia — in an absolutely perfect condition.

I have found a lump of cyanide of potassa secured by a piece of gauze to the stopple of a bottle (a French mustard jar, with its hollow, screw stopple, forms an excellent collecting bottle), to be more convenient for use than chloroform, and nearly as prompt in its anæsthetic effects. As the larger insects soon revive after being transferred to the collecting box, unless left under the influence of the potassa for fifteen minutes or more, the field collector will find it convenient to provide himself with a duplicate bottle, for use while the occupied one is resting in an inverted position in his pocket. An insect killed in this method remains in good condition for setting, wholly free from the rigidity which often attends the use of chloroform.

One result of these comparative studies is presented in the following paper, and others appear, in part, as notes to some of the preceding pages. Reference would further be made to some recent determinations by Dr. Speyer of erroneous generic references of several of our Lepidoptera, if we were confident that, in extracting from correspondence, we would not be anticipating intended publication in European journals. Whenever published, we bespeak for them, on the part of our entomologists, the consideration to which they are entitled, as coming from one who, although his modest labors have not secured for him an extensive reputation in this country, has been pronounced by perhaps our highest American authority, "the foremost student in Lepidopterology in the world."

ADDENDA ET CORRIGENDA.

Page 177, line 28, 2d column, *dele* [5] and corresponding note at foot of page.
Page 179, line 15, *dele* the line: the credit to New England is erroneous.
Page 196, line 20, for Boarmia sublunaria *Guen.*, read Tephrosia spatiosaria *Walk.*
Page 196, line 27, for intentata.....Sept. 15, read intentaria Walk.....June 21.
Page 197, line 5, *dele* the line, as erectalis is female of scabralis.
Page 198, line 18, insert a † before T. pudens, to indicate a N. Y. species.
Page 199, line 13, after Florida add [Missouri, *Grote*].
Page 199, line 27, *dele* the † before L. albilinea, and after *Hübn.* add North Amer., Brazil,[1] and at bottom of the page the note [1 Probably an erroneous determination of Guenée. Our N. Y. species has been described by Mr. Grote as *L. Harveyi.*]
Page 200, lines 6, 12, 13 and 33, insert a † before X. sectilis, L. frugiperda, P. commelinæ and P. xanthioides. as N. Y. species. To frugiperda append a reference ([a]), and at bottom of page, note to read, [[a] Prodenia autumnalis *Riley* is a synonym of this species. —GROTE.]
Page 201, line 43, insert a † before D. capsularis.
Page 202, lines 4, 33 and 47, insert a † before P. herbacea, T. nundina and A. leo: the latter species = A. onagrus, according to Mr. Grote.
Page 203, lines 11, 17 and 42, insert a † before E. albidula, X. nigrofimbria and P. verruca.
Page 204, lines 2, 25 and 26, insert a † before P. ni, H. obliqua and Y. æruginosa.
Page 204, line 17, insert after this, † Amphipyra tragopogonis *Linn.*.....415 1284
Page 205, line 35, insert a † before A. anilis.
Page 206, lines 21 and 22, insert a † before M. epionoides and M. geometroides, and at bottom of page a note (referred to from these species), [1 On the authority of Mr. Grote, identical with Pangrapta decoralis *Hübn.*, of which *Hypena elegantalis* Fitch is also a synonym.]
Page 206, lines 17, 18, 29, 38 and 46, insert a † before P. roseicosta, P. carneicosta, H. madefactalis, B. caradrinalis and C. asopialis.
Page 208, line 3, insert after this, † Botys terrealis *Treits.* Europe.....339 384.
Page 208, line 11, *dele* the line, as P. scripturalis is not North American.
Page 208, line 15, insert after this, **Scoparidæ** GUEN., and beneath, the following line: Stenopteryx hybridalis *Hübn.* [=noctuella W.-V.].....414 537
Page 208, lines 23, 30, 35, insert a † before E. clemataria, S. truncataria and H. exsinuaria.
Page 208, line 48, for lighter read darker.
Page 209, lines 14, 18, 41 and 46, insert a † before C. majoraria, C. phasianaria, B. pampinaria and B. defectaria; line 49, *dele* the † before B. sublunaria.
Page 211, line 6, transfer the † from C. variolaria to C. erythemaria.
Page 212, line 10, for rufiscillata read ruficillata.
Page 212, line 26, after *Linn.* insert Europe, and *dele* lines 42 and 43 (A. virescens and T. nundina), as repetitions.

(E.)

[From the Stettiner Entomologische Zeitung, 31 Jahrgang, No. 10-12, 1870.]

ON CUCULLIA INTERMEDIA Nov. Spec. AND C. LUCIFUGA W.-V.

By A. SPEYER, M. D.

Of the group of Cucullia, of which *C. umbratica* Linn. [Plate 8, fig. 4] is the most common European representative, Guenée in his well-known writings, mentions only one American species, viz., *umbratica*, which he represents (Noctuélites II, p. 147) as "commune dans toute l'Europe et l'Amérique Septentrionale." Walker also knows of but one American species of this group, not *umbratica*, but *chamomillæ* W.-V., represented in the British Museum by one specimen from Hudson's Bay and one specimen from the State of New York (*List of Spec. of Lepidop. Ins. in the Collec. of the Br. Mus.*, XI, p. 650). Through the kindness of my friend Mr. Meske, of Albany, N. Y., I have received specimens of the species which, according to his authority, is generally known in America as *umbratica* [Plate 8, fig. 5], and this species is neither *umbratica* nor *chamomillæ*, but is so nearly allied to *C. lucifuga* W.-V., that I was at first disposed to take it for a local variety of the last-named species. The receipt of a greater number of specimens from America, accompanied with a drawing and description of the larva, enable me to place the identity of the species beyond all doubt. I have named it *intermedia*, it being between *lucifuga* and *lactucæ* W.-V., having the coloring of the first-named species with the form and markings of the latter, but, in fact, allied more closely to *lucifuga*.

The question now arises, is *intermedia*, which was formerly known in America as *umbratica*, also the identical *C. umbratica* of Guenée? Guenée was too well acquainted with the differences between *umbratica* and *lucifuga* and their allied species to confound *intermedia* with the so dissimilar *umbratica*, if he really had *intermedia* before him. He does not, however, expressly say that his statement as to the occurrence of the species is founded on his own examination, for "commune" *umbratica* certainly is not, otherwise it would not have escaped my entomological friends in America. I am led to believe that Guenée's statement is only a reproduction of the error made by American collectors; he, however, cites no American authority. Nei-

ther would I take Walker's *chamomillæ* for *intermedia*. It is not probable that a species, which seems to be as common in the northern United States as *umbratica* is in Europe, should not be represented in the British Museum; and whether Walker is correct in his distinction of the species is very questionable. Of *lucifuga*, he mentions only a single European specimen in the Museum.

The following description is based on the comparison of 10 *intermedia* (4 ♂ and 6 ♀) from New York, with 7 *lucifuga* (3 ♂ and 4 ♀) from Austria, Bavaria, Switzerland, Silesia and Thüringen.

Expanse about the same; the anterior wings of the largest females of both species expand 23 mm., of the smallest males of *intermedia* 20 mm., and of *lucifuga* 21 mm. As far as I can discover, the abdominal construction is the same, as is also the sharp cut of the wings so characteristic of this genus. Anterior wings sharp, posterior margin oblique, slightly wavy and curved toward the interior angle. The anterior angle of the secondaries obtuse, rounded; posterior margin slightly undulated, irregular and somewhat wavy. Color of anteriors the same as in *lactucæ*, or a little darker and more inclined to blue, a uniform bluish-gray, with slight shadings of light mold-gray, especially in the interior margin and terminal region, the latter traversed by lighter rays, but often very indistinct and variable. The last may be said of the two zigzag lines, which are, however, formed precisely as with *lucifuga*; of these the front line is almost always distinctly visible, and the hinder one only distinct near the interior margin. Toward the anterior margin these lines become broader and macular, and here, between the two, a third line is visible, darker and stronger than either. The dorsal vein,* and those in the terminal region, appear as very fine black lines. The black ray emerging from the base is long and fine. The three rays in the terminal region — the longer and finer ray in cell no. 4†, which emerges from the outer margin of the

[*The submedian of American entomologists.]

[†Among the German entomologists, the nerves and nervules are designated by the numbers 1, 2, 3, 4, etc., counting on the posterior margin from the posterior toward the anterior angle of the wing. The first nervule of the median uniformly bears the number 2. The submedian, the internal, and whatever interior nerves may exist, are known as 1 a, 1 b, 1 c, enumerating from the internal margin. The nerve opposite the discal cell, and usually given off from the cross-vein, is no. 5, and, for the sake of uniformity, is so counted even when absent: no. 8 usually terminates just below the apex of the wing. The cells (*interspaces* of Clemens and others) are as follows: between the internal margin and nerve adjacent is 1 a; if this nerve be the internal, then the space between it and the submedian is 1 b, followed by 1 c; but when there is no internal nerve, then this latter cell becomes 1 b. Between the nervules of the median and of the subcostal, the cells bear the numbers of the nervules which precede them; thus, between the first median nervule (no. 2) and the second (no. 3), is cell no. 2; opposite the discal cell, separated by nerve 5, are cells 4 and 5, and thus, to cell 12 or 13, if the venation permit, on the basal portion of the anterior margin.]

reniform mark and runs along without quite reaching the margin; a shorter ray resting on the margin in cell no. 3; and, lastly, the short and usually strong and somewhat oblique ray, with a whitish border, in cell 1 b, near the interior angle — have the forms and positions as with *lucifuga*, but the markings are mostly fainter; in some specimens quite indistinct, but are never wanting. A row of black lines or lunettes, which, with the female, form nearly an unbroken line, are placed on the extreme terminal margin as with *lucifuga*, and the gray fringes, divided in the middle by a light line, are identical in both species. The orbicular spot is totally wanting; the outer border of the reniform spot is more or less completely marked by dark lines: most constantly its lower portion, next in frequency the outer, and lastly the upper border. These marks are not discernible in the male. On the discal cross-vein is, in some cases, an indistinct dark spot. The blackish-gray secondaries become lighter toward the base. With the male, the secondaries are always lighter colored, as is the case with all of this genus: in the female they are sometimes uniform black-gray. The white fringes are divided by a hair-like dark line, which latter is in some cases so obscure and imperfect that they seem totally white. Under side of the primaries ashy-gray, bordered along the anterior and interior margins with whitish-gray. The secondaries of the female whitish-gray, with a more or less broad hinder margin of a darker gray; in the male, almost completely dull white, with dark veins. On the discal cross-vein is a distinct, rounded, dark reniform mark, which is often connected with the base of the wing by a streak of the same color.

Color and markings of the remaining parts of the body are precisely as in *lucifuga*, with the exception that *intermedia* is more bluish-gray on the thorax, corresponding to the color of the wings. The center, between the shoulder covers of *intermedia*, is also darker, blackish-gray; on the abdomen are four distinct dark, downy tufts, as is the case with all its allies. The female is remarkable for the pointedness of its abdomen. The downy hair which adorns this part, is on the sides and on the underside of the last segment, in a greater or less degree, of a rust-yellow color. The most distinctly marked females have, on each side of the segment, a rust-yellow spot, the base of which is formed by the last incisure; and on the flat tuft, which covers the sexual organ from beneath, is a transverse spot of the same color. When I first noticed this singularity of coloring, I supposed it to be a peculiarity exclusively characteristic of *intermedia*, as I did not observe it in any others of the genus, and has, as far as I know, never been mentioned in any description. It proved, however, to be the same with *lucifuga*, and, furthermore, that this marking is not constant. Four

of my female *intermedia* show the spots large and distinct, the fifth, small and less brightly colored, while with the sixth it is reduced to simply a few of the hairs of the tufts which form the gray ground, being sprinkled slightly with rust-yellow. In two females of *lucifuga* the spots are similarly conspicuous, as usually in *intermedia*, while in two other bred specimens they are apparent only in a slight sprinkling of rust-yellow upon the gray tufts.

Of the allied species which I can compare, the Russian *C. balsamitæ* (1 ♀) alone has these spots of the same shape and coloring as *intermedia*, while the much closer allied species, *lactucæ* and *campanulæ*, show no trace of them; *umbratica* ♀ is also without this mark, although some specimens have a slight sprinkling of dull rust-yellow scales in the last segment. In *chamomillæ*, and especially in its variety, *chrysanthemi*, the parts named show only an indistinct surrounding of dull yellow or rust-brown.

Invariable distinguishing marks between *intermedia* and *lucifuga* are, therefore, not to be found either in the markings or form of the imago; the coloration only is different. The color of *lucifuga* (*Hübner Noct.*, fig. 262; *Freyer N. Beitr.*, tab. 431) on the thorax and anteriors is less inclined to blue, being more ash-gray, the lighter shades more strikingly whitish, the shadings stronger and inclined to brown, while *intermedia* is devoid of all brown whatever. The yellowish-brown coloration of the reniform mark which *lucifuga* shows more or less distinctly, is also wanting in *intermedia*.

From *C. lactucæ* (*Entom. Zeit.* 1858, S. 83 fig.), with which it has a coloration in common (though somewhat darker), *intermedia* differs by the sloping cut of the anteriors, the points of which are with *lactucæ*, obtuse and rounded, and the margin more convex. The dark markings in the terminal region of this species are also much fainter, or scarcely discernible, particularly the short dark line in cell no. 3, near the margin (so distinct in *intermedia*), which in this is totally wanting. The terminal margin is also without the strong black lines or lunettes; the dark dividing line of the fringes of the primaries is, on the contrary, broader and stronger. The middle of the thorax is not materially darkened, the tufts of the abdomen are less robust and lighter, being brownish-gray. *C. campanulæ* has a similar ground color, but a very different cut of the secondaries, they not being rounded at the anterior angle, but strong, pointed and almost falcate; the hinder margin is slightly indented. The deep, black markings, especially the lines in cells nos. 4 and 1 b., are longer and stronger, and are very conspicuous on the gray ground color. Lastly, *campanulæ* has a fine comma-like line in the median region, which emerges from the middle prong of the oblique line, which, of all the

other species, *umbratica* alone possesses. The last-named species also corresponds in the cut of the secondaries with *campanulæ*, and is additionally easily distinguishable by the faint, dull yellow streak on the primaries, and in the white secondaries of the male. *C. santolinæ* Ramb. and *C. chamomillæ* have indented secondaries and no black crescentic lines on the terminal margin, and are characterized by the deep black veins which run into the middle of the fringes. *Santolinæ* is also smaller than *intermedia*, and *chamomillæ* is differently colored from it. The remaining species are even less liable to be confounded with *intermedia*.

