

Q

11

G22

NH

Special papers

no. 9-12, 14



Q  
11  
O 22  
no. 14  
NH

Proceedings  
of the  
Ohio State  
Academy of Science



---

VOLUME V, PART 2

---

PUBLICATION COMMITTEE:

J. C. HAMBLETON, E. L. RICE, BRUCE FINK.

Special Paper No. 14

Discomycetes in the Vicinity of Oxford, Ohio.  
Contributions from the Botanical Laboratory  
of Miami University. I.

FREDA M. BACHMAN.

## INTRODUCTION.

The purpose of this work has been to prepare a descriptive catalog of the discomycetes of this region which would be helpful to students in the study of Discomycetes in Ohio, and to contribute to the distribution of the Discomycetes in the state. Comparatively little systematic work has been done on this group, and none has been done in Ohio except that of A. P. Morgan. Many of the plants are very minute and seldom or never seen by those uninterested. The group is, however, of much biological interest and perhaps would receive much more attention from students of botany if there were more literature to be had.

The time of collecting has extended over a period of two years, 1907 and 1908. Collections have been made by several persons to whom credit has been given with the dates of collection. All of the plants described were found within five miles of Oxford, Ohio. It is very probable that quite a number of the Discomycetes of the region have been overlooked, though no pains were spared in the two years to get as many as possible.

In each species the characteristics of the plants in the fresh condition were noted. In many the apothecia appear to change but little, if any, in drying, and when water is applied have the same appearance as when growing. Others when dry lose both color and form permanently.

Most of those in the family Ascobolaceae were grown in the laboratory on old dung. This was brought from several pastures and placed in moist chambers. Only on that which was exposed to the sunlight and in a temperature of about 20° or 23° C. were many apothecia obtained. Some of the plants seem to grow equally well on the damp blotting paper which lined the dishes.

The classification used is largely that in Engler-Prantl's *Natürlichen Pflanzenfamilien*. In working out the type species of the genera, the rules adopted by the botanical congress which met in Philadelphia, March, 1907, were observed. Whether this

is the best method for determining type species may well be questioned, but it seems to the writer that a universal method for such procedure is desirable, and since many American systematists are using it, it has been used here. However, the use of the genus *Lachnea* Quel. is a departure from following these rules. A genus of flowering plants, *Lachnaea* L., is older. For the purposes of such a paper as the following, it was thought best to make no change in a genus on the grounds of priority, at least not until the cryptogamic genera have been carefully examined by some one with abundance of time and bibliographical facilities.

All microscopic drawings were made with the aid of a Bausch and Lomb camera lucida. In drawings showing the structure of the sterile tissues of the apothecia, the lines were followed as far as possible with the camera and very little was done free hand. Where all of a section could not be seen in the field with the desired magnification, and it was necessary to move the section, a break was left in the drawing as in Plate II, figures 2, 3, and 4. All drawings were made from free-hand sections of fresh material or from the plant as growing.

The species marked + have not been previously reported from southwestern Ohio.

Herbarium specimens of all except two or three species are preserved in the herbaria of Freda M. Bachman and Bruce Fink. Nearly full sets are also deposited in the Lloyd museum at Cincinnati, Ohio, and in the herbarium of W. G. Stover.

The writer is indebted to Dr. H. Rehm, Rev. Giacoma Bresadola and Dr. Narcisse Patouillard for determining some of the more difficult species; to Prof. F. J. Seaver for suggestions as to culture methods; to Mr. C. G. Lloyd for the use of literature and specimens in the Lloyd library and museum at Cincinnati, Ohio; to Mr. Wm. Holden, librarian, for looking up literature; to Mr. P. L. Ricker for several citations and types, and to Dr. Bruce Fink, under whose direction all of the work was done, for kind advice and most helpful suggestions.

FREDA M. BACHMAN.

Miami University, Oxford, O., Aug. 31, 1908.

## BIBLIOGRAPHY.

- ALBERTINI, J. B. VON AND SCHWEINITZ, L. D. VON. *Conspectus Fungorum*. 1805.
- ATKINSON, G. F. *Mushrooms, Edible and Poisonous*. Ed. 2. 1903.
- BATSCH, A. J. G. C. *Elenchus Fungorum*. 1786.
- BERKELEY, M. J. *Outlines of British Fungology*. 1860.
- BOUDIER, E. *Memoire sur les Ascobolees*. *Ann. Sci. Nat.* 10<sup>5</sup>: 191-268. 1869.
- BOUDIER, E. *Discomycètes D'Europe*. 1907.
- BULLIARD, M. *Histoire des Champignons de la France* 1: 1791.
- COOKE, M. C. *Handbook of British Fungi*. 2: 1871.
- COOKE, M. C. *Mycographia*. 1: 1879.
- DE CANDOLLE, A. P. et Lamarck, J. *Flore Francaise*. 1805.
- DILLENIUS, J. J. *Catalogus Plantarum*. 1719.
- DURAND, E. J. *Classification of the Fleshy Pezizineae with Reference to the Structural Characters illustrating the Basis of their Division into Families*. *Bull. Torr. Bot. Club*, 27: 463-495. 1900.
- FRIES, E. *Observationes Mycologicae*. 1, 2, 3: 1818.
- FRIES, E. *Systema Mycologicum* 2: 1822.
- FRIES, E. *Systema Orbis Vegetabilis*, 1825.
- FRIES, E. *Elenchus Fungorum*, 1828.
- FRIES, E. *Summa Vegetabilium Scandinaviae*, 1846.
- FRIES, E. *Novae Symbolae Mycologicae*, 1851.
- GERARD, W. K. *New Species of Fungi*. *Bull. Torr. Bot. Club*. 4: 47-48 and 64. 1873.
- GILLET, C. C. *Les Discomycetes*, 1879.
- GREVILLE, R. K. *Scottish Cryptogamic Flora*. 1823-28.
- HOFFMAN, G. H. *Vegetabilia Cryptogamica* 2: 1790.
- HONE, DAISY S. *Minnesota Helvellinaea* *Minn. Bot. Stud.* 3: 309-321. 1904.
- JACQUIN, N. J. *Miscellanea Austriaca* 1: 1778.
- KARSTEN, A. P. *Mycologia Fennica* 1: 1871.
- KÖRBER, G. W. *Parerga Lichenologica*. 1865.

- KUPFER, ELSIE M. Studies on *Urnula* and *Geopyxis*. Bull. Torr. Bot. Club, 29: 137-144. 1902.
- LINNAEUS, C. *Flora Suecia*, 1775.
- LINNAEUS, C. *Species Plantarum* Ed. 1, 4: 1753.
- LINNAEUS, C. *Genera Plantarum* Ed. 5: 1754.
- LINNAEUS, C. *Species Plantarum* Ed. 2, 2: 1763.
- LINNAEUS, C. *Systema Natura* Ed. 13. 2: 1791.
- MASSEE, G. *British Fungus Flora*. 4: 1895.
- MASSEE, G. A Monograph of the *Geoglossaceae*. Ann. Bot. 11: 59-67. 1897.
- McILVAINE, C. *One Thousand American Fungi* 1900.
- MONTAGNE, J. F. *Sylloge Generum Specierumque Cryptogamarum*, 1856.
- MORGAN, A. P. *The Morels*. Journ. Mycol. 8: 49-50. 1902.
- MORGAN, A. P. *Discomycetes of Miami Valley*. Journ. Mycol. 8: 179-192. 1902.
- NEES VON ESENBECK, TH. F. *System der Pilze*. 1837.
- PERSOON, C. H. *Icones et Descriptiones Fungorum Minus Cognitum* 1, 2: 1798.
- PERSOON, C. H. *Observationes Mycologicae*. 2: 1799.
- PERSOON, C. H. *Synopsis Methodica Fungorum*. 1801.
- PERSOON, C. H. *Icones Pictae Rariorum Fungorum*. 1803.
- PERSOON, C. H. *Mycologia Europaea*. 1, 2, 3: 1822-'28.
- PHILLIPS, W. *British Discomycetes*. 1887.
- QUELET, L. *Enchiridion Fungorum*. 1886.
- REHM, H. *Ascomyceten*. 1881.
- REHM, H. *Hysteriaceen und Discomyceten*. Rabenhorst's *Cryptogamic Flora*. 3: 56-1172. 1896.
- SACCARDO, P. A. *Conspectus Generum Discomycetum hucusque cognitorum*. Bot. Cent. 18: 213-220, 247-256. 1884.
- SACCARDO, P. A. *Sylloge Fungorum*, 8: 3-802; 10: 1-63; 11: 391-435; 12: 1-1039; 15: 1-455. 1887-1901.
- SCHAEFFER, J. *Icones Fungorum*, 1763.
- SCHRADER, H. F. *Spicilegium Florae Germanicae*. 1: 1794.
- SCHRÖTER, J. *Helvineae and Pezizineae*, Engler & Prantl. *Die Natürlichen Pflanzenfamilien*. 1<sup>1</sup>: 162-243. 1894.
- SCHUMACHER, C. F. *Enumeratio Plantarum* 2: 1803.