So slight as the differences between the so simply and monotonously marked imagines may appear, they are, on the contrary, very strongly marked in the brilliant and variegated colors of the larvæ. The larva of *intermedia* is no exception to this rule, although, as may be expected, in its earlier stages, it approaches nearer *lucifuga* than to the other species. The larva of *intermedia* is described by Mr. Lintner of the New York State Museum of Natural History, who is a close and reliable observer, as follows: "Sides with reddish spots, one on each segment, the first four square, the seven following semicircular, the two on the last segment small. Dorsum with two small reddish spots on the first four segments, a very indistinct spot on the fifth and one on each of the last four segments. The caterpillar is very lively in its motions and feeds generally at night." According to the figure accompanying the description, the ground color of the mature larva is dull black, head and feet the same, color of the spots, which are of about the same size as with *lucifuga*, lilac. Of its food and transformations I have not been informed. Very perfect specimens of the imago were taken by Mr. Meske in Albany, N. Y., early in August.

For the sake of comparison I give a detailed description of the larva of *lucifuga* (which is however already accurately described by Treitschke, Schmett. v. Eur. X, 2, 128) from two specimens prepared by Mr. O. Schreiner in Weimar in his masterly style. Mature larva black with three parallel rows of orange-yellow spots. The row on the dorsum consists of twenty-five small spots, two on the first segment, three each on the second and third, the first of which is rectangular, two each of a round form on the fourth to the eleventh segments, and the last two form a band instead of spots. The row on the side consists of thirteen spots, one on each segment.* Those on the second and third segments are broader, made so by the small spot in front running into the larger one behind; those on the twelfth and thirteenth are smaller and nearly touch each other; the last is a spot running

[*The author regards the body of the larva as consisting of *thirteen* segments, the twelfth segment being properly divisible, it is claimed, into two distinct portions.]

cross-wise. The rest are rounded, somewhat elongated transversely, which is also the case with those on the dorsum. The larva is entirely naked, and all except the collar thickly granulated. Head and feet black, the first granulated and wrinkled in front, with the clypeus furrowed cross-wise. In its youth the larva has a quite different appearance, it having stripes instead of spots. The young larva, (length thirty millimetres) which I have before me is velvety black with light yellow stripes, the dorsal stripe slightly mixed with reddish-yellow, and the broad side-stripes dotted with black. The skin is not granulated, but each of the middle segments is adorned by four tiny warts surmounted each by a rather long bristle. The head is smooth, black, with yellow markings in the middle and on the sides.

It is probable that the larva of *C. intermedia* changes in its appearance after its last molting in a similar manner. In this stage it has the ground color and the three rows of spots in common with *lucifuga*, but the color, number and division of the spots are different. The spots of *intermedia* are lilac, those of *lucifuga* orange; the first has thirteen dorsal spots, the other twenty-five, etc., etc. The larvæ of *lactucæ* and *campanulæ* have no resemblance whatever with that of *intermedia*. The larva of *umbratica* has more resemblance to it, but here the differences in color and markings are too striking to necessitate a comparison.

(F.)

DESCRIPTIONS OF NEW SPECIES OF FOSSILS

FROM THE DEVONIAN ROCKS OF IOWA.

By JAMES HALL & R. P. WHITFIELD.

PRELIMINARY NOTE ON THE GEOLOGICAL FORMATIONS.

During the progress of the Geological Survey of Iowa, from 1855 to 1860, a considerable amount of material, in the way of facts, maps and sections, was accumulated, beyond and after that which was embraced in the volumes published in 1858. The cessation of the work of the survey left the materials on hand.*

The collections of fossils, which had been made in the Devonian rocks and sent to the principal geologist, were so meagre that no satisfactory account of the palæontology of the formations could be given. No subdivision of the beds had been noticed, and the fossils were all communicated as coming from the same formation, and were at that time referred to beds of the age of the Hamilton group.

Subsequently, more considerable and important collections, in number of species, were contributed by Mr. O. H. St. John, residing at Waterloo. While these collections added much to our knowledge of this ancient fauna, they were not sufficient to clear up some points in doubt, and in 1866 Mr. R. P. Whitfield undertook an exploration of the principal localities of the region.

While making the collections of fossils from some of the rock formations of north-eastern Iowa, in localities previously considered of the age of the Hamilton group of New York, his attention was attracted to the peculiar grouping of organic remains, and to the great numbers of species which were known or believed to be characteristic of other formations; — as for example, at Waterloo, on Cedar River, where the formations are chiefly marked by the assemblage of fossil corals and Stromatopora, abundant at the quarries and along the banks of

* The Legislature of Iowa, after receiving and distributing the volumes published n 1858, and with the evidence of progress before them in a printed supplement, with maps, sections, etc., of portions of the coal field, prepared for publication, not only refused to publish or go on with the field work, but refused to refund to the principal geologist the salaries of his assistant and expenses of the survey for the preceding year, which he had advanced from his own means, or to pay for his own services during that time; all of which to this day remains unpaid. — J. H.

the stream below the town. Among the most common forms at this place are *Stromatopora erratica* of this paper, *Acervularia Davidsoni*, *A. profunda*, *Favosites* sp. like *F. polymorpha*, *Cystiphyllum Americanum*, *Cystiphyllum* n. sp., *Zaphrentis gigantea*, *Chonophyllum* sp., apparently the same as one in the Upper Helderberg of New York and at the Falls of the Ohio, *Amplexus Vandelli*, *Streptelasma* n. sp., *Aulacophyllum sulcatinum*, *Syringopora* sp., having large cells, three species of *Cladopora*, two species of *Aulopora*, one very large. Of the Brachiopoda, we find the following: *Spirifera euruteines*, *S. Oweni*, *S. Manni*, *S. subvaricosa* n. sp., *S. pennatus* only one individual, *Cyrtina Hamiltonensis*, *Atrypa reticularis*, *Atrypa* n. sp.?, *Pentamerella arata*, *P. obsolescens*, *Gypidula lævisculo*, *Rensselaeria Johnsoni*, *Terebratula Rominger*i, *T. elia*, *T. jucunda*. There are also several forms of fish-teeth known to occur in those same beds.

Of the Brachiopoda here enumerated, four are of species hitherto known only in the limestones of the Upper Helderberg group; two others, *Cyrtina* and *Atrypa*, are common to the Upper Helderberg and Hamilton: and one, *Terebratula Rominger*i, is credited only to the Hamilton group.

The corals, considered collectively, have a much greater similarity to those of the Upper Helderberg than to the Hamilton group.

At another locality, some seven miles east of Waterloo, near Raymond Station, there is an outcrop of white limestone apparently holding a position beneath the Waterloo beds, but entirely destitute of organic remains, except a few indistinct fragments of Stromatopora and an occasional specimen of a large species of Pleurotomaria, which has considerable resemblance to *P. arata* Hall, a species highly characteristic of, and known only from, the Scholarie grit of eastern New York. The Raymond Station species (*P. Isaacii*, of this paper), differs from the New York form only in the want of the transverse ridges on the upper side of the volutions and in the greater depression of the spire, and may be considered a closely representative species.

At the town of Independence, twenty-three miles east of Waterloo, there is a set of strata exposed and quarried which contain a group of fossils very different from the Waterloo rocks. Among them we find Cystiphyllum, Chonophyllum, Zaphrentis and Heliophyllum. Of the Brachiopods, we find *Crania* sp.?, *Orthis Iowensis*, *Strophodonta demissa*, *S. perplana* (the Hamilton type), *S. inequistriata*, *Spirifera inutilis*, *S. bimesialis*, *S. aspera* and *S. pennatus*, *Cyrtina Hamiltonensis* and *Gypidula* (*Pentamerus*) *occidentalis* as the more common forms; the whole presenting a more Hamilton aspect than the Waterloo collections.

At Waverly, twelve or fifteen miles north-west of Waterloo, the same beds occur, holding nearly the same series of fossils as that at Independence.

From the foregoing facts, we should infer that the Waterloo beds are more nearly related to the Upper Helderberg limestones of New York, while those of Independence and Waverly may be representative of the New York Hamilton. At Cedar Falls, between Waverly and Waterloo, the Waverly beds are exposed, and above them are groups of strata which are referred by Mr. Worthen to the Chemung group. (See *Geol. Iowa*, Vol. I, pt. 1, p. 310.)

Near Rockford, in Floyd county, on the west branch of Lime creek, there is a series of beds outcropping, a section of which is given on page 309 *Geological Report of Iowa*. Near the base of this section there is a thin bed of calcareous sandstone, containing the characteristic Chemung fossil *Spirifera disjuncta* Sow., in considerable numbers. Above this bed is a heavy layer of white limestone, in which occur large quantities of Stromatopora, forming extensive layers of many feet in extent, and often three or four feet in thickness, with but slight interruptions of shaly matter. Further up the bank there is a bed of calcareous clay of considerable thickness, formed in part, at least, by the decomposition of a bed of pyritiferous argillaceous limestone, which occupies the top of the cliff, and contains great numbers of beautiful fossils. Among them we find two species of Stromatoporoid forms belonging to the genus Cænostroma of Winchell, and one which is referable to Caunopora of Phillips. Of the corals, a species of Pachyphyllum (*P. Woodmani* of this paper, *Smithia Woodmani* White, *Geol. Rep. Iowa*, 1870, vol. 1, p. 188), is the most abundant, and, so far as we are aware, is the first species of the Pachyphyllum recognized in this country. A second species of the genus, and a number of other Cyathophylloid corals, all of which are undescribed, are common. These species being new, have, therefore, no stratigraphical significance; but among the Brachiopods there are several which may be considered as forms characteristic of the Chemung group, or as close representative species of that formation. Of the former, we may mention *Orthis impressa*, *Strophodonta perplana* var. *nervosa*, *Atrypa hystrix* and *Cryptonella Eudora* *: of the latter, *Strophodonta reversa*, *S. arcuata* and *Spirifera Whitneyi* — representing *Strophodonta cælata*, *Strophodonta cayuta* and *Spirifera disjuncta* of the Chemung group in New York.

At a point eight miles above Rockford, known as Hackberry, there is another outcrop of the same beds, containing the same fossils, with

[* An examination of other specimens of the form referred as above, has proved it to be a distinct species, for which the name *C. Calvini* is proposed.]

the addition of several other corals, among which is a new species of Acervularia and two species of Smithia described in these pages.

From the assemblage of fossils found at these two localities (Rockford and Hackberry), we are inclined to consider these beds as equivalents of the Chemung group of New York.

DESCRIPTIONS OF NEW SPECIES.

Genus — STROMATOPORA GOLD.

STROMATOPORA ERRATICA *n. sp.*

Specimens growing in strong, irregular, convex or hemispherical masses, six or eight inches in diameter, becoming extremely rough and irregularly laminated on weathering, but in a vertical section or fresh fracture showing a remarkable regularity of structure, with the exception of a slight alternation in the density, occurring at intervals of from an eighth to a sixth of an inch. Vertical columns much thicker than the spaces between, five to seven in the space of a tenth of an inch, moderately diverging upward, unequal in strength and frequently coalescing. Horizontal filaments appearing as continuous in a section, from six to eight in a tenth of an inch, much thicker than the interspaces, and expanding at their junction with the vertical column.

Weathered specimens present a somewhat coarsely shagreen-like surface, with occasional distant, slightly elevated patches of greater density, or of a madreporiform structure.

Formation and locality. In the coralline beds, and found abundantly in detached specimens over the surface and along the banks of streams at Waterloo, Iowa.

STROMATOPORA EXPANSA *n. sp.*

Plate 9, fig. 1.

Specimens in large expanded lamellar masses, sometimes of many feet in extent, with a slightly uneven or undulating surface, which is covered with broad, low prominences, distant from center to center three-eighths to one-half of an inch. In a vertical section the columns are distant from each other a little more than their own diameter, and are from six to seven in number in the space of a tenth of an inch. The horizontal layers are more closely arranged, becoming crowded at regular intervals of about a sixth of an inch, and averaging from ten to thirteen in the space of a tenth of an inch.

This crowding of the horizontal plates at intervals gives to the mass, when broken, a coarsely laminated character. When viewed on the surface it presents the appearance of minute, generally five-pointed, stellate forms, from the vertical columns being connected by the minute lateral processes, which form and represent the horizontal plates as seen in the vertical section.

In small specimens this species somewhat resembles the *S. erratica*, but it is more distinctly alternating in structure, has smaller and more numerous vertical columns, and wider interspaces; it also differs in mode of growth.

Formation and locality. In beds of white limestone, bordering Lime creek, above Rockford, Iowa; of the age of the Chemung group.

Stromatopora (Cænostroma) incrustans *n. sp.*

Plate 9, fig. 3.

Parasitic, incrusting other bodies, especially discs of Alveolites, sometimes coating them to a depth of three-fourths of an inch. Surface covered with irregularly disposed, conical pustules, distant from each other from one-fourth to five-eighths of an inch; when perfect, terminating at the apex in a minute, rounded perforation, from which proceed several (generally five) flexuous, bifurcating channels, which pass down the sides of the pustules and over the surface of the mass between them, often extending a distance of more than half an inch. In a section, the older channels are seen beneath the surface, traversing the substance of the mass as round pores, and terminating in the vertical tube of the cell. The pustules are from one-twelfth to one-eighth of an inch at base, and about half as high as the width; the spaces between strongly granulose.

In a vertical section, the horizontal layers are so compact and closely arranged as to be counted with difficulty; while the vertical columns, representing those of true Stromatopora, are mostly obsolete or blended with the transverse plates.

Formation and locality. In rocks of the age of the Chemung group: Rockford and Hackberry, Iowa.

Stromatopora (Cænostroma) solidula *n. sp.*

Plate 9, fig. 4.

Specimens in irregular masses, or incrusting foreign substances, the form of which they frequently retain. Surface extremely irregular and more or less thickly covered with small conical or rounded irregularly disposed pustules, giving origin to minute, indistinct, flexuous, ramifying channels, which traverse their sides and the intervening spaces, seldom extending to any great distance. Vertical section showing closely arranged horizontal layers of varying density, giving a strongly lamellose appearance: the individual plates or vertical columns scarcely or not at all distinguishable, but showing the ramifying tubes of different sizes very distinctly.

This species may be easily distinguished from any of the foregoing by the great density and compactness of the substance.

Formation and locality. In marly beds of the age of the Chemung group; Hackberry, eight miles above Rockford, Iowa.

Genus—CAUNOPORA PHILL.

CAUNOPORA PLANULATA *n. sp.*

Plate 9, fig. 2.

Specimens forming flat discoid bodies of greater or less extent and varying in thickness, apparently originating at a subcentral point of attachment. Surface of disc irregularly flattened. Centers of cells distinctly marked, scarcely or slightly elevated, and characterized by numerous radiating grooves or channels, which traverse the body in all directions, terminating in the central pore or tube. In a vertical section the horizontal plates are very thin, curving upwards as they approach the central pore, and so closely arranged as to be undistinguishable except under a strong magnifier; the vertical columns are much thicker than the intervening spaces, and number about nine in the space of a tenth of an inch.

This species differs from *S. (Cænostroma) incrustans* (which in vertical section it closely resembles) by the absence of conical pustules on the surface, or in having them broader and but slightly elevated.

Formation and locality. In marly beds of the age of the Chemung group; at Hackberry, eight miles above Rockford, Iowa.

There may be some doubt regarding the propriety of separating the species here referred to CAUNOPORA and CÆNOSTROMA, from the true STROMATOPORA. When carefully examined under a magnifier they prove to be made up of a series of vertical columns, connected by lateral filaments, which radiate more or less regularly at given intervals, and unite the several columns to each other just as in the typical STROMATOPORA; and it is these latter processes which, in a vertical section, give the appearance of horizontal plates. The conical pustules of CÆNOSTROMA are only a further development of the rounded eminences on the surface of most of the true STROMATOPORA, which, in the natural surface, are covered by a net-work of vermicular cavities larger than the interspace, and often present the same appearance as the madreporiform tubercle on the star-fishes. These vermicular passages, of course, represent the ramifying channels on the surface and through the substance of CÆNOSTROMA and CAUNOPORA. The latter genus (if we take the typical species of Prof. Phillips as an example) differs from CÆNOSTROMA only in the absence or degree of development of the surface tubercles; and, if a specimen of a true species of CÆNOSTROMA be ground down parallel with the horizontal layers, it will present the same characters as shown in Prof. Phillips' figure 29 d, plate x, *Pal. Foss.*

Genus—FISTULIPORA McCOY.

FISTULIPORA OCCIDENS *n. sp.*

Plate 10, figs. 9, 10.

Coral growing in strong, anastomosing branches, or branching masses of from half an inch to two and a half inches in extent, solid,

or composed of distinct concentric layers coating each other. Large pores, round or oval, about a fiftieth of an inch in diameter, bounded (in perfect surfaces) by a slightly elevated border, and separated from each other by a single row of smaller pores, of one-third to one-half the diameter of the larger pores, and more irregular in form. The larger tubes, divided by transverse partitions, situated at distances equal to two or three times the diameter of the tube; the partitions in the smaller tubes are much more closely arranged, there being three or even four in a space equal to that occupied by one of the other. Surface usually smooth, sometimes covered by low, rounded tubercles, accompanied by a change in the form of the cell-apertures; but from the occurrence of both these characters on the same specimen, they can only be considered as accidental features.

Specimens not unfrequently occur with branches of Aulopora imbedded in their substance, leaving only the aperture of the Aulopora in sight, and the substance of the Fistulipora elevated around it so as to present the appearance of a much larger pore, and in this condition it might easily be mistaken for a distinct species.

Formation and locality. In the marly beds, of the age of the Chemung group, at Rockford, Iowa.

Genus — ALVEOLITES Lamarck.

Alveolites Rockfordensis *n. sp.*

Coral forming broad, irregular, discoid expansions, several inches in extent, and often an inch in thickness. Cell small, numbering in a section from forty to sixty in the space of one-tenth of an inch; septa very thin and closely arranged, from two to two and a half in a space equal to the diameter of the cell-tube. Apertures very oblique, rhombic in outline; the middle of the upper lip receding to a sharp elevated angle, and the center of the lower side occupying the groove formed by the junction of the two lower cells in advance.

Formation and locality. In the marly beds, at Rockford and Hackberry, Iowa.

Genus — CLADOPORA Hall.

The genus Cladopora, is described as consisting of ramose or reticulate branches, having tubular cells "radiating equally on all sides from the apex, and opening upon the surface in rounded or subangular expanded mouths; cells more or less closely arranged, but not always contiguous, and apparently destitute of septa or rays."

No mention is here made of communicating pores between the different cell-tubes composing the mass; nor are the original specimens in a condition to show such a feature, except by careful manipulation. It has, however, been seen in other forms, and the three new species here described show that such a feature does exist. Two of them

preserve the character very satisfactorily while, in the other, *C. magna*, although indistinct from excess of silification, it is evident that connecting pores have existed. On the filling of the cell-tubes of *C. fibrosa* (Vol. II, Pal. N. Y., Pl. 38, fig. 4 *a*), there exists small projections which, evidently, remain from the decomposition of the substance of the coralline body. In the case of *C. dichotoma* Hall, from Devonian rocks at New Hamburg, Illinois, weathered specimens show satisfactorily the existence of similar pores of rather large size.

One species here referred to this genus (*C. palmata*) differs from the characteristic forms in another respect, not having the cell-tubes "radiating equally on all sides from the axis;" it being composed of broad, irregular, frondose branches, and differing from the true CLADOPORA, in the same manner that the palmate forms of MADREPORA do from the round, branched forms of that genus. But as, in all other respects, it agrees with the generic characters given, and has, also, the communicating pores between the different tubes, there can be no hesitation to include it with the other forms of CLADOPORA.

CLADOPORA PROLIFICA *n. sp.*

Plate 10, fig. 2.

Coral growing in loose masses of slender, branching stems, of about three-sixteenths of an inch in diameter, with distinct bifurcations, forming angles of about 35° at a short distance above their fork. Cells proportionally rather large, longer than wide, often slightly sinuate on the lower side, and spreading above to the base of the next cell in advance; margins of the cells thin and sharp; communicating pores large and distant.

This species is somewhat smaller than *C. dichotoma* Hall, with much thinner, intercellular spaces, and somewhat smaller cells. It occurs in large masses, eight or more inches in diameter, composed of rather distant branches which appear to coalesce occasionally.

Formation and locality. In limestones of the age of the Upper Helderberg of New York, at Waterloo, Iowa. Presented by Mr. O. H. St. John.

CLADOPORA MAGNA *n. sp.*

Plate 10, figs. 3, 4.

Coral growing in strong, ramose branches, of from one-fourth to five-eighths of an inch in diameter, with frequent bifurcations which form angles of variable extent. Cells of moderate size, closely arranged, slightly transverse and spreading above, with salient margins, varying from a sixteenth to a twelfth of an inch in transverse diameter.

This is a very robust form and attains a much larger size than any previously described species. The general aspect of the branches is much like that of STRIATOPORA, but the form of cell is different, and they have no apertural striæ and no transverse septa, so far as ascertained.

Formation and locality. In limestones of the age of the Upper Helderberg of New York, at Waterloo, Iowa.

CLADOPORA PALMATA *n. sp.*

Plate 10, fig. 1.

Coral growing in broad, spreading, frondose or palmate branches, two or three inches in width; with or without frequent, irregular projections from their surface; cells sinuate with narrow, salient division walls, closely arranged, five to seven within the space of a fifth of an inch, and often much more crowded in irregular patches; apertures directed obliquely upward and slightly transverse, but varying in size and form according to the character of the frond, being regular on regular fronds and variable in irregular specimens; communicating pores distant.

This species has much the appearance of thin fronds of ALVEOLITES when seen in detached fragments showing only one surface, especially in the form of the cell apertures. The cells are, however, destitute of transverse partitions, and the communicating pores are very distinct, while both surfaces of the frond are alike celluliferous, which is not a character in any species showing the transverse partitions, so far as observed.

Formation and locality. In the limestone at Waterloo, Iowa.

Genus—ZAPHRENTIS RAF. & CLIF.

ZAPHRENTIS SOLIDA *n. sp.*

Plate 9, fig. 5.

Coral turbinate, broadly spreading; cup deep, broad at bottom, with abruptly ascending sides; fosset not strongly marked, septa rather strong, denticulate on the edge, about thirty in the primary series; secondary series very much smaller, barely extending to the base of the cup. Transverse tabulæ distinct, often closely arranged, extending half the diameter of the cup; vesicular portion very narrow and very dense, scarcely showing the minute cysts. Epitheca slight, usually contiguous.

This species is peculiar, from the strong lamellæ and the very solid texture of the outer portion of the cup.

Formation and locality. In the marly beds at Rockford, Iowa.

Genus—PACHYPHYLLUM ED. & HAIME.

PACHYPHYLLUM WOODMANI.

Plate 9, fig. 9.

(*Smithia Woodmani* White, *Geol. Rep Iowa*, 1870, vol. 1, p. 188.)

Coral growing in irregular convex or hemispheric masses from one inch to six inches in diameter. Cell-walls strongly exsert, often pro-

jecting more than an eighth of an inch above the intervening spaces; central depression very irregular, varying from one-tenth to thirty-five hundredths of an inch in diameter, and sometimes more than an eighth of an inch in depth: entire cell from one-fourth to three-fourths of an inch in width, partially limited by a wall formed by the coalescing of the costæ from the adjoining cells. Rays numbering from twenty-eight to thirty-two, about half of which extend to the small horizontal plate in the center, while the remainder terminate just within the inner wall. Rays and costæ, continuous, passing down the outside of the cell-walls and over the intercellular spaces. Intercostal and interseptal spaces divided by numerous thin, transverse partitions.

This species is mentioned by Mr. C. A. White (*loc. cit.*) under the name *Smithia Woodmani*, but the exsert form of the cells, and their limitation by an outer wall, are features which do not exist in SMITHIA, but pertain to the genus PACHYPHYLLUM.

Formation and locality. Very common in the marly beds at Rockford and Hackberry, Iowa.

PACHYPHYLLUM SOLITARIUM *n. sp.*

Plate 9, figs. 6, 7.

Coral growing in solitary cup-shaped cells, from one-half to three-fourths of an inch in diameter, sometimes one inch and a half in height, slightly curved, externally irregular, and showing evidences of attachment at the lower extremity. Calyx as deep as wide, outer wall thin; rays numerous, moderately strong, from sixty to more than seventy in number, alternating in size within the cup. Costæ distinct and continuous with the rays over the edge of the cup and for some distance below the margin; lower down, often interrupted or covered by an imperfect epithecal crust (which is often broken and sometimes almost entirely absent), showing traces of numerous transverse partitions.

This is the only solitary species of the genus so far as known, but it agrees perfectly with the generic character otherwise, and with the structure of the compound species, so that this deviation does not seem to warrant its separation.

Formation and locality. In the marly beds at Rockford, Iowa.

Genus—CAMPOPHYLLUM ED. & HAIME.

CAMPOPHYLLUM NANUM *n. sp.*

Coral small, elongate-turbinate, irregularly distorted in growth, and, in older specimens, frequently contracted at the upper part. Calyx deep, broad at base, with nearly vertical sides; rays well developed, about sixty in number, alternating in size, and strongly denticulate on

the edge; transverse diaphragms broad, smooth, slightly convex, and closely arranged; outer portion of the body closely and minutely vesiculose.

Formation and locality. In the marly beds at Rockford, Iowa.

Genus—CHONOPHYLLUM* ED. & HAIME.

CHONOPHYLLUM (PTYCHOPHYLLUM) ELLIPTICUM *n. sp.*

Plate 9, fig. 13.

Coral small, subturbinate, laterally compressed, and much distorted in growth; rays somewhat strongly developed and numerous, very slightly twisted as they approach the center of the cup. Calyx shallow, with rapidly ascending sides in young specimens, and spreading nearly horizontally toward the margin in older forms. Exterior of the body covered by a continuous epithecal coating, increasing in strength from below upward. In a vertical section the infundibuliform cups are somewhat distant, broad at the base, with rapidly ascending sides; the spaces between them, and also between the rays, are filled with numer ous, irregular, cystose partitions.

The distinctive features of this species consist in its elliptical outline and distinctly marked rays. There may be some doubt as to its generic relations. The rays are very slightly twisted as they approach the center of the cup, but there is no appearance of a columella. The great development of the rays, and the continuous epithecal coating, are features which pertain more particularly to PTYCHOPHYLLUM than to CHONOPHYLLUM.

Formation and locality. In the marly beds at Rockford, Iowa.

Genus—ACERVULARIA SCHWEIG.

ACERVULARIA INEQUALIS *n. sp.*

Plate 9, figs. 11, 12.

Coral forming convex masses several inches in diameter. Cells very irregular, seldom exceeding a fourth of an inch in diameter, while fully one-fourth of those constituting the mass do not exceed an eighth of an inch; the central depression of the cell forms about one-half of its diameter, and is usually about half as deep as wide, with a very slightly elevated center. Rays well developed, corrugated on their sides and edges, numbering about twenty-eight in the larger cells, of which one-half extend into the central depression, while the remainder reach only to its margin or but slightly down beyond; in the smaller cells the rays are less fully developed, and number from twenty-five to

* This genus is apparently identical with CHONOPHYLLUM Hall, *Palæontology of New York*, vol. 2, published in 1852, though actually in print more than two years earlier

twenty-six; cell-walls well marked, forming an elevated ridge dividing the cells on the general surface; the inner wall shows distinctly in some cells, and very slightly in others; partitions between the rays distant on the surface, but closely arranged vertically.

Formation and locality. In the marly beds of the Chemung group at Hackberry, eight miles above Rockford, Iowa.

Genus — SMITHIA ED. & HAIME.

SMITHIA JOHANNI *n. sp.*

Plate 9, fig. 10.

Coral growing in flat, expanded masses. Cells of moderate size, distant from half an inch to one inch from center to center; the surface of each cell slightly concave, with moderately elevated area surrounding the central depression, which averages a tenth of an inch in diameter; the larger depressions, not exceeding an eighth of an inch in diameter, and not more than one-fourth as deep as wide, generally situated nearer one extremity of the area, and with the center or columellar portion scarcely elevated. Rays numerous, rounded, from twenty-nine to thirty-nine, alternating in size on the margin of the depression, very flexuous and confluent, forming an irregular, slightly elevated ridge between the cells, and often an angular node at the angles. In a vertical section the lamellæ, formed by the surface plates at different stages of growth, are closely arranged, and the intervening spaces filled by vesiculose partitions.

Formation and locality. In the marly beds at Hackberry, eight miles above Rockford, Iowa.

SMITHIA MULTIRADIATA *n. sp.*

Coral forming flat expansions with distant cells; the border surrounding the central depressions slightly raised, leaving depressed interspaces; depressions, varying from an eighth to a sixth of an inch in diameter. Rays from thirty-six to forty, somewhat strong, rounded, flexuose and confluent.

This species differs from *S. Johanni* in the larger cells, the more numerous, stronger rays, and the larger cell depressions. It is a larger and more robust species.

Formation and locality. Associated with the preceding species.

Genus — CYSTIPHYLLUM LONSDALE.

CYSTIPHYLLUM MUNDULUM *n. sp.*

Coral small, seldom exceeding one inch and a fourth in height, turbinate, rapidly spreading from the base to a diameter of three-fourths

of an inch, above which it is irregular and seldom increases in lateral dimensions. Calyx not very deep, broadly rounded at the bottom, and more rapidly ascending near the sides. Rays distinctly marked on the surface of the cup, about sixty in larger specimens. Exterior of cup clear and neat, entirely covered with an epithecal coating, and very distinctly marked by the costal ridges corresponding to the rays of the cup; the base usually shows evidences of attachment. In a vertical section the vesiculose partitions are small and numerous.