- SCHWEINITZ, L. D. VON. Synopsis Fungorum Carolinae Superioris. Schrift. Nat. Gesel. Leips. 1: 1-105. 1822.
- SCHWEINITZ, L. D. VON. Synopsis Fungorum in America Boreali. Trans. Am. Phil. Soc. 4:141-316. pl. 19.
- SEEVER, F. J. Discomycetes of Eastern Iowa. Bull. Univ. Iowa. 5<sup>3</sup>: 1-70. 1904.
- SOWERBY, J. English Fungi. 1, 2, 3: 1797-'03.
- STREINZ, W. M. Nomenclator Fungorum. 1862.
- STURM, J. Pilze Deutschlands. 1-4: 1817.
- TULASNE, C. Selecta Fungorum Carpologia. 3: 1865.
- UNDERWOOD, L. M. On the Distribution of the North American Helvellales. Minn. Bot. Stud. 1: 483-500. 1896.
- UNDERWOOD, L. M. Moulds, Mildews and Mushrooms. 1899.
- WAHLENBERG, G. Flora Suecia. 2: 1826.

## EXPLANATION OF PLATES.

### PLATE I.

#### *Lachnea setosa*

- Fig. 1—apothecium, natural size  
" 2—structure of apothecia,  $\times 55$   
" 3—hair from outside of cup,  $\times 55$   
" 4—paraphysis,  $\times 200$   
" 5—ascus,  $\times 200$   
" 6—spore somewhat immature,  $\times 200$   
" 7—mature spores,  $\times 200$

#### *Pustularia stevensoniana*

- Fig. 8—apothecium, natural size  
" 9—structure of apothecia,  $\times 45$   
" 10—paraphysis,  $\times 325$   
" 11—ascus,  $\times 325$   
" 12—spores,  $\times 325$

### PLATE II.

#### *Ascobolus atrofuscus*

- Fig. 1—apothecium,  $\times 2$   
" 2, 3, and 4—Sterile part of apothecium,  $\times 325$   
" 5—paraphysis,  $\times 325$   
" 6—ascus closed,  $\times 325$   
" 7—ascus with operculum removed,  $\times 325$   
" 8—mature spores,  $\times 325$

### PLATE III.

#### *Arachnopeziza aurelia*

- Fig. 1—apothecium,  $\times 2$   
" 2—paraphyses,  $\times 325$   
" 3—ascus,  $\times 325$   
" 4—spores,  $\times 325$

#### *Sclerotinia tuberosa*

- Fig. 6—mature apothecium and sclerotium, natural size  
" 7—younger stages, natural size  
" 8—paraphysis,  $\times 325$   
" 9—ascus,  $\times 325$   
" 10—spores,  $\times 325$

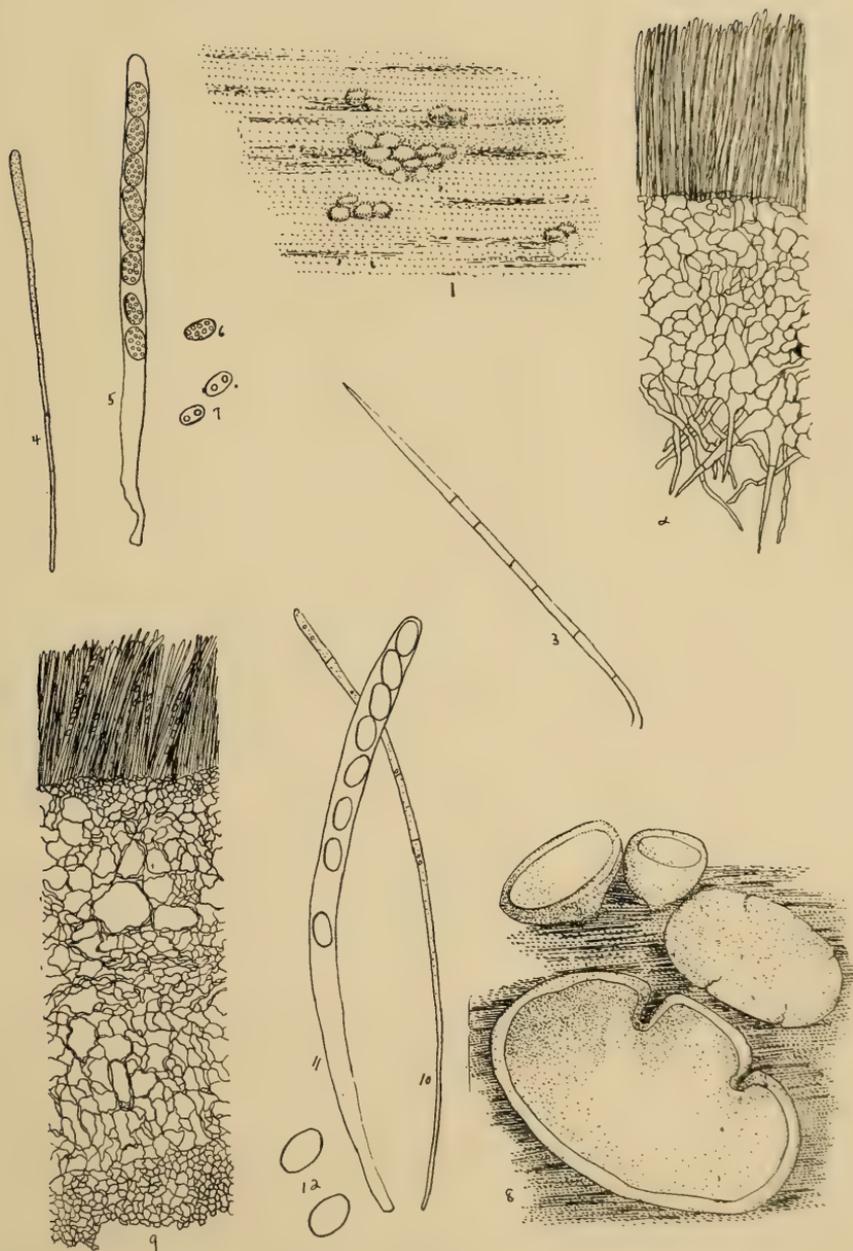


Plate I.



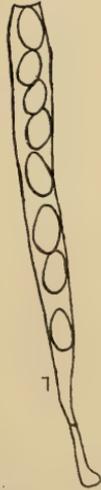
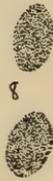
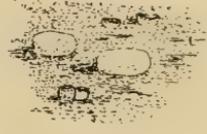
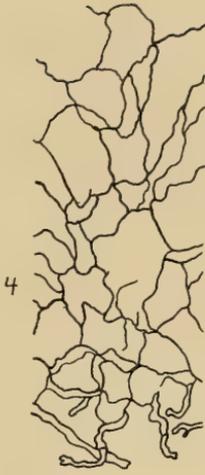
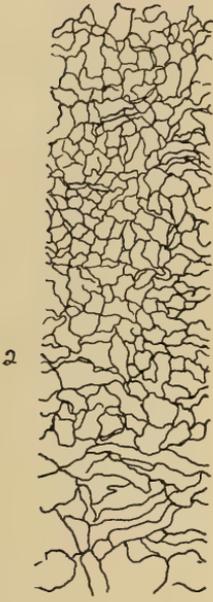
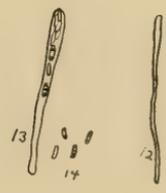
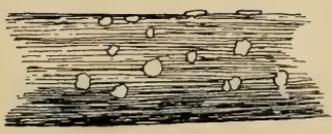
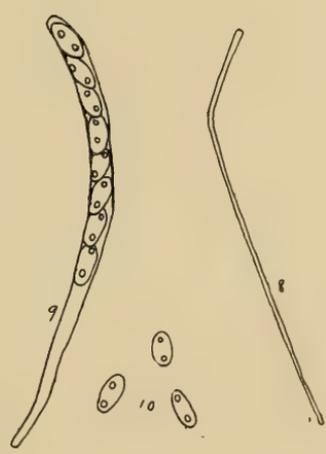
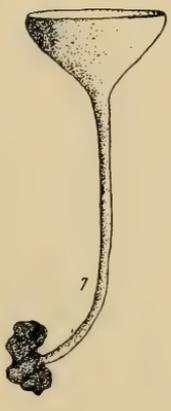
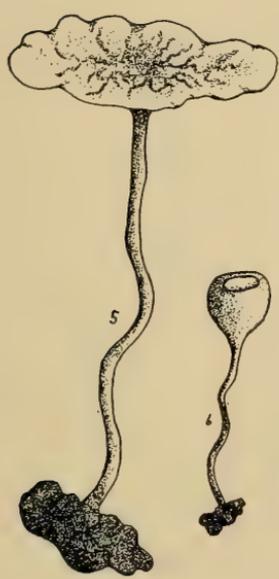
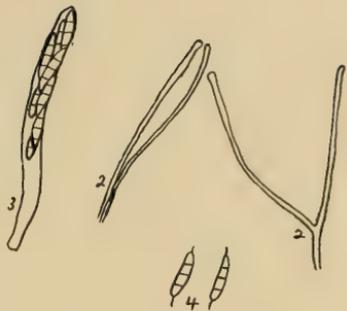
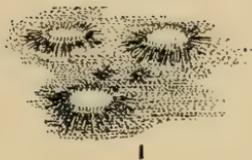


Plate II.





11 Plate III.



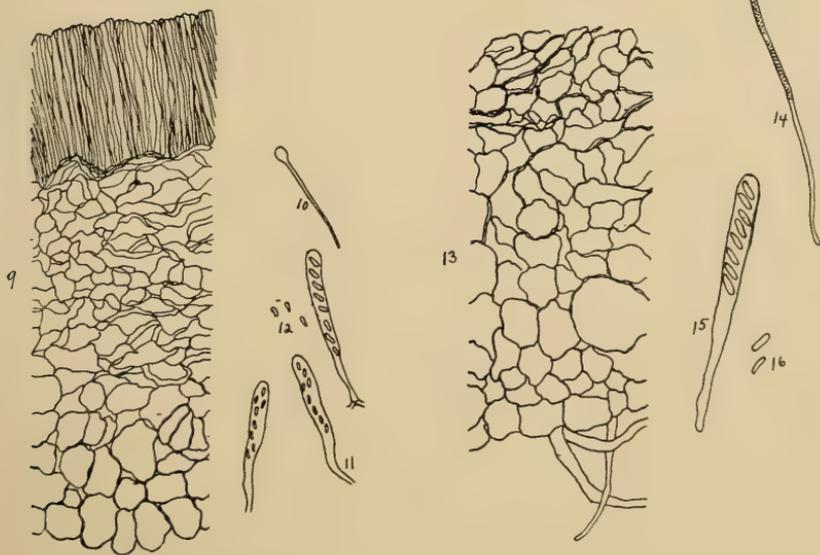
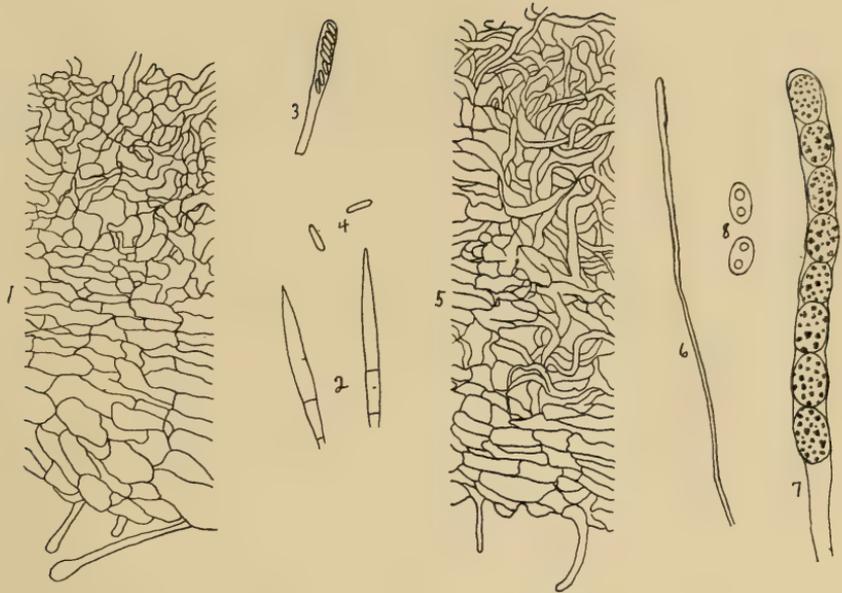


Plate IV.



*Helotium herbarum*

- Fig. 11 — apothecium on an old stem,  $\times 2$   
“ 12 — paraphysis,  $\times 325$   
“ 13 — ascus,  $\times 325$   
“ 14 — spores,  $\times 325$

PLATE IV.

*Dasyscypha virginea*

- Fig. 1 — part of the center of the cup and the outer cells and hairs,  
 $\times 325$   
“ 2 — paraphyses,  $\times 325$   
“ 3 — ascus,  $\times 325$   
“ 4 — spores,  $\times 325$

*Sarcoscypha occidentalis*

- Fig. 5 — part of the center of the cup and the outer cells and hairs,  
 $\times 325$   
“ 6 — paraphysis,  $\times 325$   
“ 7 — ascus, spores immature,  $\times 325$   
“ 8 — mature spores,  $\times 325$

*Orbilbia xanthostigma*

- Fig. 9 — structure of apothecium,  $\times 460$   
“ 10 — paraphysis,  $\times 460$   
“ 11 — asci,  $\times 460$   
“ 12 — spores,  $\times 460$

*Mollisia cinerea*

- Fig. 13 — part of the center of the cup, the outer cells, and attaching hyphae,  $\times 325$   
“ 14 — paraphysis,  $\times 325$   
“ 15 — ascus,  $\times 325$   
“ 16 — spores,  $\times 325$

## KEY TO ORDERS.

- a—Hymenium covered by a membrane until maturity of spores  
..... Phacidiales
- a—Hymenium exposed from the first or very early
  - b—Receptacle pileate, mitrate, or clavate.....Helvellales
  - b—Receptacle cup-shaped or plane.....Pezizales

### Order I. PHACIDIALES.

Vegetative portion within the substratum; saprophytic or parasitic; apothecia immersed or superficial, at first enclosed within a membrane which ruptures irregularly at maturity of the spores.

#### Family I. STICTIDACEAE.

Saprophytic. Apothecia soft, fleshy, bright or light colored, immersed in the substratum, rounded or elliptic. Hypothecium thin or nearly absent. Exciple thin, tough, membranaceous, adnate to the substratum.

Genus I. PROPOLIS Fr. Sum. Veg. Scand. 372. 1849.

Type species, *Stictis farinosa* Pers. Myc. Eur. 339. 1822.

Apothecia pale, yellowish or greenish, exterior brownish. Paraphyses linear, somewhat branched or merely indented at the ends. Asci 8 spored, clavate or cylindrico-clavate, somewhat narrowed at the base. Spores oblong, more or less curved, colorless, guttulate. Growing on decayed wood.

*Propolis faginea* (Schrad.) Karst. Myc. Fenn. 244. 1871.

*Hysterium fagineum* Schrad. Journ. Bot. 2: 68. 1799.

Apothecia immersed, spreading, 3-7 mm. long, elliptical, pale, fleshy, membrane covering the hymenium pale grayish. Hymenium gray, hypothecium very poorly developed. Paraphyses filiform, branched at the ends, hyaline when seen singly, in mass the ends appear to be filled with coloring matter and to be adherent. Asci cylindrico-clavate. Spores oblong or fusiform, an oil globule in each end, 20-26 mic. long and 6-8 mic. wide.

Common on old stumps, twigs, board fences, etc. Early spring to late autumn.

Coll. Freda M. Bachman, Oct. 31, 1907. Bruce Fink, May 1, 1908. W. G. Stover, June 27, 1908. Freda M. Bachman, Aug. 5, 1908.

Order II. PEZIZALES.

Vegetative portion within the substratum, or superficial; saprophytic, rarely parasitic; apothecia plane, concave or convex, sessile or stipitate, fleshy, waxy, leathery or gelatinous, free or borne upon a stroma. Hymenium exposed from the first or at least very early; hypothecium well developed, exciple well developed or wanting.

KEY TO FAMILIES.

- a—Exciple well developed, leathery
  - b—Apothecia minute, dark, free from the first.....Patellariaceae
  - b—Apothecia large, erumpent.....Cenangiaceae
- a—Exciple none or well developed but never leathery
  - b—Exciple when present and hypothecium of similar structure
    - c—Exciple developed, fleshy.....Pezizaceae
    - c—Exciple wanting or poorly developed
      - d—Asci emergent .....Ascobolaceae
      - d—Asci not emergent.....Pyronemaceae
  - b—Exciple and hypothecium of different structure
    - c—Exciple of elongated, light colored usually thin-walled cells ..... Helotiaceae
    - c—Exciple of roundish, dark, thick-walled cells....Mollisiaceae

Family I. PEZIZACEAE.

Mycelium mostly within the substratum; usually saprophytic; Apothecia fleshy, superficial or somewhat immersed in the substratum, sessile or stipitate, exterior smooth, scaly, warty or hairy. Hypothecium and exciple of similar structure and either prosenchymatous or pseudo-parenchymatous.

KEY TO GENERA.

- a—Externally hairy .....Lachnea
- a—Externally smooth, scaly, or warty.....Peziza

Genus. I. PEZIZA (Dill.) L. Gen. Pl. 493. 1754.

Type species, *Peziza acetabulum* L.

Mycelium visible only near the base if at all. Apothecia fleshy, sessile or shortly stiptitate, varying much in size, smooth, warty or pruinose, never hairy, variously colored, plane, concave, or convex. Paraphyses simple or branched, colored or hyaline, filamentous or clavate. Asci cylindrical. Spores 8, large, smooth or rough, usually hyaline, elliptic, oblong-elliptic or spherical. Growing on earth or decayed wood.

A very large genus. The subgenera often used as genera.

KEY TO SUBGENERA.

- a—Apothecia stipitate ..... *Geopyxis*
- a—Apothecia not stipitate
  - b—Apothecia small, usually bright colored..... *Humaria*
  - b—Apothecia large
    - c—Exterior warty ..... *Pustularia*
    - c—Exterior scaly or smooth
      - d—Asci becoming very blue with iodine..... *Plicaria*
      - d—Asci slightly blue with iodine..... *Discina*

Subgenus I. *DISCINA*.

Apothecia solitary, at first bell-shaped, closed, finally plane, fleshy, edge of the cup wavy and often torn, base often narrowed into a very short thick stipe, exterior smooth. Paraphyses branched at the base, septate, more or less clavate, colored. Asci cylindrical. Spores elliptical, simple, hyaline, often containing a single large oil globule, sometimes 2 oil globules.

KEY TO SPECIES.

- a—Interior of the cup covered with large veins..... *venosa*
- a—Interior of the cup having shallow grooves..... *reticulata*

*Peziza reticulata*. Grev. Crypt. Fl. 3: 156. 1825.