Formation and locality. In the marly beds at Rockford, Iowa.

Genus—AULOPORA Goldf.

Aulopora saxivadum *n. sp.*

Plate 10, fig. 6.

Bryozoum incrusting foreign bodies, in branching tubes composed of a succession of separate cells; bifurcations frequent, often at each cell; seldom more than two cells in direct succession; angles of bifurcations varying from thirty to nearly sixty degrees; tubes about a thirtieth of an inch in diameter, increasing somewhat in older specimens; cells seldom more than a tenth of an inch in length; slender at base and enlarging upward; apertures round, slightly thickened and elevated, situated near the upper end of the cell. Surface finely striated when well preserved, but this feature is seldom seen.

Formation and locality. In the marly beds at Rockford and Hackberry, Iowa.

Aulopora Iowensis *n. sp.*

Plate 10, fig. 5.

Tubes robust, branching from nearly every cell, and frequently coalescing with adjoining ones, so as entirely to conceal the surface beneath. Cells from one-tenth to one-eighth of an inch in length, and about one-twentieth of an inch in diameter, wider than high, with large, round, considerably elevated apertures, which are directed upward, are as wide as the greatest diameter of the cells, and are situated near their upper extremities.

This species differs from the preceding in the greater strength of the cells and in the frequent coalescing of the tubes.

Formation and locality. In the marly beds at Hackberry, Iowa.

Genus—STOMATOPORA Bronn.

(ALECTO Lam. not Leach.)

Stomatopora? alternata *n. sp.*

Plate 10, figs. 7, 8.

Bryozoum consisting of a slender, irregular, bifurcating tube, giving origin to small cylindrical cells on the opposite sides, in alternating

order; parasitic on and incrusting foreign bodies in the form of dendritic branches; tubes less than one-fiftieth of an inch in diameter, rugose throughout the entire length. Cells branching from the main trunk at intervals of about one-fortieth of an inch in direct succession; the alternation with those on the opposite side gives a cell for every eighth of an inch; cell-apertures opening upward.

This may not be a true STOMATOPORA, but will probably form the type of a new genus, and is only provisionally referred as above.

Formation and locality. Usually found incrusting the surface of Brachiopods; from the marly beds at Hackberry and Rockford, Iowa.

Genus — CRANIA RETZ.

CRANIA FAMELICA *n. sp.*

Plate II, figs. 6, 7.

Shell small and thin, seldom exceeding one-third of an inch in diameter,— the largest seen measuring about four-tenths of an inch; usually flattened, discoid, the apex subcentral and scarcely elevated. Surface marked by distinct lamellose lines of growth, which are often partly obliterated by conforming to the surface of the bodies to which they are attached, as SPIRIFERA and ORTHIS.

The only convex example seen, is about half as high as wide, but it is attached to a very convex surface, which must occupy about half the convexity; usually they are entirely compressed, with the exception of a small area surrounding the apex.

Formation and locality. In the marly beds at Rockford and Hackberry, Iowa.

Genus — STROPHODONTA HALL.

STROPHODONTA CANACE *n. sp.*

Plate II, figs. 8-11.

Shell of medium size, concavo-convex, wider than long, semicircular in outline, or with slightly extended cardinal angles; cardinal area narrow; area of the ventral valve more than twice as wide as the dorsal, strongly striated vertically, and marked in the center by a narrow lineal callosity. Surface of ventral valve marked by alternating coarser and finer wrinkled, radiating striæ, the stronger ones being most distinct on the most convex part of the valve, where they are sometimes very marked; from three to five of the finer striæ occupy the spaces between the coarser ones. Dorsal valve usually marked with fine, even striæ, as fine as those on the interspaces of the ventral valve.

This species is of the type of *S. perplana*, both in the character of striæ and the form of muscular impressions of the ventral valve; but the general expression of the exterior of the ventral valve strongly

resembles the *S. inequistriata* Conr., except, perhaps, in the narrower area. The interior characters show it to be of a different type.

Formation and locality. In the marly beds at Rockford and Hackberry, Iowa.

Genus — SPIRIFERA Sow.

SPIRIFERA ORESTES *n. sp.*

Plate 11, figs. 16-20.

Shell smaller than medium, somewhat wider than long, and usually a little gibbous, frequently extended on the hinge-line in larger specimens, but with hinge extremities rounded in young and smaller individuals. Valves marked by moderately strong, rounded or slightly angular plications, simple on the sides of the shell, but bifurcating on the mesial fold and sinus, where there are from four to six plications. Mesial fold strongly elevated in front on large specimens. Ventral area moderately high, strongly incurved near the beak; foramen rather large. Surface marked by very fine striæ parallel to the plications.

This species differs from its associate, *S. Whitneyi* (= *S. Verneuilii*), in the much stronger and more angular plications, in the sharper elevation and angular aspect of the mesial fold and sinus, in the higher cardinal area, and in having the plications of the mesial fold and sinus stronger than those of the body of the shell, while in that species they are always smaller.

Formation and locality. In the marly beds at Rockford and Hackberry, Iowa.

SPIRIFERA SUBVARICOSA *n. sp.*

Plate 11, figs. 12-15.

Shell small, seldom more than five-eighths of an inch on the hinge-line. Valves highly convex, the ventral somewhat gibbous, with an incurved cardinal area of moderate height, divided by a triangular foramen which is higher than wide; cardinal angles slightly rounded, plications subangular, eight to ten on each side of the ventral valve, with one moderately strong in the bottom of the sinus not always extending to the apex; on the dorsal valve the mesial fold consists of two strong equal plications, with a deep angular groove between. Surface marked by somewhat strong, rugose, ziz-zag lines of growth which are sharply bent backward as they cross the plications.

This species resembles *S. varicosa* Hall, of the Upper Helderberg limestones of New York and Indiana; but it differs by its shorter form, more curving area, and duplicate character of the mesial fold.

Formation and locality. In the limestone below the village of Waterloo, Iowa.

SPIRIFERA CYRTINAFORMIS *n. sp.*

Plate 11, figs. 21-24.

Shell small, subtrapezoidal, with a slightly convex dorsal valve, marked by a faint, undefined, mesial elevation and a highly pyramidal ventral valve. Cardinal area vertical, nearly as high as wide, divided nearly or quite to the apex, by a somewhat large foramen, which is distinctly grooved on the edges for the reception of a detidial plate. Surface of the valves marked by about forty-five to fifty low, rounded plications; the central plication on the mesial fold and sinus divides once or twice before reaching the front of the shell; the other plications are simple.

This shell has all the external appearances of CYRTINA, except in the want of a closed deltidium. Internally, it is without the mesial septum of the ventral valve of the shells of that genus; and the spires are arranged as in SPIRIFERA. Under the microscope the shell proves to be impunctate.

Formation and locality. In the marly beds at Rockford and Hackberry, Iowa.

Genus—PLEUROTOMARIA DE FRANCE.

PLEUROTOMARIA ISAACSII *n. sp.*

Plate 12, figs. 6, 7.

Shell depressed, suborbicular, with moderately elevated spire and rapidly increasing volutions, three to four in number, flattened or slightly convex on the upper surface, rounded below, obliquely truncate on the periphery. Umbilicus very broad and open. Surface of shell apparently destitute of ornamentation.

This species bears much resemblance to the *P. arata* Hall, from the Schoharie grit of New York, and may be considered as a western representative species appearing to hold a very similar geological position. It differs in the absence of the transverse furrows, crossing the upper side of the volutions, which characterize *P. arata.*

Formation and locality. From the limestone beds which appear to lie beneath the Waterloo beds; near Raymond station. Collected and presented by Mr. McIsaacs, of Waterloo, Iowa.

Genus—NATICOPSIS McCOY.

NATICOPSIS GIGANTEA *n. sp.*

Plate 12, figs. 8-10.

Shell large and thick, ovate-conical, with a moderately ascending spire which forms a little more than one-third of the entire length. Volutions somewhat angular, flattened on the sides and below, with strong, deep sutures. Aperture oblique, somewhat patulose, slightly extended below; columella lip thickened and flattened on the lower

half, rounded above and entirely concealed by the umbilicus. The volutions are sometimes marked by strong, subregular, transverse folds or wrinkles, crossing from the suture obliquely backward to near the angle at the base of the whorl, but always strongest near the suture.

There is much difference in the general form among individuals referred to this species, often, perhaps, owing to distortion after being imbedded; but some of them appear to have had a much higher spire than others, as in the case of a small specimen figured. In some examples the suture is close, while in others it is very distant. There is, also, much variation in the strength of the transverse folds and in the degree of flattening on the under side of the volution; but as none of these characters appear to be constant, they have been considered only as variations of the same species.

Genus — CRYPTONELLA Hall.

Cryptonella Calvini *n. sp.*

The species of Cryptonella referred to on page 225 as *C. Eudora* proves on the examination of more perfect specimens to be entirely distinct from the New York species, and we therefore propose for it the name *C. Calvini*. The shell is much less ventricose than *C. Eudora*, is often broadest below the middle, and usually has the median area of the dorsal valve elevated near the front margin. The best specimens were obtained at Hackberry, Iowa, by Prof. S. Calvin, of Dubuque.

Genus — STROPHODONTA Hall.

Strophodonta hybrida *n. sp.*

Shell of medium size, resupinate; hinge line equal to or shorter than the shell below; valves closely appressed to each other; area of moderate width, distinctly crenulate exteriorly. Surface marked by irregular and often indistinct radiating striæ, which are strongest near the umbones and are frequently interrupted by the stronger lines of growth, where they bifurcate, and become finer toward the front of the shell.

This species resembles *S. reversa* Hall, but attains a larger size, is always flatter, more finely striated, is a thinner shell, less arcuate, and has differently formed muscular impression.

Obtained at Hackberry, Iowa, from rocks of the age of the Chemung, by Prof. S. Calvin.

NOTICE OF THREE NEW SPECIES OF FOSSIL SHELLS FROM THE DEVONIAN OF OHIO.

LEIORHYNCHUS NEWBERRYI *n. sp.*

Plate 11, figs. 25-27.

Shell large, ventricose and suborbicular, with slightly projecting beaks, a scarcely elevated mesial fold on the dorsal valve, and a corresponding depression on the ventral.

Surface marked by numerous subangular, bifurcating plications, which are strongest on the mesial fold and sinus; and also by fine, closely arranged concentric lines of growth, which, in larger specimens, become more numerous toward the front.

The number of plications varies in different individuals; some specimens have only about three in the space of a fourth of an inch, on the middle of the shell; while others have from six to eight.

This species differs from any other described, in its greater gibbosity, larger number of plications, and generally larger size.

Formation and locality. Chemung group; Kelloggsville, Ashtabula county, Ohio.

NATICOPSIS CRETACEA *n. sp.*

Shell of medium size, with a depressed spire, consisting of three to three and a half volutions, increasing rapidly in size, and angularly rounded on the periphery. Aperture broadly ovate, or patulose, scarcely modified by the preceding volution; outer lip sharp, entire, somewhat extended on the angle when perfect. Columella thickened, forming a flattened callus which entirely conceals the umbilicus; suture distinct, not channeled.

Surface marked by somewhat strong concentric lines of growth, most distinct on the inner volutions. In old specimens, the outer volutions sometimes become slightly depressed just below the suture.

Internal casts of this species have very low spires, with the volutions subangular on the periphery, and are largely umbilicated from the removal of the heavy callus.

Formation and locality. In the cherty limestone of the Upper Helderberg group; near Dublin, Ohio.

PORCELLIA SCIOTA *n. sp.?*

Shell small, discoid, consisting of about three and a half volutions; the outer one more rapidly expanding. Ornamented on the dorso-lateral margin, with a series of elongated nodes, and on the sides with a series of undulations, which extend from the base of the node to the inner margin of the volution, and are crossed by two revolving lines of furrows, giving them the character of depressed nodes or tubercles.

The volutions are rounded on the back, and depressed on the sides, and narrowed on the inner edge, giving a somewhat triangular form to the transverse section.

The shell has been removed from the dorsal portion of the outer volution, in the specimen described, so that the surface characters and form of aperture cannot be fully ascertained. There is an appearance of undulating concentric lines of growth, and indications of a deep notch in the center of the aperture, with a strong rounded lobe on each side.

Formation and locality. Upper Helderberg limestone; five miles west of Delaware, Ohio, on Sciota river. Collection of Rev. M. Herzer.

PALÆONEILO PARALLELA *n. sp.*

Shell of medium size, ventricose anteriorly, with a strong constriction running obliquely from behind the beaks to the postero-basal angle. Cardinal and basal margins parallel, the two valves when united being of a somewhat cylindrical form, with length slightly exceeding twice the height. Beak small, situated near the anterior end, and scarcely rising above the hinge line. Anterior extremity rounded, posterior end prolonged, and rounded above the postero-basal sulcus, but strongly indented by it below the middle of the shell, giving a much shorter basal line than the length of the shell above. Hinge-character, not ascertained.

Surface marked by irregular concentric lines of growth, sometimes forming strong, irregular varices.

This species closely resembles *Palæoneilo emarginata* Conrad, of the Hamilton group of New York; but differs in being destitute of the regular elevated and equi-distant varices of the surface so constantly characterizing that species.

Formation and locality. Waverly sandstone; Newark and Bagdad, Ohio.

NOTICE OF TWO NEW SPECIES OF FOSSIL SHELLS FROM THE POTSDAM SANDSTONE OF NEW YORK.

The discovery of new forms of organic remains in the rocks of the Potsdam period of New York is of such rare occurrence that it has been thought proper to notice the two following species, obtained at the chasm near Keeseville, New York, during the summer of 1867, from a layer near the base of the cliff, at the stairs used in descending the chasm. The layer contains, besides the following species, numbers of a small Trilobite (*Conocephalites minutus* Brad.) in fragments, and is just above the bed which contains the *Obolella prima*=Lingula prima *Conrad*, and *Lingulepis antiqua*=Lingula antiqua *Hall*.

Of the patelliform shell here described, only two specimens were obtained; of the other, several impressions or cavities left by the

removal of the shell, and preserving the characters shown in the figures, were collected; but neither species is likely to prove common.

The patelloid shell is probably generically identical with some of the Lower Silurian forms which have been referred to the genus METOPTOMA Phill., but it certainly cannot be congeneric with the truncated forms upon which the genus was founded, and which, if we may judge from the figures of the typical forms given by the author, are so similar to the terminal plates of some of our carboniferous "*Chitons*," as to suggest a doubt whether they may not belong to that family. We therefore propose for the following species the provisional generic name PALÆACMÆA, in allusion to their similarity to the recent forms of ACMÆA.