Apothecia solitary or caespitose, 5-14 cm. broad, edge more or less incised, somewhat repand, interior rugose near the center, light brown becoming quite dark brown when older, exterior

whitish, pruinose, fleshy, brittle, substipitate or sessile. Stipe very short and thick. Hymenium brownish hypothecium and exciple of about the same color. Cells of the exciple and the hypothecium are elongated cylindrical cells of septate hyphae. Paraphyses enlarged at the ends, slightly adherent, rather numerous, quite brown at ends because of brownish granules. Asci cylindrical. Spores uniseriate, oval, smooth, 20-23 mic. long and 10-12 mic. wide.

Apothecia are about twice as thick as those of *Peziza repanda* Wahl. Growing on earth in woods.

Coll. W. G. Stover, April 25, 1908. Bruce Fink, May 2, 1908.

+*Peziza venosa* Pers. Myc. Eur. 1: 220. 1822.

Apothecia solitary, about 10 cm. broad, sessile, funnel-shaped, becoming quite expanded, interior umber brown and having large anastomosing veins, exterior nearly the same color when damp but, when somewhat dry, becoming whitish, very slightly pruinose or having minute fasciculate hairs, edge very tough becoming very dark, entire. Hymenium pale brownish, hypothecium of the same color, central part of the cup with less coloring and composed of a network of hyphae, outer cells somewhat dark. Paraphyses filiform, brownish, slightly clavate. Asci cylindrical, broader than those of *P. repanda* and *P. reticulata*. Spores smooth, hyaline, broadly elliptic, 20-24 mic. long and 19-12 mic. wide.

Growing on the ground in the woods.

Coll. Freda M. Bachman, April 28, 1908.

#### Subgenus II. PLICARIA.

Apothecia often in groups or caespitose, sessile, at first spherical and closed becoming plane and more or less irregular in shape and often torn, fleshy. Paraphyses branched at the base, more or less enlarged upward, hyaline or colored. Asci cylindrical, ends quite blunt. Spores elliptical or oval, smooth or rough, simple, with or without oil globules, hyaline.

## KEY TO SPECIES.

- a—Apothecia very dark brown or blue black.....*badia*  
 a—Apothecia light brown.....*repanda*

*Peziza badia* Pers. Mycol. Eur. 1: 224. 1822.

Apothecia solitary or caespitose, 6-8 cm. broad, interior of the cup light brown with a slight purplish tinge, later becoming quite dark brown, more or less wrinkled at the center, exterior purplish near the base but the upper part covered with the ends of brownish, fasciculate, septate, hyphae making it more or less olivaceous; sessile or substipitate, base pubescent, white. Flesh blue, rather thin. Hymenium and hypothecium brownish, central part almost colorless and composed of large rounded cells; outer cells more compact and ends of hyphae protruding to form the granulations on the surface. Paraphyses septate, hyaline, unbranched, very slightly enlarged upward. Asci cylindrical, blue with iodine. Spores elliptic, granular at first, later biguttulate, smooth, 15-17 mic. long and 6-8 mic. wide.

The sterile parts of the apothecia are described by Masse as composed of hyphae irregularly inflated and less inflated near the outer part of the cup.

Growing on rotting logs and on the ground in woods.

Coll. Bruce Fink, Wm. Shideler, May 19, 1907. L. O. Overholts, H. W. Fink, May 2, 1908. Freda M. Bachman, May 12, 1908.

+*Peziza repanda* Wahl. Ups. 466. 1820.

Apothecia solitary or caespitose, 6-10 cm. broad, edge incised and repand, interior light brown, somewhat wrinkled toward the center, exterior mealy and whitish, but brownish when meal has been rubbed off; fleshy, brittle, substipitate, rooting. Stipe 1-2 cm. long and about 1 cm. thick, wrinkled. Hymenium almost colorless, hypothecium and central part of the cup brownish; cells of central and outer part very large and more or less rounded. Paraphyses filiform, septate, very few. Asci cylindrical. Spores uniseriate, hyaline, smooth, oval, but varying much in size, 12-17 mic. long and 6-10 mic. wide.

Growing on an old log, also on the ground in the woods.

Coll. Marian Richey, Mary Hirn, Freda M. Bachman, April 25, 1908.

Subgenus III. PUSTULARIA.

Apothecia large, solitary or caespitose, immersed or above the substratum, spherical but finally expanded, exterior scaly or warty, base often narrowed and rootlike. Paraphyses branched at the base, septate, often enlarged upward and colored. Asci cylindrical, ends blunt. Spores elliptical or oval, 1 celled, with or without 2 small oil globules, smooth, hyaline.

KEY TO SPECIES.

- a— Spores 12-15 mic. long.....*stevensoniana*  
a— Spores 20-22 mic. long.....*vesiculosa*

+*Peziza stevensoniana* Ellis; Rhem Ascom. Lojk. 3, 1882.

Apothecia solitary or caespitose, 3-4 cm. broad, interior pale brownish, exterior brownish or more often whitish and minutely warty or scaly, edge of the cup often remaining somewhat involute; fleshy-waxy, brittle, shortly stipitate. Hymenium hyaline, other parts of the cup somewhat brownish. Paraphyses slender, very slightly enlarged upward, granular. Asci cylindrical. Spores oval, smooth, hyaline, 12-15 mic. long and 10-12 mic. wide.

Found growing on old logs.

Coll. Bruce Fink, May 21, 1908. Freda M. Bachman, June 30, 1908.

*Peziza vesiculosa* Bull. Hist. Champ. Fr. pl. 457. f. 1. 1787-1795.

Apothecia solitary or caespitose, 1-3 cm. broad, interior light brown, exterior covered with minute light brown scales, cup-shaped or somewhat irregular, edge crenate or incised. Hymenium yellowish, hypothecium and central part paler and composed of large rounded cells, exterior darker. Paraphyses filiform, few, somewhat larger near the ends. Asci cylindrical. Spores oval, smooth; 20-22 mic. long and 8-10 mic. wide.

Growing on dung or in gardens. Very common in the spring.

Coll. Bruce and H. W. Fink, May 27, 1907. Freda M. Bachman, April 15, 1908. Stephen R. Williams, April 30, 1908.

Subgenus IV. HUMARIA.

Apothecia usually in groups, seldom solitary, sessile, at first closed, soon expanded, often becoming convex, sometimes narrowed at the base, fleshy, usually red or yellow in color. Paraphyses branched at the base, septate, often enlarged upward, filled with colored oil globules. Asci cylindrical, ends rounded. Spores elliptical, oval, or spindle-shaped, usually smooth, simple, with or without oil globules, hyaline, but when mature often colored.

KEY TO SPECIES.

a—Apothecia brownish .....*fuscocarpa*  
a—Apothecia dull yellow.....*convexula*

*Peziza fuscocarpa* Ell. and Holw. Journ. Mycol. 1:5. 1885.

Apothecia scattered, 3-8 mm. broad, interior of the cup almost black, exterior olivaceous or dark brown with large brown septate hairs near the base. Hymenium reddish-brown; hypothecium dark brown, central part of the cup composed of large olive-brown cells, outer cells very dark. Paraphyses very numerous, slender, brownish with green granules. Asci cylindrical. Spores ovoid, olivaceous, guttulate, 8-10 mic. long and 4 mic. wide.

Growing on well-rotted wood.

Coll. Bruce Fink, Freda M. Bachman, Nov. 11, 1907.

+*Peziza convexula* Pers. Obs. Mycol. 85. 1796.

Apothecia caespitose or scattered, 3-5 mm. broad, somewhat convex, interior and exterior dull yellow, sessile, fleshy. Hymenium ochraceous, hypothecium paler, central part of the cup colorless. Paraphyses septate, clavate, ochraceous, numerous. Asci cylindrical. Spores broadly elliptic, colorless, smooth, 15-20 mic. long and 14-12 mic. wide, when mature usually having one large oil globule in the center.

Growing on ground among moss.

Coll. W. G. Stover, April 30, 1908.

Subgenus V. *GEOPYXIS*.

Apothecia usually in groups, cup-shaped, fleshy, sessile later stipitate, closed and spherical, later plane, exterior smooth. Paraphyses branched at the base, septate, often enlarged upward and colored. Asci cylindrical, ends usually rounded. Spores elongated or elliptical, smooth, simple, with or without a large central oil globule.

*Peziza nebulosa* Cooke Mycog. 163. f. 281. 1879.

Apothecia scattered, 0.5-1 cm. broad, dull gray in color, at first cup shaped become almost or entirely plane, stipitate. Stipe 1 cm. or less in length, about 2 mm. in diameter, expanding into the cup. Hymenium slightly brownish, hypothecium and exciple dull gray. Paraphyses filiform, slender. Asci cylindrical. Spores usually fusiform, guttulate, 30-35 mic. long and 7-8 mic. wide.

Growing on old wood in very wet places.

Coll. Freda M. Bachman, G. D. Smith, Bruce Fink, August 6, 1908.

Genus II. *LACHNEA* Quel. Bull. Soc. Myc. Fr. 25:291. 1878.

Type species, *Lachnea fimbriata* Quel.

Mycelium within the substratum. Apothecia fleshy or somewhat waxy, sessile, at first closed, becoming plane or concave, exterior or at least the edge pilose or tomentose, hairs dark, variously colored. Paraphyses linear or clavate, frequently filled with colored granules near the apex. Asci cylindrical, usually long, hyaline. Spores 8, elliptic or oblong, smooth or rough, often biguttulate and minutely granular, hyaline.

Growing on the ground, decaying wood or other organic material.