Genus — PALÆACMÆA N. GEN.

Conical univalve shells, having a circular, ovate or elliptical outline, with a more or less elevated subcentral apex, either erect or slightly curving toward one extremity; peristome entire, not sinuate. Surface marked by concentric ridges of growth. Internal muscular markings unknown.

PALÆACMÆA TYPICA *n. sp.*

Plate 11, figs. 4, 5.

Shell patelliform, broadly oval in outline, with a depressed conical exterior, and a pointed subcentral apex, situated three-sevenths of the greatest length from one extremity. Surface of the shell marked by several strong folds or undulations parallel to the lines of growth.

Genus — HYOLITHES EICH.

HYOLITHES GIBBOSUS *n. sp.*

Plate 11, figs. 1-3.

Shell elongate conical, gradually tapering to an obtuse point, and slightly curving; very depressed, convex on the ventral side, and highly convex and gibbous on the dorsal, the sides being nearly vertical for a short distance from their junction with the ventral margin. Aperture rather more than semicircular; the lip on the ventral portion moderately projecting.

This species resembles *Hyolithes* (*Theca*) *primordialis* Hall, from the Potsdam sandstones of Wisconsin, but differs in being much more convex on the dorsal side, and in the less projecting lip of the ventral side of the aperture. The outlines given in figure 3, show the relative convexity of the two species, the outer dorsal line being that of *H. gibbosus*, and the inner of *T. primordialis*.

SUPPLEMENT.

The following, with descriptions of other new species, were intended to accompany the paper "On some new or imperfectly known forms of Brachiopoda," in its completed form, but these two having been figured the descriptions are here appended:

Trematis punctostriata *n. sp.*

Plate 13, figs. 17, 18.

Shell of medium size, oblate, with the rostral border somewhat protruding, giving a broadly oval form to the upper valve. Upper valve convex, most prominent near the umbo; lower valve flat, transversely elliptical and strongly notched on the posterior margin, the notch extending two-thirds the distance from the edge to the center of the valve.

Surface marked by distant radiating impressed striæ, which are indented along the bottom by distinct puncta. In exfoliated specimens neither the striæ nor puncta are visible, these being features of the exterior layer only.

The punctate and distant striæ are features which distinguish this species from any other described.

Formation and locality. In hydraulic limestone of the age of the Trenton formation; at Clifton, Tennessee.

Trematis rudis *n. sp.*

Plate 13, fig. 19.

Shell of medium size, transversely elliptical, length and breadth about as three to four; beak projecting considerably beyond the cardinal border and broadly rounded. Upper valve strongly convex, distinctly marked by sharp flexuose striæ; cardinal angles deeply excavated; lower valve unknown.

This species resembles *T. filosa*, of the Trenton limestone of New York, in its transverse form and extended beak, but differs in the character of the cardinal slopes which, in this one, are concave.

Formation and locality. In the hydraulic limestones of the age of the Trenton formation; at Clifton, Tennessee.

These specimens have been derived from collections received many years since, from Prof. J. M. Safford of Lebanon, Tennessee.

(G.)

NOTES ON SOME NEW OR IMPERFECTLY KNOWN FORMS AMONG THE BRACHIOPODA, ETC.*

By JAMES HALL.

In the preparation of a supplementary part to Vol. IV, of the *Palæontology of New York*, it became necessary to re-examine many of the genera and species more critically than I had before been able to do. On every side, it is evident that we are far from a complete knowledge of those forms which have been longest known, while it is to be expected that every year will give us new and important facts regarding those which have been less studied.

It has been asserted and believed that the genus LINGULA, as known in the living forms, was the first among the marine inhabitants of our globe. Examples have been cited from the Potsdam sandstone of America, and from the old Lingula flags of Europe; and some little time since it might have been considered very heretical to doubt the combined authority on which such statements are made. However, when we come to examine the evidence advanced in support of such an assertion, we find it, even at this day, far from satisfactory. The living Lingula is a shell, generally of an elliptical or spatulate form, living more usually in sandy deposits, but occurring in all others.

In the older sandstones and limestones we find fossils having phosphatic shells, of the form of LINGULA, but of the relations or identity of internal structures we know little or almost nothing. In fact, the fossil linguloid shells are among the most difficult to separate from their matrix; the interior of the shell is rarely seen, and for the most part still remains unknown.

Some years since (in 1865), Mr. Salter proposed the name LINGULELLA for some of the Linguloid shells of the Silurian rocks of Great Britain, and one of his species (*L. ferruginea*) is regarded as the earliest Brachiopod hitherto discovered in England.

In 1863 I described some fossils from the Potsdam sandstone of the Mississippi valley as *Lingula aurora* and *L. aurora* var., pointing out a peculiar texture of the shell, and indicating in one of them an inequality of the valves. These forms correspond with LINGULELLA of Salter, and will be described and illustrated as *Lingulella aurora*, etc.

* Published March, 1871. Reprinted with explanation of figures, March, 1872.

[Plate 13, figs. 4, 5]. It remains to be determined whether other species described in the same paper* as Lingula really belong to the same genus.

In that communication I proposed the generic name of Lingulepis for the form described by Dr. Owen as *Lingula pinnaformis*.

In 1861 Mr. Billings proposed the name Obolella for some small shells of the Lower Silurian rocks, and this genus will probably include the species originally described by Mr. Conrad as *Lingula prima*. It is not improbable that the shell known as *Lingula antiqua* may belong to Lingulepis. The foundation to our claim for recognizing the genus Lingula in the lower sandstones is therefore very much weakened, to say the least, and until shells demonstrated to be true Lingulæ are shown to occur in our Silurian rocks, I think that we have a right to assert the contrary. Indeed, I am extremely doubtful whether we have yet evidence to claim the occurrence of a single species of true Lingula in the Lower *Palæozoic* rocks.

In a late examination of some Lower Silurian species, usually designated as Lingula, one of them was found to possess a muscular impression differing entirely from any described Linguloid species. The ventral (?) valve presents a small area with a narrow pedicel groove, and a large lobed muscular impression, which in the cast extends as a narrow groove, toward the base of the shell. The character of the area and foramen differ from the typical forms of Lingulella, though in that genus the form and character of the muscular impression has not been determined, so far as I am aware. For this shell I propose the name Lingulops. [Plate 13, figs. 1, 2.]

We have, therefore, in our Lower Silurian rocks the genera, Lingulella, Lingulepis, Obolella and Lingulops, which have heretofore been referred to the genus Lingula, while the characters of this latter genus have not yet been identified in any species of this Geological period.

There is still another Linguloid form, occurring both in the Lower Silurian and Devonian, and probably in the Middle Silurian, having a longitudinal septum in one or both valves, and which it will be convenient to separate for the present under the name Dignomia [Plate 13, fig. 3]; and it is probable that still another type may be indicated. The material, therefore, among which true Lingula is to be sought is very much restricted.

Adopting the generic name Orbiculoidea, it will embrace many of our so called Discina, and, indeed, it may be questioned whether we have any true Discina in the older rocks. The details of the characters of these genera will be discussed in another place.

* Sixteenth Annual Report on the N. Y. State Cabinet of Natural History.

In the mean time it may be mentioned that the genus Trematis seems to be worthy of more than subgeneric distinction, the differences between it and Discina being much more marked and important than between the fossil forms of the so-called Discina and Orbiculoidea.

In the limestone beds accompanying the shales of the Quebec Group near Troy, there is a minute discinoid phosphatic shell which I have long known in its exterior character as having the concentrically striated and obscurely radiate surface, with an eccentric apex, like many of the Discinæ. The interior of the shell (dorsal valve) is distinctly marked by nine radiating depressions, the central one of which extends toward the margin nearest the apex, with four others upon each side. At the extremities of some of these depressions there are distinct muscular markings; but were all these to be considered due to the muscular organization we would scarcely recognize the fossil as a Brachiopod, but rather as a Gasteropod. The general character of shell, however, is such as to ally it with the Discinidæ, and since we do not yet know any Gasteropod of similar form and character in the older rocks, I propose for this fossil the name of Discinella.*

The species which, in the Sixteenth Report on the State Cabinet, was placed by me, with doubt, under the genus Obolella of Billings, was thus referred rather in deference to Mr. Billings' expressed opinion, than with its correspondence to the generic description and figure of the author. The grooving or emargination of the apex of both valves and the thickening of the edges of the shell on each side below the apex, together with the form and character of the muscular impressions, would also separate this species from Obolella as described and figured by Mr. Billings. I shall therefore indicate this form as a distinct genus under the name Dicellomus. The species described by me as *Orbicula? crassa* in vol. 1, Pal. N. Y., has a similar form of muscular impression and will fall under the same genus [Plate 13, figs. 6–9].

In the Twentieth Report on the State Cabinet of Natural History, I published, under the name of *Obolus Conradi*, a form which I am far from regarding as a true Obolus.†

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*In the preceding month of February (1871,) I sent drawings of this fossil to Mr. Davidson, proposing the name Discinella therefor. Mr. Davidson's long study and extensive knowledge of the Brachiopoda will entitle his opinion to paramount importance in the determination of the relations of the fossil.

†See Twentieth Report on the State Cabinet, 1868, page 368, and revised edition, 1870, page 375.

The casts of this species, with the gutta percha molds made therefrom, are the specimens referred to by Mr. Dall as the Trimerella seen in my cabinet.* My opinion regarding their relations to Trimerella is expressed in the report cited, and the specimens have not been so labeled in my collection.

*Dall: Revision of the Terebratulidæ and Lingulidæ, etc.: Amer. Jour. Conch. vol. vi, part 2, p. 161. 1870.

This fossil is certainly closely related to Obolus, while it preserves certain characters which ally it with Trimerella. I am convinced, however, of the necessity of proposing a distinct name for this form in order that its relations may be more critically discussed. I would, therefore, suggest the generic name Dinobolus. The relations of this genus to Obolus are shown in the figures given (ut cit.). The extension of the median septum with the elevated lateral plates (the margins of which, however, remain free below the muscular impression) are features so similar to the same parts of Trimerella as not to escape the most cursory comparison. In the latter genus, the lateral margins of this elevated plate are recurved and conjoined with the inner surface of the shell, leaving two tubular cavities beneath, separated by the longitudinal septum. In Dinobolus the transverse plate below the muscular imprints is rapidly narrowed to the median septum, leaving beneath it on each side, a shallow cavity, the filling of which is shown in the casts figured.

The genus Trimerella will, therefore, at present, rest upon the specimens figured by Mr. Billings, which possess the remarkable characters indicated. Through the kindness of Mr. Selwyn, Director of the Geological Survey of Canada, I have lately had an opportunity of seeing the original specimens. A mold, made from the cast, showing the extension of the plate on each side, and continued to the depth indicated by probing beneath the processes, or filling of the cavities, gives a form so similar to that figured by Dr. Lindstrom, as to leave no doubt of the generic identity of the fossils. In the Canadian specimens, the rostral portion of the cast is so much worn that the interior character of the shell in that part cannot be determined, and therefore we have not the means of comparing with the figure cited above.

Among my collections made many years since at Galt, in Canada West (Ontario), there is a cast of a ventral valve which bears some resemblance to the casts of Trimerella. It has, however, a thickened area or solid rostral extension with a central pedicel groove. The evidence of median septum and transverse plates is obscure, and confined to the central portion of the valve below the middle of its length, presenting in the cast only the appearance of a strong duplicate muscular impression, not unlike Obolus. For this [Plate 13, fig. 10] and allied forms the name Rhynobolus may be adopted. The *Obolus galtensis* Billings, will probably fall under this genus.

[The above was originally intended as preliminary to a more extended paper giving the results of examinations among the forms proposed as new genera, but the author, having learned that similar investigations with more extensive material were in progress by Mr. Davidson and Prof. King, he has therefore deferred farther publication until their work shall be completed. At the time of this writing (December, 1872), they have already published a preliminary notice, entitled "Remarks on the genera Trimerella, Dinobolus and Monomorella."]

(H.)

The preceding pages, entitled "Notes on some new or imperfectly known forms among the Brachiopoda," were printed in March, 1871, as advance sheets of the 23d Report on the N. Y. State Cabinet of Nat. Hist., and reprinted in precisely the same form (except a single typographical error) adding the explanation of plates, in March, 1872: a number of copies were distributed immediately after the first-named date. The question of publication has been raised by Mr. Billings, and the accompanying article is my reply. It was written to appear in the June number of the American Journal of Science, but was deferred till the August number.

The question of priority of publication is one of small moment to me, compared with the charge and insinuations, by Mr. Billings publicly, and by the Director of the Canadian survey in a private letter, that I had derived material from the collections of that survey to aid in my determinations. This I have explicitly denied in my reply, and I take this occasion to put upon record the fact that for more than ten years past *all collections borrowed by me, and all sent in exchange, or received for labeling*, or otherwise, have been taken in charge and recorded by Mr. R. P. Whitfield, who has made up all the returns during this time.

This course was originally adopted to prevent a recurrence if possible of some annoyances of not very dissimilar nature to the present example, or at least to have in such cases other evidence than my own testimony, should it become necessary.

[From the Amer. Jour. of Science and Arts for August, 1872.]

REPLY TO A "NOTE ON A QUESTION OF PRIORITY."*

By James Hall.

In the April number of this Journal there is published an article with the above title, in which the author questions the fact of publication of a small pamphlet entitled "Notes on some new or imperfectly known forms among the Brachiopoda." I perhaps owe to myself and to the scientific public, a few words in reply.

The pamphlet referred to was printed in March, 1871, and a number (between twenty-five and thirty copies) delivered to me at that time. The type was left standing, in order to print a larger number, to be accompanied by a plate of figures then in progress, with descriptions of the same. Of these copies, the greater part were distributed in the

* By E. Billings, who has treated the same question, essentially in the same style and manner, in two or more articles in the Canadian Naturalist.

United States soon after publication. Copies were sent to the Geological Society of London, to Mr. Davidson, Mr. A. C. Ramsay, M. Barrande, Dr. Lindstrom, Dr. Geinitz, Prof. DeKoninck, Dr. F. Rœmer, Edward Desor, Dr. A. von Volborth, and the Imperial Society of Naturalists of Moscow. These, with one exception, were sent in packages with other publications, through the Smithsonian Institution, and are marked in my list as having been forwarded from Albany on the 7th of April, 1871. The pamphlet is noticed in the *Jahrbuch* for 1871, page 989.

On the 7th of April, 1871, the printing establishment of Weed, Parsons & Co. was destroyed by fire, together with the twenty-third Report on the State Cabinet (printed to nearly two hundred pages), the lithographic stones, and every thing else pertaining to that work. In the confusion which followed, and with the necessity on the part of the State printer to furnish certain documents as soon as possible, no attention was given to the State Cabinet Report for several months. Had there existed in my mind the least doubt about publication, I should naturally have procured an additional number of copies; for this work could easily have been done at any printing office. It has usually been my practice to distribute at least one hundred copies of publications made in advance of the regular reports; and this would have been done in the present instance within a month after the first publication, together with the plate of figures and descriptions, but for the disastrous fire referred to.