Structure of the cup is similar to that of *Peziza* but distinct from that genus by the hairy exterior or edge of the cup.

## KEY TO SPECIES.

- a—Epispore roughened .....hemispherica
- a—Epispore smooth
  - b—Interior of the cup at first red
    - c—Cups 1-2 cm. broad.....scutellata
    - c—Cups 6-8 mm. broad.....setosa
  - b—Interior of the cup brownish
    - c—Cups 0.5-1.5 mm. broad.....erinaceus
    - c—Cups 3-5 cm. broad.....fusicarpa

+*Lachnea fusicarpa* Ger. in Bull. Torr. Bot. Cl. 4:64. 1893.

Apothecia solitary, 3-5 cm. broad, hemispherical, never plane, interior of the cup pale brown, exterior darker brown and covered with short, fasciculate brown, septate hairs; base wrinkled or folded, forming a short thick stipe. Hymenium and hypothecium slightly brownish, outer cells brown. Paraphyses filiform. Asci cylindrical. Spores elliptic, guttulate, 30 mic. long and 10 mic. wide, with a heavy brownish wall.

Growing on the ground under beech trees. Partially immersed.

Coll. Freda M. Bachman, Sept., 1907.

*Lachnea hemispherica* (Wigg.) Gillet Les Disco. de Fr. 73. 1789.

*Peziza hemispherica* Wigg. in Hoffm. Veget. Crypt. 2:28. pl. 7. f. 6. 1790.

Apothecia caespitose or solitary, 1-3 cm. broad, fleshy-cartilaginous, brittle, interior pale lead-color becoming white when dry, exterior covered with fasciculate brown hairs, more abundant on the edge. Hairs rather stiff, stout, septate, dark brown, pointed, 70-100 mic. long, in fascicles, sometimes somewhat broader at the base. Hypothecium slightly darker than the hyaline parenchymatous cells which compose the greater part of the cup, outermost cells brown. Paraphyses straight, septate, tips clavate. Asci cylindrical. Spores obliquely uniseriate, oblong, biguttulate 18-22 mic. long and 12-14 mic. wide, epispore minutely roughened.

Found on very much decayed log next to the ground.

Coll. Freda M. Bachman, July 4, 1908.

Opinions seem to vary as to the spores. Masee says they are at first smooth and then minutely aspirate; Phillips says they are smooth; Cooke in *Mycographia* says they have sometimes a tendency to become rough and gives figures to illustrate.

+*Lachnea setosa* (Nees.) Phil. Brit. Disco. 406. 1887.

*Peziza setosa* Nees. Sys. 260. f. 275. 1817.

Apothecia caespitose or in groups, 6-8 mm. broad, sessile, plane, mahogany-red, after drying losing color and then pale yellowish gray, exterior of the cup covered with dark brown, septate, pointed hairs. Hymenium reddish, hypothecium of the same color, outer cells of the cup hyaline or tinged with brown. Paraphyses red, clavate at the ends. Asci cylindrical, hyaline. Spores broadly oval, uniseriate, 1-3 oil globules, very often a single large oil globule nearly filling the spore, 16-24 mic. long and 10-12 mic. wide.

Growing on rotten wood in the woods. Very common in summer and fall.

Coll. Freda M. Bachman, Nov. 3, 1907, June 20, 1908. G. D. Smith, W. G. Stover, August 4, 1908.

*Lachnea scutellata* (Sow.) Gill. Les Disco. de Fr. 75. 1879.

*Peziza scutellata* Sow. Eng. Fung. 1: pl. 24. 1797.

Apothecia sessile or nearly so, 1-2 cm. broad, interior at first dark red, later becoming brighter red, exterior at first pale, later brownish because covered with dark, brown, pointed, septate straight hairs; edge fringed with longer but similar hairs which at first extend in toward the center but later stand erect or outward. Hymenium reddish-orange in color, hypothecium pale grayish, exciple still lighter in color. Paraphyses septate, unbranched, numerous, enlarged at the apices, filled with orange granules. Asci cylindrical. Spores uniseriate, oblong-elliptic, granular, 18-22 mic. long and 8-12 mic. wide.

Growing on old wood, also on soil. Very common till late fall.

Coll. Freda M. Bachman, April 25, 1907, July 19, 1907. Bruce Fink, W. G. Stover, April 17, 1908. Freda M. Bachman, August 4, 1908.

+*Lachnea erinaceus* (Schw.) Sacc. Syl. Fung. 8: 182. 1889.

*Peziza erinaceus* Schw. Syn. Fung. Carol. No. 1194.  
1822.

Apothecia in clusters, 0.5-1.5 mm. broad, fleshy, interior light brown, exterior covered with bristle-like, brown, septate, pointed hairs. Hymenium and hypothecium pale gray, outer cells of the cup slightly brownish. Paraphyses filiform, slender, granular. Asci cylindrical. Spores hyaline, oblong-elliptic, 2-4 oil globules, uniseriate, 13-16 mic. long and 8-10 mic. wide.

Growing on rotten wood. Probably quite common.

Coll. Bruce and H. W. Fink, June 15, 1907.

Family II. PYRONEMACEAE.

Mycelium mostly superficial and threadlike. Apothecia plane or convex from the first. Hypothecium and exciple when present of similar structure, usually pseudo-parenchymatous. Exciple more often wanting or very poorly developed.

Growing on soil, charcoal, ashes, or decaying vegetation.

Genus I. PYRONEMA Carus Nova. Acta Acad. Caes. Leop. Car. 17: 370 pl. 27. 1835.

Type species, *Pyronema marianum* Carus.

Mycelium delicate, radiating, white, weblike. Apothecia fleshy, sessile, plane or convex from the first, small, usually bright-colored, glabrous or hairy, distinct or more or less confluent as the hymenium spreads. Exciple very poorly developed. Paraphyses slender or stout, often granular, colored or hyaline, simple, septate or non-septate, filiform or clavate. Asci cylindrical or cylindrico-clavate. Spores 8 ellipsoid or oblong, hyaline, without oil globules, smooth.

Growing most commonly on ashes, charred wood or on the ground where there has been fire, but also found on newly plastered walls and paper. Early spring to late fall.

*Pyronema confluens* (Pers.) Tul. Select. Fung. Carp. 3: 197.  
1865.

*Peziza confluens* Pers. Obs. Mycol. 81. No. 126. pl. 5.  
f. 6 and 7. 1796.

Apothecia crowded or confluent, spreading, convex, 1-2 mm. broad, fleshy, orange yellow, sessile. Hymenium pale salmon-pink, hypothecium darker, central part of the cup colorless. Paraphyses filiform, rather stout, sometimes appearing pseudo-septate, hyaline but pinkish in mass. Asci cylindrical, wall thickened at the ends. Spores uniseriate, hyaline, 10-12 mic. long and 6-7 mic. wide, oval, smooth.

Growing on ashes and burnt wood. Probably common. Spring and summer.

Coll. Freda M. Bachman, April 24, 1908.

Family III. ASCOBOLACEAE.

Mycelium mostly in the substratum. Apothecia fleshy, superficial or somewhat immersed, sessile or nearly so, exterior smooth, scaly, or hairy. Exciple when present, and hypothecium of similar structure and usually pseudo-parenchymatous. Exciple often wanting or poorly developed. Asci emergent.

KEY TO GENERA.

- a—Spores at maturity dark colored.
  - b—Spores in a gelatinous envelope.....Saccobolus
  - b—Spores not in an envelope.....Ascobolus
- a—Spores hyaline.
  - b—Apothecia covered externally with sharp, pointed hairs  
..... Lasiobolus
  - b—Apothecia not covered with conspicuous hairs.....Ascophanus

Genus I. ASCOBOLUS Pers. in Gmel. Sys. 1461. 1791.

Type species, *Peziza stercoraria* Bull.=*Ascobolus furfuraceus* Pers.

Mycelium within the substratum. Apothecia fleshy or fleshy-gelatinous, sessile or rarely substipitate, at first concave, becoming either plane or convex, small glabrous or scaly, rarely hairy. Hymenium more or less gelatinous, hyaline or colored. Paraphyses numerous, slender, scarcely enlarged upwards, at first longer than the asci, simple or divided at the base, septate. Asci clavate or cylindrico-clavate, large, attenuated at the base, the apex broad, the operculum round and often drawn up to a

point in the center. Spores 8, large, oblong or elliptic, hyaline, then purple and finally brown, smooth with longitudinal branching ridges or verrucose. As the spores mature the hymenium presents a dotted, papillate appearance caused by the hyaline emergent asci filled with dark spores.

Commonly found on dung but also on damp paper or other decaying plant material.

The genus may be distinguished from others of the family by the color and reticulations of the spores, by the non-adherent epispore, and by the length of the paraphyses.

## KEY TO SPECIES.

- a—Exterior of the apothecia not scaly, immersed.....*immersus*  
 a—Exterior of the apothecia scaly.  
   b—Epispore minutely warty.....*atrofuscus*  
   b—Epispore with longitudinal reticulations.....*furfuraceus*

+*Ascobolus immersus* Pers. Syn. Fung. 677. 1801.

Apothecia solitary or in groups, minute, immersed in the substratum, interior pale-olivaceous, becoming very dark as spores mature; exterior covered with minute hyaline hairs. Hymenium slightly greenish, hypothecium pale. Paraphyses often branched. Asci broadly clavate. Spores oblong-elliptic, showing the large nucleus when immature, becoming brown with longitudinal and branched reticulations; enclosed in a hyaline envelope, 50-60 mic. long and 22-23 mic. wide.

Grown in the laboratory on old cow dung.

*Ascobolus furfuraceus* Pers. Obs. Mycol. 33. 1796.

Apothecia scattered or in clusters, 3-6 mm. broad, sessile, pale olive, becoming quite dark as the spores mature, exterior covered with yellowish scaly particles. Hymenium greenish, hypothecium pale. Paraphyses filiform, granular, somewhat enlarged at the ends. Asci clavate, operculate, ends blunt and usually somewhat narrower. Asci and paraphyses hyaline, but both surrounded by a greenish, gelatinous, granular mass. Spores uniseriate or irregular, ellipsoid, with longitudinal reticulations, 23 mic. long and 10 mic. wide.

Grown in the laboratory on old cow dung. Found in a pasture on cow dung.

Coll. Freda M. Bachman, April 4, 1908.

+*Ascobolus astrofuscus* Phil. & Plow. in Grev. 2: 186. pl. 24. f. 1. 1874.

Apothecia solitary or in groups, sessile, becoming plane, edge crenulate, interior and exterior dark reddish-brown, exterior scaly. Hymenium and outer cells of the cup brownish. Paraphyses somewhat longer than the asci, simple or branched. Asci narrowly clavate. Spores oblong-elliptic, 22 mic. long and 13 mic. wide, hyaline, then violet, then brown, minutely warty.

Growing on the ground where fire had been and among charcoal.

Coll. Freda M. Bachman, July 1, 1908.

GENUS II. *SACCIBOLUS* Bond. Ann. Sci. Nat. 10:228. 1869.

Type species, *Saccibolus kerverni* (Cronan) Boud.

Mycelium within the substratum. Apothecia fleshy, sessile, somewhat concave, then becoming plane and convex, small, somewhat transparent, glabrous. Paraphyses numerous, slender, septate, simple or branched, of the same length as the asci, the apices clavate and often colored. Asci broad, short, attenuated at the base, emergent, with triangular operculum. Spores 8, usually elliptic, hyaline, then purple and finally brown, smooth, if ridged, then transversely never longitudinally, large, enclosed in a common hyaline gelatinous envelope.

Growing on dung.

The genus is easily distinguished from *Ascobolus* by the smaller size of the apothecia, by the shorter, larger and less prominent asci, by the shorter paraphyses, and by the gelatinous envelope enclosing the spores. The hymenium becomes dotted as in *Ascobolus* as the spores mature.

+*Saccibolus depauperatus* (B. & Br.) Phil. Brit. Disco. 296. 1887.

*Ascobolus depauperatus* B. & Br. Ann. and Mag. Nat. Hist. III. 15: 448. No. 1084. pl. 14. f. 6. 1865.

Apothecia scattered or in groups, pale pink, becoming some-

what darker, minute, sessile. Paraphyses slender, bent at the ends, not branched. Asci operculate, broadly clavate, hyaline. Spores hyaline, then purple, then brown, oval or somewhat fusiform, ejected in a mass surrounded by a gelatinous envelope, not filling the ascus when mature, 12 mic. long and 5 mic. wide.

Grown on old cow dung in the laboratory.

Coll. Freda M. Bachman, Nov. 13, 1907.

Genus III. *ASCOPHANUS* Bond. Mem. Ascob. 51. 1869.

Type species, *Ascophanus subfuscus* (Cronan) Bond.

Mycelium mostly in the substratum but more or less abundant beneath the apothecia. Apothecia fleshy or fleshy-gelatinous, sessile, concave then plane or convex, small, glabrous or pruinose, somewhat pyriform. Paraphyses simple or branched, septate, slender, often granular, hyaline or colored, equal in length with the asci, apices usually clavate. Asci broadly clavate, rarely oblong-ovate, hyaline or slightly tinted, attenuated at the base, prominent as crystalline papillae on the hymenium, with a conspicuous round, often recurved operculum. Spores 8 or 16, elliptic or oblong-elliptic, when immature surrounded singly by a hyaline gelatinous envelope, smooth or rare minutely punctate, hyaline or very slightly tinted, the nucleus conspicuous.

Commonly found on dung but also on decaying plant material.

The genus may be distinguished from *Ascobolus* and *Saccobolus* by the spores which are always hyaline although sometimes by refraction they appear greenish or roseate, and from *Lasiobolus* by the less hairy exterior of the apothecia. A single species has 16 spores.

+*Ascophanus saccharinus* (Currey) Bond. Ann. Sci. Nat. v. 10: 251. pl. 12. 1869.

*Ascobolus saccharinus* Berk. & Curr. Journ. Bot. 2:154. f. 10. 1864.

Apothecia scattered or crowded, 2-4 mm. broad, interior salmon pink, becoming convex, exterior paler, at first surrounded by hyaline hyphae which are not apparent later. Hymenium salmon pink, hypothecium very pale pink or hyaline. Paraphyses

stout, septate, enlarged near the apex and filled with reddish granules. Asci clavate, very broad. Spores 8, smooth, irregularly arranged, oblong-elliptic, 18 mic. long and 10 mic. wide.

Grown on cow and horse dung in the laboratory.

Genus IV. *LASIOBOLUS* Sacc. Bot. Cent. 18:220 [8]. 1884.

Type species, *Lasiobolus papillatus* (Bond.) Sacc.

Mycelium seldom visible. Apothecia fleshy, sessile, becoming plane or convex, minute, externally covered with sharp pointed hairs. Paraphyses simple or branched, septate, slender or somewhat stout, often granular, equaling the asci in length, apices often clavate. Asci clavate or cylindrico-clavate, hyaline, tapering slightly at the base. Spores 8, elliptic or oblong-elliptic, hyaline.

Growing commonly on dung.

The genus may be distinguished from *Ascophanus* by the sharp pointed hairs which cover the exterior of the apothecia.

*Lasiobolus equinus* (Müll.) Karst. Acta Soc. Fauna et Fl. Fenn. 2<sup>6</sup>: 122. 1885.

*Peziza equina* Müll. Fl. Dan. 5:8. pl. 779. f. 3. 1778.

Apothecia in groups, 0.5-1.5 mm. broad, sessile, brownish, exterior of cup having a number of bristle-like, septate, colorless hairs. Hymenium, hypothecium and exciple brownish yellow. Paraphyses numerous, septate, granular, rather stout. Asci cylindrico-clavate, operculate, hyaline. Spores oblong-elliptic, smooth, hyaline, usually granular, 22 mic. long and 10 or 11 mic. wide.

Growing on old cow dung in pasture.

Coll. Freda M. Bachman, April 21, 1908.

Family IV. *HELOTIACEAE*.

Mycelium superficial, somewhat superficial or wholly within the substratum. Apothecia fleshy-waxy, waxy, membranous, cartilaginous or gelatinous, sessile or stipitate, exterior smooth or hairy, concave becoming more or less plane or plane from the first. Hypothecium usually distinct from the tissue beneath. Exciple composed of elongated, parallel, light colored cells.

KEY TO GENERA.

- a—Mycelium superficial .....Arachnopeziza
- a—Mycelium within substratum.
  - b—Apothecia springing from sclerotia.
    - c—Apothecia large .....Sclerotinia
    - c—Apothecia small .....
  - b—Apothecia not from sclerotia.
    - c—Externally hairy.
      - d—Apothecia large, bright-colored, hairs inconspicuous, appressed .....Sarcoscypha
      - d—Apothecia small, pale.
        - e—Apothecia sessile or subsessile.....Lachnella
        - e—Apothecia stipitate .....Dasyscypha
    - c—Externally smooth.
      - d—Cartilaginous or gelatinous.
        - e—Spores simple .....Ombrophila
        - e—Spores several celled.....Coryne
      - d—Waxy.
        - e—Stipe slender .....Phialea
        - e—Stipe none or thick.....Helotium

Genus I. HELOTIUM Pers. Syn. Fung. 677. 1801.

Type species, *Leotia acicularis* Pers.

Mycelium within the substratum. Apothecia waxy, often thick, sessile or with a short thick stipe, externally smooth or sometimes pruinose, often plane from the first, usually bright colored and small. Paraphyses slender, filiform. Asci cylindrical or cylindrico-clavate, hyaline. Spores 8, elliptic, fusiform, ovoid or oblong, blunt or sharp pointed, hyaline, guttulate, pseudo-septate, 2-4 celled.

Growing on old wood or herbaceous stems.

KEY TO SPECIES.

- a—Interior of the cup bright yellow.....citrinum
- a—Interior of the cup pale yellow.
  - b—Growing on wood.....pallescens
  - b—Growing on stems.....herbarum

+*Helotium herbarum* (Pers.) Fr. Sum. Veg. Scand. 356. 1846.

*Peziza herbarum* Pers. Syn. Fung. 1: 664. 1801.

Apothecia sessile, pale yellow, 1-3 mm. broad. Hymenium,

hypothecium and exciple colorless. Paraphyses filiform. Asci slightly clavate. Spores ellipsoid or fusiform, guttulate, pseudo-septate, 10-15 mic. long and 2.5-4 mic. wide.

Very common on old stems in late autumn.

Coll. Freda M. Bachman, Oct. 31, 1907.

+*Helotium pallescens* (Pers.) Fr. Sum. Veg. Scand. 355. 1846.

*Peziza pallescens* Pers. Obs. Mycol. 85. 1799.