These are the facts of the case; the scientific public will decide the question of publication.* And here I might close: but there are a few points in Mr. Billings' article which require my attention.

From the tenor of Mr. Billings' statements in this Journal, and especially in the *Naturalist*, any reader would suppose that I had borrowed specimens of the Canadian Geological Survey on which to found my descriptions or conclusions concerning the genera there published as Rhynobolus and Dinobolus, and then endeavored to keep him in ignorance of what I had done. This would certainly have been an absurdity, and, moreover, it is not true. The only specimens borrowed of the Survey, having the remotest relation to Rhynobolus, were of Trimerella. I wished to compare authentic specimens of the latter with Dinobolus, which, under the name of *Obolus Conradi*, had been stated by Mr. Dall to be a true Trimerella. The idea of designedly keeping Mr. Billings in ignorance of what I had done would have been simply silly and purposeless.

* If the fact of being on sale with booksellers is necessary for publication, the question could certainly be raised regarding all the State Cabinet Reports; for the State of New York has never authorized their sale.

The question regarding these Oboloid forms had occupied my attention for a long time, and in 1862, I wrote to Mr. Davidson my views of *O. Conradi**, sending a description and figures. Thus this was no new idea of mine; but the progress of my work in 1871 required some action on my part in order to prepare the supplementary plates of vol. IV, Pal. N. Y., and these were among the things to be first done.

Obolus Canadensis I did desire to see, for I had known since 1854 that it was a new and distinct genus; and Mr. Selwyn did say that Mr. Billings was at work at *O. Canadensis*, but did not mention any Galt specimens or species.

Mr. Billings says, that his genus Obolellina "*is intended to include at least one of the forms described*" by him "*as Obolus Canadensis.*" It may include also Rhynobolus, but I think that has not yet been shown by Mr. Billings' figures.

As an explanation of applying "on two occasions," I may say that I understood Mr. Selwyn's reply to my first letter to be a refusal, and the matter was of course dropped. Subsequently, Dr. T. Sterry Hunt, authorized by Mr. Selwyn, gave an explanation which induced me to renew the request. I was taking no advantage of Mr. Billings in any way, for neither himself nor Mr. Selwyn had indicated his intention in regard to Galt specimens, and those which I used had been in my possession since 1848.

As to the compact or agreement about describing New York or Canadian fossils, referred to and written about by Mr. Billings, I can only say that I have never heard of it before now. I have always had in my collections undescribed species of Canadian fossils, which I have refrained from describing from a natural sense of propriety. If I am not mistaken, Mr. Billings has derived much material from New York, by collectors sent expressly for that purpose, and, I have no doubt, has made good use of it; but I have never thought of complaining; and I have not entered into petty contrivances or insinuations to prevent fossils going into his hands. If Mr. Billings' published statements and private letters agree in regard to this matter, it is all that I can require.

In my letter to Mr. Selwyn, of the 10th of April, 1871, alluding to my work, I said, "the question of the Linguloid shells, Obolus and Trimerella, was one requiring early determination;" and it was for this reason that I had desired to see the Canadian forms. I was certainly under the impression that I had previously given Mr. Selwyn

* In my letter to Mr. Davidson, of date 31st October, 1862, I wrote: "I enclose you drawings of what I have proposed as a new genus of Brachiopoda. In some respects it is like Obolus, but is a large calcareous shell, in my opinion of quite a new type. I had originally communicated the description in my Wisconsin report, but afterward withdrew it. Please give me your opinion of it. * * * * I propose the name Conradia for this fossil."

full information of what I proposed to do; but if otherwise, this letter of the 10th of April was sufficient; and if after that no pamphlet was received, it seems a little remarkable that Mr. Billings should wait till the 30th of January following before making any further inquiries about it.

On the 23d of February, 1872, during my absence from Albany, a letter was received from Mr. Davidson, of date February 8th, in which my attention was called, for the first time, to this question of publication. I replied, stating the facts as I have done here. In a subsequent letter, Mr. Davidson discussed more fully the refusal of Mr. Billings to admit publication, and, as I understood the language, had proposed to refer the matter to several scientific gentlemen in England. I wrote quite agreeing to this, and, while feeling no doubt of the publication of my pamphlet, proposed a plan in which I consented to drop the name Rhynobolus, thus hoping to prevent a controversy, and saving the *amour propre* of Mr. Billings. In the mean time Mr. Billings published the article in this Journal, and I wrote immediately withdrawing the proposition.

The public have here the facts. I have not been aware of any "unfortunate collision;" nor of any cause for the succession of statements in the last page and a half of Mr. Billings' article against me, that "it is not my fault that this difficulty has arisen," etc.

It has, unfortunately, happened, in nearly all cases where I have proposed new genera during the last ten or fifteen years, that I have, according to Mr. Billings' expressed opinions, infringed upon his rights, or violated some rule of scientific procedure.*

I fully admit that the party at fault in this or any other case should be the sufferer. Mr. Billings has inaugurated, and thus far managed, both sides of what he denominates "this controversy" with his usual tact and adroitness. I have said nothing, while he has published, I believe, three or four articles on the subject. I have entered into no controversy, and hoped to be saved from one. It will not distress me if my name of Rhynobolus should not be adopted. Unquestionably, the pamphlet should have been reprinted at once after the fire; but in such a condition of things as then existed, every one is naturally absorbed in *what appears to be the present duty*, and may easily forget some things which afterward may prove to have been of more imperative importance. I think this is the experience of the world, judging from the aphorisms, ancient and modern.

I can say, however, in all sincerity, that, had Mr. Selwyn or Mr. Billings at any time made me a civil statement of the facts, with a request to withdraw the name Rhynobolus, I would unhesitatingly

* For example, Triplesia, Rensselaeria, Meristella, Strophodonta, etc.

have done it, so far as in my power; and it would have given me great pleasure to show my good will toward every member of a corps with whose former chief I have been for more than thirty years in uninterrupted friendly and harmonious intercourse; and always in more or less intimate relations of friendship with every member of the staff, except Mr. Billings, who has chosen for himself an attitude of hostility without any reason or cause of provocation on my part.

With regard to the accusations and insinuations of dishonest purposes and practices, to which I at first felt inclined to reply, I shall say nothing at this time.

Albany, N. Y., *May*, 1872.

PLATES AND EXPLANATIONS.

PLATE I.

Lycoperdon giganteum Batsch.

Page 53.

Fig. 1. A specimen of medium size.

Hygrophorus nitidus B. & R.

Page 114.

Fig. 2. A young plant
" 3. A specimen showing the upper surface of the pileus.
" 4. A specimen showing more of the lower surface.
" 5. Vertical section of a pileus.
" 6. Transverse section of a stem.

Agaricus sarcophyllus Peck.

Page 96.

Fig. 7. A specimen with the pileus unexpanded.
" 8. A small specimen, showing the lower surface of the pileus.
" 9. A larger specimen, showing the lower surface.
" 10. Vertical section of a pileus.
" 11. Transverse section of a stem.


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PLATE II.

AGARICUS CURVO-MARGINATUS Peck.

Page 92.

FIGS. 1, 2. Lateral view of two specimens of unequal length.
FIG. 3. A specimen showing more of the lower surface of the pileus.
" 4. Vertical section of a pileus.
" 5. Transverse section of a stem.

AGARICUS STRICTIOR Peck.

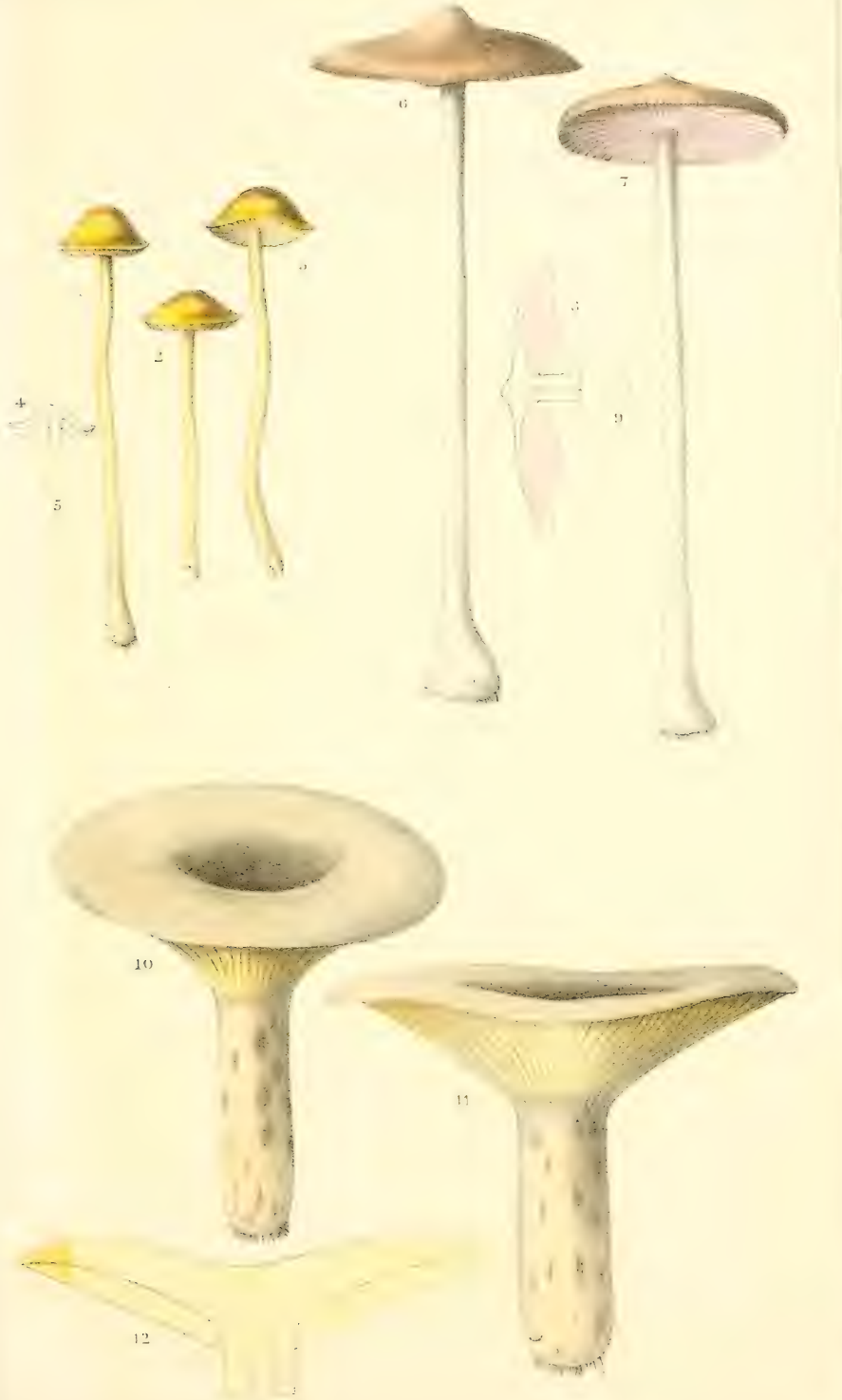
Page 88.

FIG. 6. A specimen showing the upper surface of the pileus.
" 7. A specimen showing the lower surface.
" 8. Vertical section of a pileus.
" 9. Transverse section of a stem.

LACTARIUS SORDIDUS Peck.

Page 119.

FIG. 10. A specimen showing the upper surface of the pileus.
" 11. A specimen showing more of the lower surface.
" 12. Vertical section of a pileus.



Dr. Stone by Swinton.

Lith. of Reed, Parsons & Co., Albany, N.Y.

PLATE III.

Cortinarius squamulosus Peck.

Page 108.

Fig. 1. A specimen with the pileus but little expanded.
" 2. Part of a specimen with the pileus more expanded.
" 3. Part of a vertical section of a pileus.

Agaricus Johnsonianus Peck.

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Fig. 4. A specimen of medium size.
" 5. A specimen of small size.
" 6. Vertical section of a pileus.

PLATE IV.

AGARICUS SOLIDIPES Peck.

Page 101.

FIG. 1. A specimen of small size.
" 2. A larger specimen, showing the lower surface of the pileus.
" 3. Upper part of an old plant with the cuticle of the pileus broken into scales.
" 4. Vertical section of a small pileus
" 5. Transverse section of a stem.

CANTHARELLUS DICHOTOMUS VAR. BREVIOR Peck.

Page 123.

FIG. 6. A specimen showing the upper surface of the pileus.
" 7. A specimen showing more of the lower surface.
" 8. Vertical section of a pileus.
" 9. Lines representing the dichotomous branching of the lamellæ.

CORTINARIUS CASTANEOIDES Peck.

Page 111.

FIG. 10. A specimen with the pileus partly expanded.
" 11. A specimen with the pileus expanded.
" 12. A cluster of small plants.
FIGS. 13, 14. Vertical sections of pilei.
FIG. 15. Transverse section of a stem.

PLATE V.

Boletus Clintonianus Peck.

Page 28.

Fig. 1. A young plant with the tubes concealed by the veil.
" 2. A specimen of small size.
" 3. A specimen of medium size, showing the marginal depression of the pileus.
" 4. Part of a vertical section of a pileus.
" 5. Mouths of tubes slightly magnified.

Agaricus paluster Peck.

Page 82.

Fig. 6. A specimen of small size, with the pileus expanded.
Figs. 7, 8. Specimens of medium size, with the pileus less expanded.
" 9, 10. Vertical sections of pilei.
Fig. 11. Transverse section of a stem.

Agaricus velutipes Curt.

Page 79.

Fig. 12. A cluster of very young plants.
Figs. 13, 14. Specimens showing the upper surface of the pileus.
Fig. 15. A specimen showing the lower surface of the pileus
" 16. Vertical section of a pileus.
" 17. Transverse section of a stem.

PLATE VI.

Boletus spectabilis Peck.

Page 28.

Fig 1. A young plant with the tubes concealed by the veil.
" 2. A specimen of medium size.
" 3. Vertical section of a small pileus.

Boletus palustER Peck.

Page 32.

Fig. 4. A very young plant.
" 5. A specimen showing the upper surface of the pileus.
" 6. A specimen showing the lower surface.
" 7. Vertical section of a pileus.

Agaricus latifolius Peck.

Page 81.

Figs. 8, 9. Specimens showing the upper surface of the pileus.
" 10, 11. Specimens showing the lower surface.
" 12, 13. Vertical sections of pilei.
Fig. 14. Transverse section of a stem.