Apothecia scattered or in groups, 1-2 mm. broad, sessile or shortly stipitate, yellowish white. Hymenium and hypothecium slightly brownish, central and outer cells of the cup pale gray. Paraphyses filiform. Asci cylindrico-clavate. Spores oblong elliptic, guttulate, pseudo-septate, 8-13 mic. long and 2-4 mic. wide.

Found growing on old wood.

Coll. Freda M. Bachman, Nov. 13, 1907.

*Helotium citrinum* (Hedw.) Fr. Sum. Veg. Scand. 355. 1846.

*Octospora citrina* Hedw. Desc. Musc. Frond. 1: 28. pl. 7. 1787.

Apothecia caespitose or in groups, 2 mm.-1 cm. broad, often plane from the first, usually with a short stipe, interior very bright yellow, exterior paler, smooth. Stipe 1-3 mm. long. Hymenium pale olivaceous and slightly darker than the hypothecium, exciple hyaline. Paraphyses hyaline. Asci cylindrico-clavate. Spores pseudo-septate, oblong-elliptic or fusiform, 10-15 mic. long and 3-4 mic. wide.

Growing on old stumps or twigs. Very common in summer and fall.

Coll. Freda M. Bachman, Sept. 28, 1907. Bruce Fink, June 23, 1908.

Genus II. *PHIALEA*. Bond. Les Disco. de Fr. 93. 1879.

Type species, *Phialea aspregrenii* (Fr.) Gill.=*Phialea bolaris* Bond.

Mycelium within the substratum. Apothecia waxy-membranaceous, at first urceolate and more or less closed, later concave or convex, glabrous or pruinose, stipitate, with slender

stipe, usually bright-colored and small. Paraphyses slender, filiform, slightly wider at the ends. Asci cylindrical or somewhat cylindrico-clavate. Spores 8, ovoid, oblong or somewhat rounded, hyaline.

Growing on decorticate wood and herbaceous stems.

The genus differs from *Helotium* in the more slender stipe, in the apothecia being urceolate and more or less colored at first.

*Phialea scutula* (Pers.) Gill. Les Disco. de Fr. 108. 1879.

*Peziza scutula* Pers. Mycol. Eur. 1: 284. 1882.

Apothecia scattered, 2-3 mm. broad, cup-shaped becoming almost plane, stipitate, interior pale yellow, exterior same color. Stipe 5-8 mm. long, slender. Hymenium and hypothecium pale or colorless. Paraphyses filiform, slightly wider at the ends. Asci cylindrico-clavate. Spores pseudo-septate, guttulate, 3 or 4 oil globules, fusiform or oblong-elliptic, 16-18 mic. long and 3-5 mic. wide.

Growing on old stems in damp places.

Coll. Freda M. Bachman, Oct. 31, 1907. Bruce Fink, July 4, 1908.

Genus III. *LACHNELLA* Fr. Sum. Veg. Scand. 365. 1849.

Type Species, *Lachnella flammea* (Alb. and Schw.) Fr.

Mycelium within the sub-stratum. Apothecia fleshy-waxy, firm, sessile, at first closed and globose, then expanded, exterior pilose or villous, small. Hairs of the cup hyaline or colored. Paraphyses filiform or needle-like usually exceeding the asci in length. Asci cylindrico-clavate or clavate. Spores 8, simple, hyaline, oblong, oblong-elliptic or ovoid.

Growing on decaying wood, stems, or leaves.

+*Lachnella papillaris* (Bull.) Phil. Brit. Disco. 257. 1887.

*Peziza papillaris* Bull. Hist. Champ. Fr. pl. 467. f. 1. 1787-1795.

Apothecia caespitose or scattered, 1-2 mm. broad, cup-shaped becoming nearly plane but closed when dry, sessile, interior pallid, exterior of the same color but covered with brown, septate, blunt hairs, having crystal granules on the ends. Hy-

menium somewhat brownish, other parts of the cup pale gray. Paraphyses filiform, slightly exceeding the asci in length, more or less pointed at the ends. Asci cylindrico-clavate. Spores oblong-elliptic, hyaline, 2-celled, 6-12 mic. long and 3 mic. wide.

Growing on old wood. Very common.

Coll. Freda M. Bachman, Nov. 22, 1907.

Genus IV. SARCOSYPHA Sacc. Syl. Fung. 8: 153. 1889.

Type species, *Sarcosypha coccinea* (Jacq.) Sacc.

Mycelium within the substratum. Apothecia waxy or fleshy-waxy, stipitate, generally cup-shaped, usually bright-colored, exterior tomentose and paler than the interior, caespitose or in groups, large. Hairs of the cup short or long, white or slightly colored often appressed and inconspicuous. Stipe erect or rooting. Paraphyses slender, branched, more or less clavate, filled with colored granules. Asci cylindrical attenuated at the base. Spores 8, elliptic or oblong, smooth or seldom rough, hyaline, guttulate, large, simple.

Growing on decorticate wood or partially buried sticks.

KEY TO SPECIES.

- a — Hairs conspicuous ..... *floccosa*
- a — Hairs inconspicuous.
  - b — On half-buried sticks in early spring..... *coccinea*
  - b — On decaying wood all summer..... *occidentalis*

*Sarcosypha floccosa* (Schw.) Sacc. Syl. Fung. 8: 156. 1889.

*Peziza floccosa* Schw. Syn. Am. No. 782. 1831.

Apothecia solitary or caespitose, 1-2 cm. broad, fleshy, funnel-shaped, interior bright scarlet, exterior pink, tomentose, edge surrounded by longer erect hairs. Stipe straight or flexuous, 3-4 cm. long, tomentose. Hairs of the exterior colorless. Hymenium and hypothecium reddish, outer parts hyaline. Paraphyses filiform, hyaline, reddish in mass. Asci cylindrical. Spores granular, elliptic, 30 mic. long and 11 mic. wide.

Growing on partly buried sticks in woods.

Coll. Bruce Fink, May 30, 1908. Freda M. Bachman, Grace M. Kalter, June 10, 1908.

*Sarcoscypha coccinea* (Jacq.) Sacc. Syl. Fung. 8: 154. 1889.

*Peziza coccinea* Jacq. Fl. Aus. 2: pl. 169. 1774.

Apothecia fleshy, 2-5 cm. broad, stipitate, interior brilliant scarlet, exterior pale or pinkish and covered with hyaline, appressed, septate hairs, not apparent to the unaided eye. Paraphyses numerous, filled with colored granules. Asci operculate. Spores uniseriate, oblong-elliptic, smooth, 23-29 mic. long and 10 mic. wide, oil globules varying in number.

Found on sticks partly buried in the soil or under leaves. Probably rare. In early spring.

Coll. Bruce Fink, April 11, 1908.

*Sarcoscypha occidentalis* (Schw.) Sacc. 8: 154. 1889.

*Peziza occidentalis* Schw. Syn. N. Am. Fung. 171 No. 781. 1831.

Apothecia fleshy, leathery when dry, 1-2 cm. broad, stipitate, interior scarlet, exterior paler and covered with appressed, inconspicuous hairs. Stipe 5 mm.-2 cm. long, slender. Hymenium pale brick-red, hypothecium and exciple pinkish. Paraphyses filiform, tapering slightly toward the base, filled with reddish granules. Asci cylindrical. Spores uniseriate, oblong-elliptic, smooth, 18-20 mic. long, and 10 mic. wide, granular, usually containing 2 large oil globules when mature.

Growing on sticks or decayed logs in the woods. Common all summer.

Coll. Bruce Fink, June 15, 1907, July 23, 1907, Grace M. Kalter, Freda M. Bachman, May 25, 1908, Freda M. Bachman, August 5, 1908.

Genus V. *CHLOROSPENIUM* Fr. Sum. Veg. Scand. 356. 1849.

Type species, *Chlorosplenium schweinitzii* Fr.=*Peziza chlora* Schw.

Mycelium within the substratum, often colored. Apothecia waxy, tough, stipitate, cup-shaped or somewhat irregular, becoming expanded and often subflexuous and repand, green or olivaceous, interior often paler than exterior; glabrous, caespitose or in groups. Stipe short, thick. Paraphyses simple or

divided only near the base, often granular and colored, the ends sometimes slightly adherent. Asci cylindrical or cylindrico-clavate. Spores 8, simple, elliptic or fusiform, usually guttulate.  
Growing on decaying wood.

KEY TO SPECIES.

- a—Substratum colored green.....aeruginosum
- a—Substratum uncolored.
  - b—Apothecia greenish yellow.....chlora
  - b—Apothecia very dark green.....versiforme

*Chlorosplenium chlora* (Schw.) Mass. Brit. Fung. Fl. 356. 1849.  
Peziza chlora Schw. Syn. Fung. Carol. No. 1235. 1822.

Apothecia solitary or in groups, 4-6 mm. broad, interior greenish yellow, exterior slightly darker and somewhat roughened, cup-shaped. Hymenium pale olivaceous, hypothecium greenish, exciple dark. Paraphyses filiform, granular, rather stout. Asci cylindrico-clavate. Spores elliptic or fusiform, finely guttulate, 6-9 mic. long and 2.5-3 mic. wide.

Growing on old wood. Probably quite common.  
Coll. Freda M. Bachman, Nov. 3, 1907.

*Chlorosplenium versiforme* (Pers.) De. Not. Comm. Soc. Critt. Ital. 1:376. 1864.

Peziza versiformis Pers. Icon. et Descr. 25. pl. 7. f. 7. 1798.