Marasmius subvenosus Peck.

Page 25.

Figs. 15, 16. Specimens showing the upper surface of the pileus.
" 17, 18. Specimens showing the lower surface.
" 19, 20. Vertical sections of pilei, the latter slightly enlarged.
Fig. 21. Transverse section of a stem slightly enlarged.


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PLATE VII.

FIG. 1. *NISONIADES LUCILIUS Lintner.* ♀.

" 2. *NISONIADES LUCILIUS*, showing under surface of wings of ♂.

" 3. *NISONIADES PERSIUS Scudder.* ♂.

" 4. *NISONIADES PERSIUS*, showing under surface of wings of ♀.

" 5. *NISONIADES ICELUS Lintner.* ♂.

" 6. *NISONIADES ICELUS*, under surface of ♂.

" 7. *NISONIADES MARTIALIS Scudder.* ♂.

" 8. *NISONIADES MARTIALIS*, under surface of ♀.

" 9. *NISONIADES BRIZO Boisd. et Lec.* ♀.

" 10. *NISONIADES BRIZO*, under surface of ♀.

" 11. *NISONIADES AUSONIUS Lintner.* ♂.

" 12. *NISONIADES AUSONIUS*, under surface of ♂.

PLATE VIII.

FIG. 1. *HEMILEUCA MAIA* (*Drury*). ♂.

" 2. Pupa of *HEMILEUCA MAIA*.

" 3. Egg-belt of *HEMILEUCA MAIA*.

" 4. *CUCULLIA UMBRATICA* (*Linn*). ♂.

" 5. *CUCULLIA INTERMEDIA Speyer*. ♀.

" 6. Pupa-case of *CUCULLIA INTERMEDIA*.

" 7. Larva of *CUCULLIA INTERMEDIA*.

" 8. Larva of *ELLEMA HARRISII Clemens*.

" 9. Pupa of *ELLEMA HARRISII*.

" 10. *ELLEMA HARRISII*, showing under surface of wings of ♂.

" 11. *ELLEMA HARRISII*, showing under surface of wings of ♀.

" 12. *ELLEMA PINEUM Lintner*. ♂.

" 13. *ELLEMA PINEUM Lintner*. ♀.

" 14. Chrysalis of *MELITÆA NYCTEIS Doubleday*.

PLATE IX.

Stromatopora expansa H. & W.

Page 226.

Fig. 1. The surface of a specimen as it appears when split horizontally, breaking through several of the laminæ. The black dots mark the vertical filaments, but those forming the slight elevations are represented too strongly in the lithograph, there being only from four to seven of the stronger ones near the center of the elevation, while the others are small and evenly arranged over the surface. (Natural size.)

Caunopora planulata H. & W.

Page 228.

Fig. 2. The natural surface of a specimen that has been weathered clean but uninjured, showing the scarcely elevated centers with the tubuli ramifying from them over the surface, while those below have their opening in the center of the elevation. (Natural size.)

Stromatopora (Cænostroma) incrustans H. & W.

Page 227.

Fig. 3. The natural surface showing the strongly and abruptly elevated centers, with their ramifying tubuli. (Natural size.)

Stromatopora (Cænostroma) solidula H. & W.

Page 227.

Fig. 4. The natural surface of a fragment from the margin of a specimen, with the irregular elevations and ramifying tubuli. (Natural size.)

Zaphrentis solida H. & W.

Page 231.

Fig. 5. This is the largest individual seen of this species, and shows the general form of the cup, and the strong lamellæ.

Pachyphyllum solitarium H. & W.

Page 232.

Fig. 6. An individual showing the usual form of the cup, with the lamellæ extending down the exterior surface.

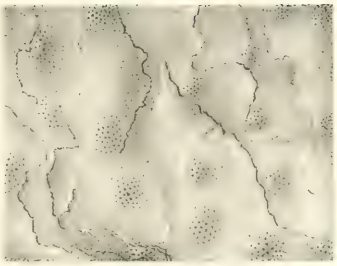
" 7. A transverse section of another specimen, showing the arrangement of the rays in the interior. The solid external rim corresponds with the elevated portion of fig. 6, and also with the same part of each calyx in *P. Woodmani*, fig. 9.

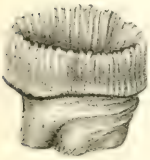
" 8. A longitudinal section of an individual larger than fig. 6. At the base on the left side there is an accumulation of cellulose material, developed apparently for the purpose of support and to give surface for attachment to some foreign substance. The vertical lines at *a* represent the junction of the vertical lamellæ near the center, forming a very slight elevation in the bottom of the calyx, or a kind of loose columella.

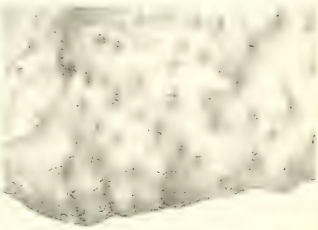
Pachyphyllum Woodmani White, sp.

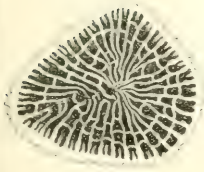
Page 231.

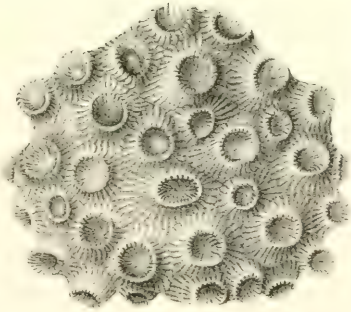
Fig. 9. Surface view of a small specimen, having the calyces of medium size. Presented by H. T. Woodman, Esq., of Dubuque, Iowa.

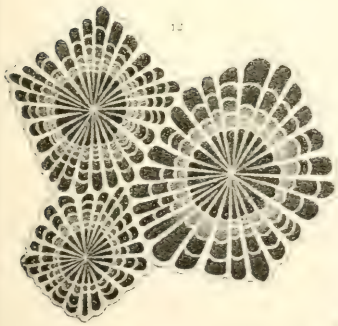












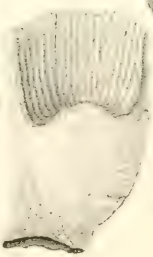


PLATE IX — Continued.

Smithia Johanni H. & W.

Page 234.

Fig. 10. Several calyces of this species. (Natural size.)

Acervularia inequalis H. & W.

Page 233.

Fig. 11. A portion of a large specimen, showing the general form and unequal size of the cells.

" 12. Enlargement of three individual cells as seen in a transverse section. The inner wall is represented only by a closer arrangement of the concentric partitions and a ring of greater density, caused apparently by the distribution of spiculæ.

Chonophyllum (Ptychophyllum) ellipticum H. & W.

Page 233.

Fig. 13. Lateral view of a large individual, showing the subtortuose form.

PLATE X.

Cladopora palmata H. & W.

Page 231.

Fig. 1. This figure represents the form and mode of branching of a specimen of this species. The tinted portion on the right shows the size and distance of the cell-apertures.

Cladopora prolifica H. & W.

Page 230.

Fig. 2. A fragment of a large mass showing the form of the branches and their mode of bifurcation; the upper left hand branch gives the relative size and distance of the cell-apertures. (The form of the cell in this and the preceding figure is not quite correctly represented in the lithograph.)

Cladopora magna H. & W.

Page 230.

Fig. 3. This figure shows the form, size and mode of coalescing of several branches; a character which appears common to the lower portion of the mass.

" 4. A more robust, detached fragment, showing the size and form of the calyces.

Aulopora Iowensis H. & W.

Page 235.

Fig. 5. A portion of a large frond of this species, which is attached to the surface of a specimen of *Naticopsis gigantea*.

Aulopora saxivadum H. & W.

Page 235.

Fig. 6. A specimen attached to the surface of *Atrypa reticularis*.

Stomatopora? alternata H. & W.

Page 235.

Fig. 7. A group of these bryozoans attached to the surface of *Spirifer Hungerfordi*. (Natural size.)

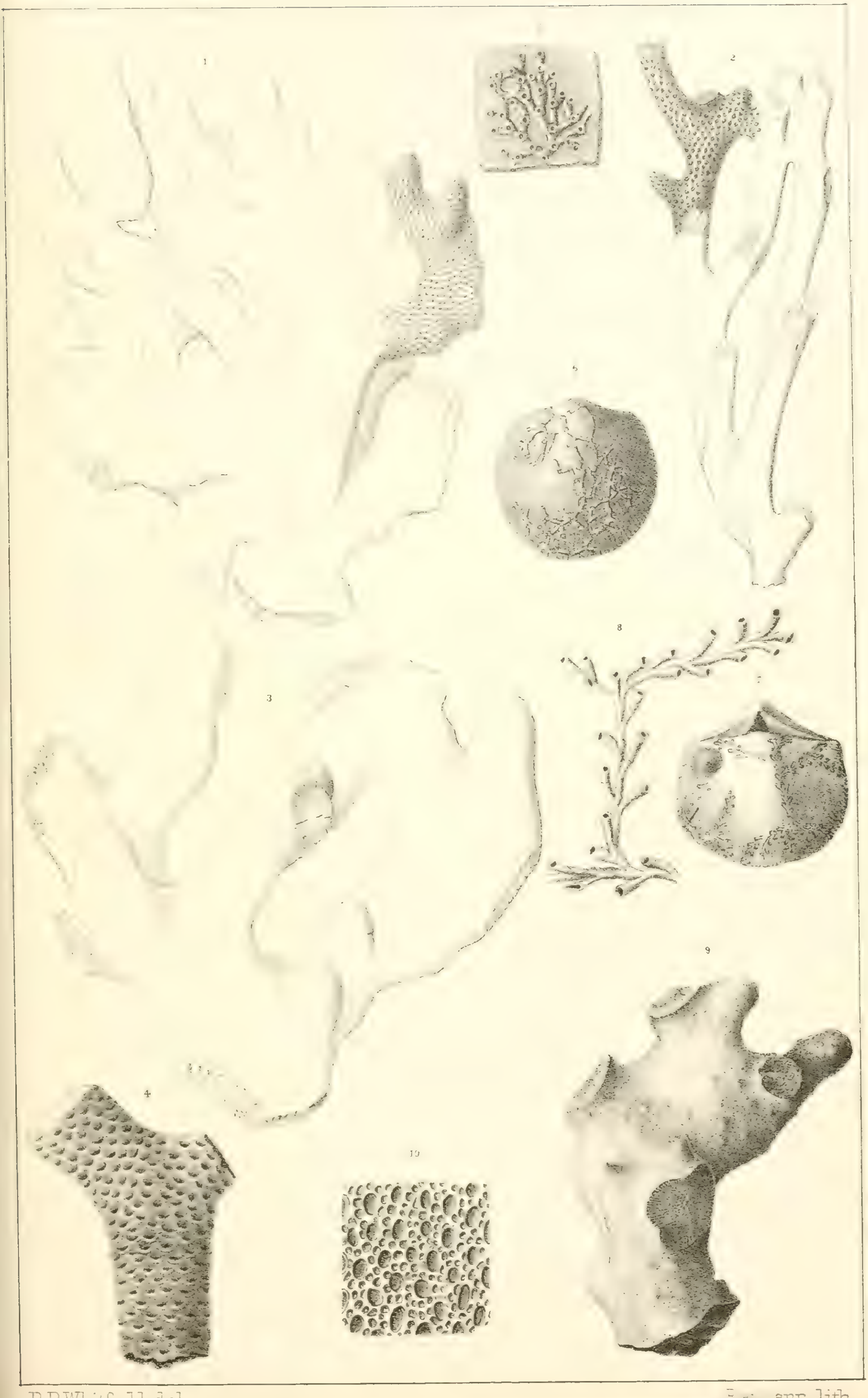
" 8. An enlargement of part of one, showing the form of tube and mode of branching.

Fistulipora occidens H. & W.

Page 228.

Fig. 9. View of a branch showing general form and mode of growth.

" 10. An enlargement of the surface.



R.P. Whitfield, del.

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PLATE XI.

Hyolithes gibbosus H. & W.

Page 242.

Fig. 1. View of the ventral or larger side, showing the form of the shell and extent of the projecting lip.

" 2. Profile view, showing the convex side and curvature of the shell.

" 3. Outline, showing the regular convexity and form of the transverse section of this species.

Palæacmæa typica H. & W.

Page 242.

Fig. 4. View of the upper side of the largest specimen found. (Natural size.)

" 5. Lateral view of the same, showing the height of the apex.

Crania famelica H. & W.

Page 236.

Fig. 6. The profile of a specimen of medium size, attached to *Orthis impressa*, and also the ventral valves of three other individuals.

" 7. Ventral view of another individual, showing the prevailing form, which is but slightly elevated.

Strophodonta Canace H. & W.

Page 236.

Figs. 8 and 9. Dorsal and ventral views of a specimen, exhibiting the general characters of the species.

Fig. 10. Outline, showing the regular curvature of the valves.

" 11. Interior of a ventral valve, showing the form of muscular impressions and crenulations of the hinge line.

Spirifera subvaricosa H. & W.

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Figs. 12–15. Dorsal, ventral, cardinal and profile views of a specimen, exhibiting the usual features of the species.

Spirifera Orestes H. & W.

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Fig. 16. Dorsal view of a small specimen, with rounded cardinal angles, and having much the appearance of *S. gregaria*, of the Upper Helderberg limestone.

Figs. 17–19. Dorsal, ventral, and profile views of a specimen of the ordinary form, showing the bifurcating plications of the mesial fold.

Fig. 20. Dorsal view of a large individual, showing the large cardinal area and fissure.

Spirifera cyrtinæformis H. & W.

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Figs. 21–24. Dorsal, front, profile and cardinal views of a specimen of ordinary form and size of this species.

Hyolithus

R P Whitfield del

PLATE XI — Continued.

Leiorhynchus Newberryi Hall.

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Fig. 25. Dorsal view of a large individual, showing the general features of the shell when marked with fine plications; the dark line extending from the beaks indicates the median septum in this specimen.

" 26. Ventral view of a specimen with coarser plications, especially in the mesial depression.

" 27. Cardinal view of a crushed specimen, showing the double character of the lamellæ of the dorsal valve, partially shown in Fig. 25.

[The figures of this species on the plate are, by mistake, placed under the head of "Waverly Sandstone," while they properly belong to the Chemung group.]

PLATE XII.

Polyphemopsis Louisvillæ H. & W.

Figs. 1 and 2. Two views of a specimen enlarged to two diameters. The first figure shows the aperture and columella. For description of the species, see 24th Report on the State Museum, page 193. [In some copies of these explanations printed and distributed in July, 1872, as advance sheets of the 23d Report, this species was recorded as *P. Knappi.*]

Naticopsis lævis Meek.

Fig. 3. View of the aperture, showing the height of the spire and form of the callus of the columella.

" 4. Basal view of the same individual.

" 5. The spire of a larger specimen.

Pleurotomaria Isaacsii H. & W.

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Fig. 6. Lateral view of the specimen, showing the elevation of the spire and form of umbilicus.

" 7. The spire of the same individual.

Naticopsis gigantea H. & W.

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Fig. 8. Lateral view of a small individual, with an unusually high spire.

" 9. View of the aperture of a large specimen, showing the form of the lip and callus, as well as the general form of the shell.

" 10. A large specimen, somewhat distorted by pressure.

R.P. Whitfield, del.

PLATE XIII.

Lingulops Whitfieldi Hall.*

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FIG. 1. View of a ventral valve enlarged six diameters, showing the general characters of the external surface.

" 2. A partial cast of a ventral valve, showing the arrangement of some of the muscular and parietal scars, and also the ramifications of the vascular lines, which, although originating at nearly the same points as in recent Lingulæ, do not extend so far backward toward the beak.

Dignomia alveata Hall.

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FIG. 3. View of a cast of a ventral valve, showing the impression of the longitudinal septum along the center of the valve. Hamilton group, New York.

Lingulella Davisii Salt.

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FIG. 4. Interior of a ventral valve, enlarged: after Mr. Davidson.

Lingulella aurora var. Hall.

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FIG. 5. Impression of the interior of a ventral valve enlarged, showing the extent of the area and the form of the deltidial opening. Potsdam Sandstone, Wis

Dicellomus crassa Hall.

[Obolella (pars) *Billings.*]

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FIG. 6. External view of the smaller valve.

" 7. Internal cast of the same valve, showing the widely diverging muscular impressions.

" 8. Exterior of the larger valve.

" 9. Internal cast of the same valve, showing the character of the muscular imprints. (Figures all enlarged two diameters.)

Rhynobolus ———?

[Compare Obolus galtensis *Billings.*]

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FIG. 10. View of the interior of a ventral valve as obtained from a gutta-percha mold of the natural cast of the interior, showing the general characters of the shell. From the Guelph Limestone, Galt, Ont., Can.

Trimerella grandis Bill.

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FIG. 11. Interior of a dorsal (?) valve as obtained from a gutta-percha mold taken from the original specimen used by Mr. Billings. Loaned by A. R. C. Selwyn, director of the Geological Survey of Canada.

" 12. A transverse section across the middle of the valve, showing the form of the elevated muscular plate and the cavities beneath.

*Printed Ligulops by mistake in some copies of the paper.

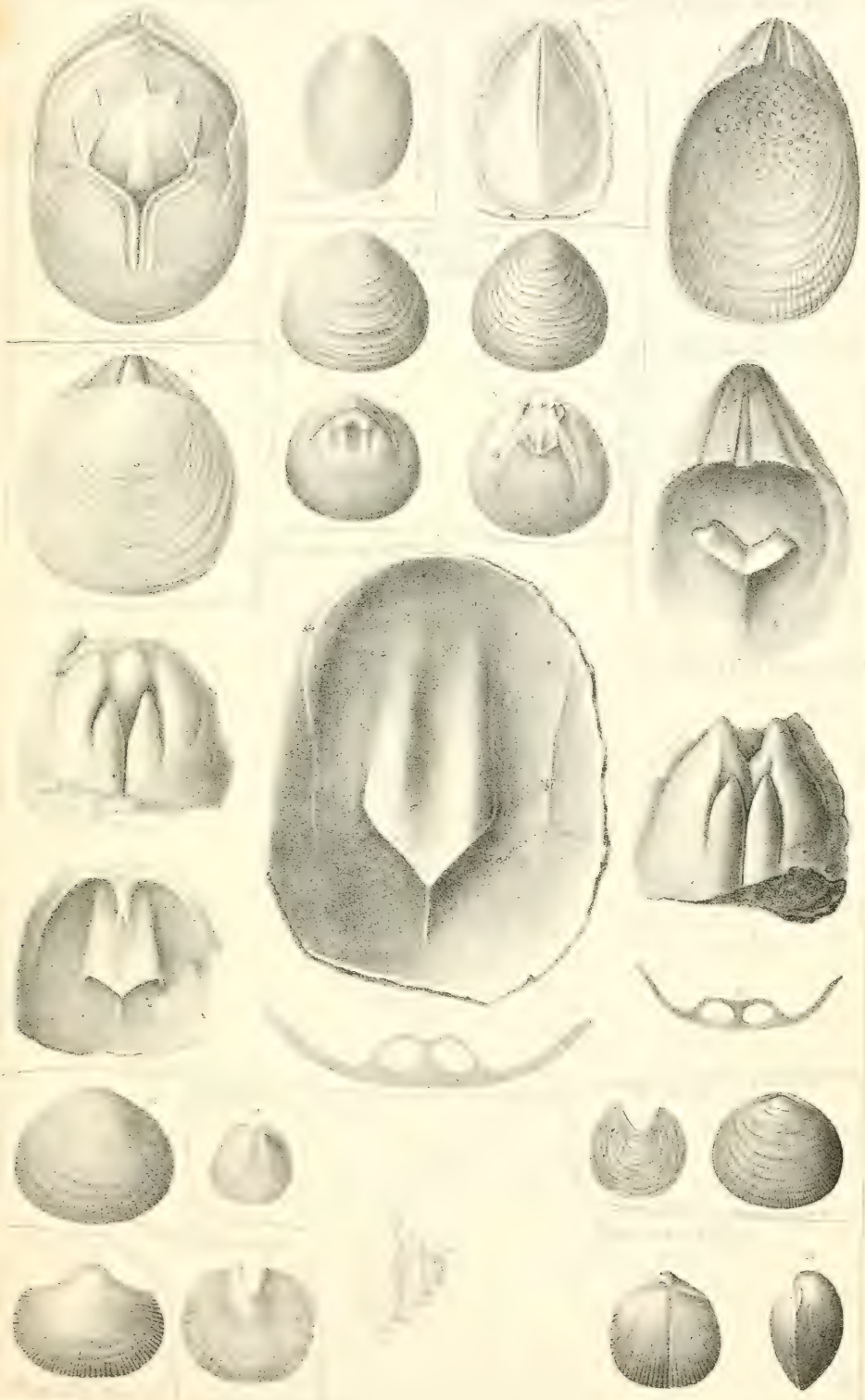

PLATE XIII — Continued.

FIG. 13. The dorsal side of a small internal cast.

" 14. Ventral side of the same, showing the fillings of the cavities in the rostral portion of the shell.

" 15. Interior of the ventral valve, as obtained from a gutta-percha mold taken from the specimen fig. 14, showing the character of the plate.

" 16. Transverse section across the valve for comparison with fig. 12.

TREMATIS PUNCTOSTRIATA Hall.

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FIG. 17. Exterior of the upper valve enlarged two diamaters, showing the puncta arranged in form of radiating striæ.

" 18. Exterior of the lower valve, showing the situation of the foramen.

TREMATIS RUDIS Hall.

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FIG. 19. View of the upper valve, showing its form and striæ, enlarged to two diameters.

TREMATIS TRUNCATA Hall.

[*Discina truncata* Hall, Pal. N. Y., vol. iv, pl. 1, fig. 15; pl. 2, figs. 36, 37.]

FIG. 20. View of the lower valve showing the form of the foramen, enlarged three diameters.

TREMATIS FILOSA Hall.

[*Orbicula? filosa* Hall, Pal. N. Y., vol. 1, p. 99, pl. 30, fig. 9.]

FIG. 21. View of the upper valve of a large specimen, from the Utica slate.

" 22. View of the lower valve showing the foramen.

ZYGOSPIRA HEADII Bill.

FIGS. 23 and 24. Dorsal and profile views of a specimen, showing the general features of the species.

FIG. 25. Outline figure showing the characters of the spire, as actually seen in a specimen partially filled with crystalline matter, and cut to show the internal arrangement of one-half of the spire and loop.

PLATE XIV

Genus TELLINOPSIS.

FIG. 1. A view of a subequilateral left valve of *T. submarginata* (= Nuculites submarginatus *Conrad*); from the Hamilton group.

" 2. View of an inequilateral right valve, showing a stronger posterior sulcus. The two represent nearly the extremes of form noticed in the species.

Genus CYPRICARDINIA.

FIGS. 3, 4. Views of a left and a right valve of *C. planulata* (= Pterinea planulata *Conrad*).

FIG. 5. View of a cast of a right valve, showing the large adductor muscle scars, and the strongly marked pallial line.

" 6. Cardinal view of the same individual, showing the inequality of the two valves.

Genus MICRODON.

FIG. 7. View of the interior of *M. tenuistriata* H. & W., as obtained by gutta-percha from the natural cast, showing faintly the features of the hinge, the anterior muscular impression, and a portion of the pallial line.

" 8. Cast of a right valve of *M. bellastriata* showing the cardinal teeth and anterior muscular scar.

Genus PALANATINA.

FIG. 9. View of the right side of *P. typa*, showing the inequality of the valves, the beak of the left projecting above that of the right.

" 10. View of a smaller left valve, showing the posterior umbonal sulcus. The cardinal extremities of this specimen are more rounded than usual.

Genus MYTILARCA.

FIG. 12. Cast of a left valve of *M. Chemungensis* (= Inoceramus Chemungensis *Conr.* Jour. Acad. Nat. Sci., Phila., vol. viii, p. 245). The cardinal and lateral teeth are plainly indicated, as also the striations of the ligamental area.

" 11. Cast of a more elongated variety.

" 13 Interior of the left valve, as obtained from an impression left in the shale.

Genus MODIOMORPHA.

FIG. 14 Interior of a left valve of *M. concentrica* (= Cypricardites concentrica *Conrad*) — the view obtained partly from the actual shell and partly completed in gutta-percha. The figure shows the strong cardinal tooth of this valve, and the adductor muscular impressions and pallial line.

" 15. View of the exterior of a left valve, showing the ordinary form.

" 16. Cardinal view of a vertically compressed specimen, showing the escutcheon and form of the ligament, as preserved on the specimen.

Genus GONIOPHORA.

Goniophora, Murch. Siluria. *p.*

FIG. 17. View of a right valve of *G. rugosa* (= Cypricardites rugosa *Conr.*), showing the general external form of the shell.

" 18. View of the interior of a right valve of *G. Hamiltonensis*, showing the cavity for the reception of the tooth of the left valve. The figure is made from a gutta-percha impression of the natural mold.

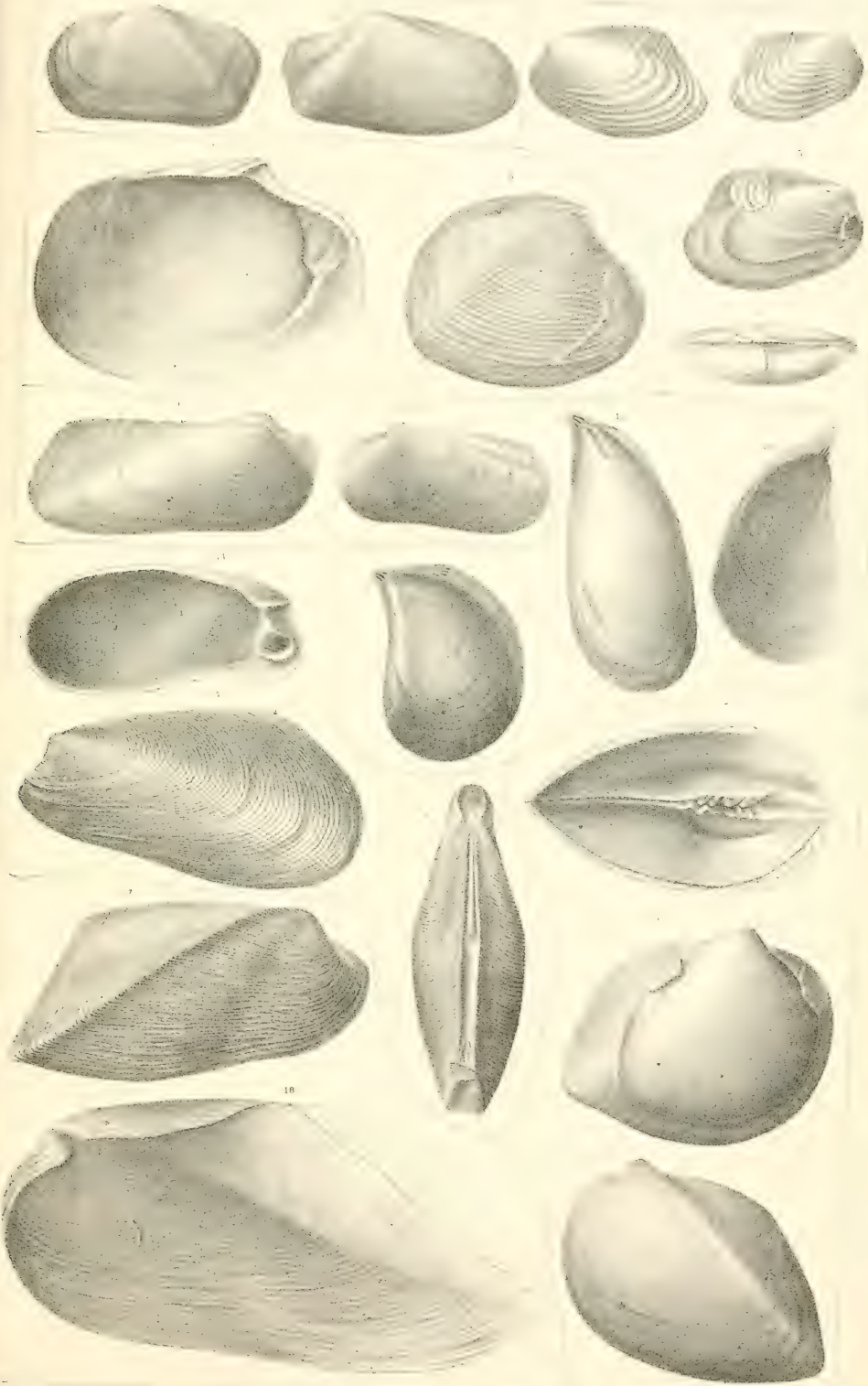

PLATE XIV — Continued.

Genus CYTHERODON.

FIG. 19. View of the right side of an internal cast of *C. tumidus*, showing the muscular impressions and pallial line. From the Upper Helderberg limestone. Columbus, Ohio.

" 20. Exterior of a left valve of *C. appressus* (= Nuculites appressus *Conrad*), showing the usual form of the shell.

" 21. View of the interior of the cardinal border of the two valves in juxtaposition, as obtained by a gutta-percha cast from the natural mold of the interior (the right valve being apparent), showing the interlocking of the cardinal teeth, of which there appear to be four in the right and five in the left valve. Hamilton group, Hardy county, Virginia.