Apothecia caespitose, 2-3.5 cm. broad, stipitate, funnel-shaped or somewhat irregular, interior and exterior greenish black. Stipe 1-2 cm. long. Hymenium slightly brownish, the ends of the paraphyses and asci dark green; hypothecium brown, central part of the cup of three dark brown and two lighter brown strata. Paraphyses filiform, branched, filled with green granules near the ends, also somewhat adherent at the ends. Asci cylindrical. Spores 6-10 mic. long and 2-4 mic. wide, elliptic.

Growing on rotting logs.  
Coll. Freda M. Bachman, Nov. 21, 1907.

*Chlorosplenium aeruginosum* (Oeder) Tul. Select. Fung. Carp.  
3: 187. 1865.

*Elvela aeruginosa* Oeder Fl. Dan. 3<sup>o</sup>: 7. pl. 534. f. 2.  
1770.

Mycelium coloring the substratum green. Apothecia in groups, 6 mm.-1 cm. broad, interior of the cup pale green or creamy, exterior verdigris-green; stipitate, somewhat leathery. Stipe 0.5-1 cm. long, usually slender. Hymenium and hypothecium almost colorless, central part of the same color, exterior portion dark green. Paraphyses filiform, sometimes branched. Asci cylindrico-clavate. Spores fusiform, 9-14 mic. long and 3-4 mic. broad, guttulate.

Growing on rotting wood.

Coll. Freda M. Bachman, Oct. 31, 1907. Bruce Fink, May 2, 1908. Grace M. Kalter, Bruce Fink, Aug. 11, 1908.

Genus VI. *SCLEROTINIA* Fuck. Symb. Mycol. 330. 1869.

Type species, *Sclerotinia libertiana* Fuck.

Apothecia fleshy-waxy, stipitate, cup-shaped or funnel shaped, later more or less expanded arising from sclerotia, large or small, usually glabrous. Stipe long, slender, more or less immersed. Paraphyses filiform. Asci cylindrical. Spores 8, oblong elliptic, ovate or elliptic, hyaline guttulate.

Growing on the ground in the spring.

+*Sclerotinia tuberosa* (Hedw.) Fuck. Symb. Mycol. 331. 1869.

*Octospora tuberosa* Hedw. Desc. Musc. Frond. 1: 33.  
pl. 10. 1787.

Apothecia springing from sclerotia, 2-3.5 cm. broad, stipitate, interior of the cup light to dark brown and becoming somewhat wrinkled, exterior of the same color. Stipe 2-4 cm. long, slender, often flexuous. Hymenium brownish, hypothecium very dark brown, outer cells of the cup lighter brown. Paraphyses filiform. Asci cylindrical. Spores uniseriate, usually elliptic, sometimes oblong-elliptic, hyaline, smooth, 12 mic. long and 6 mic. wide.

Growing on earth in the spring in woods. Very common.

Coll. Bruce and H. W. Fink, May 10, 1907. Freda M. Bachman, April 23, 1908.

Genus VII. *ARACHNOPEZIZA* Fuck. Symb. Mycol. 303. 1869.

Type species, *Tapesia aurelia* Pers.

Mycelium superficial, arachnoid. Apothecia fleshy-waxy, sessile, exterior villous or scaly, interior concave becoming plane; in groups. Paraphyses filiform. Asci cylindrical or cylindricoclavate. Spores 8, fusiform, oblong-elliptic, hyaline, simple or 1-3 septate.

Growing on decaying vegetation, most often on wood.

KEY TO SPECIES.

- a — Apothecia minute, white.....*delicatula*  
a — Apothecia larger, yellow.....*aurelia*

*Arachnopeziza aurelia* (Pers.) Fuck. Symb. Mycol. 303. 1869.

*Peziza aurelia* Pers. Mycol. Eur. 270. 1822.

Mycelium often abundant, yellowish. Apothecia solitary or in groups, 0.5-1 cm. broad, hemispherical, becoming plane, interior of the cup bright yellow, exterior covered with reddish fasciculate hairs. Hymenium and central part of the cup hyaline, hypothecium somewhat darker. Paraphyses filiform. Asci cylindricoclavate. Spores 4 celled, hyaline, 15-18 mic. long and 4-5 mic. wide, fusiform or oblong often having a short cilium at each end.

Very little of the mycelium was above the substratum in the material collected in the spring, while that of late fall showed a thick mass of hyphae in which the apothecia were borne.

Growing on old logs or stumps.

Coll. Gertrude Lett, Freda Bachman, Nov. 9, 1907. L. O. Overholts, May 2, 1908.

+*Arachnopeziza delicatula* Fuck. Symb. Mycol. 304. 1869.

Mycelium delicate and visible only near the apothecia. Apothecia scattered, minute, about 0.5 mm. broad, cup-shaped, becoming nearly plane, white, when old and dry, dingy-yellow,

exterior with a few hyaline hairs. Hymenium and other parts pale yellowish. Paraphyses filiform. Asci cylindrico-clavate, but narrowed at the ends. Spores oblong-elliptic or slightly fusiform, simple, hyaline, 6 mic. long and 2 mic. wide.

Growing on old somewhat charred wood.

Coll. Freda M. Bachman, Nov. 3, 1907.

Genus VIII. *DASYSCYPHA* Fuck. Symb. Mycol. 304. 1869.

Type species, *Dasyscypha bicolor* (Bull.) Fuck.

Mycelium within the substratum. Apothecia fleshy-waxy, stipitate, pilose or villous, at first concave, becoming more or less expanded, small. Stipe slender, hairy. Hairs of the cup hyaline or colored, often covered with granules which may disappear. Paraphyses filiform or needle-like, often exceeding the asci in length. Asci cylindrical or cylindrico-clavate. Spores 8.

Growing on decaying wood and stems.

The genus may be distinguished from *Lachnella* by the presence of a stipe.

KEY TO SPECIES.

- a—Interior of the cup yellowish.
  - b—Apothecia stipitate .....*turbinulata*
  - b—Apothecia sessile or subsessile.....*patula*
- a—Interior white.
  - b—Paraphyses with obtuse ends.....*nivea*
  - b—Paraphyses needle-like.
    - c—Growing on wood.....*virginea*
    - c—Growing on leaves.....*ciliaris*

+*Dasyscypha patula* (Pers.) Sacc. Syl. Fung. 8: 443. 1889.

*Peziza patula* Pers. Obs. Mycol. 1: 42. 1799.

Apothecia in groups, 40-300 mic. broad, sessile or with a very short stipe, white, hemispherical, the disc surrounded by non-septate, long, slender, pointed, hyaline, hairs. Hymenium, hypothecium and exciple colorless. Paraphyses needle-like and longer than the asci. Asci cylindrico-clavate. Spores elliptic or fusiform, hyaline, 7-10 mic. long and 1.5-2 mic. wide.

Growing on maple leaves in late fall. Common.

Coll. Freda M. Bachman, Oct. 23, 1907.

+*Dasyscypha ciliaris* (Schrad.) Sacc. Syl. Fung. 8: 443. 1889.

*Peziza ciliaris* Schrad. Journ. Bot. 2: 2. 1799.

Apothecia solitary or in groups, minute, about 220 mic. broad, almost sessile, white exterior covered with hyaline, needle-like, septate hairs. Hymenium and hypothecium hyaline. Paraphyses quite stout, needle-like, somewhat longer than the asci. Asci cylindrico-clavate. Spores 12-16 mic. long and 1-2 mic. wide, elliptic or fusiform.

Growing on maple leaves.

Coll. Freda M. Bachman, Nov. 3, 1907.

+*Dasyscypha turbinulata* (Schw.) Sacc. Syl. Fung. 8: 456. 1889.

*Peziza turbinulata* Schw. Syn. Fung. 173. No. 813. 1834.

Apothecia in groups, 0.5-1 cm. broad, at first greenish-yellow, exterior paler and villous, stipe of the same color and villous. All tissues of the cup greenish-yellow in section. Paraphyses filiform hyaline, sometimes branched. Asci cylindrico-clavate. Spores fusiform or elliptic, hyaline, 12-18 mic. long and 3-5 mic. wide.

Growing on old logs, etc.

Coll. Bruce Fink, May 2, 1908.

*Dasyscypha virginea* (Batsch) Fuck. Symb. Mycol. 305. 1869.

*Peziza virginea* Batsch Elen. Fung. 125. 1786.

Apothecia in groups, 2-3 mm. broad, becoming almost plane, interior and exterior white. Stipe 2-4 mm. long, slender. Hairs of the cup septate, somewhat clavate. Hymenium hyaline, hypothecium and exciple slightly less clear than the hymenium. Paraphyses needlelike. Asci cylindrico-clavate. Spores obliquely uniseriate, elliptic or fusiform, 5-7 mic. long and 1.5-2 mic. wide.

Very common on rotting wood or on the under side of bark on decaying logs from early spring to late autumn.

Coll. Freda M. Bachman, Nov. 3, 1907. Bruce Fink, Apr. 11, 1908, May 2, 1908. Freda M. Bachman, July 4, 1908.

+*Dasyscypha nivea* (Fr.) Sacc. Syl-Fung. 8:437. 1889.

*Lachnea nivea* Fr. Sys. Mycol. 2:90. 1822.

Apothecia in groups, 2-3 mm. broad, white, stipitate, exterior covered with minute hyaline, septate, obtuse hairs. Stipe short, slender. All tissues hyaline in microscopic section. Paraphyses filiform, ends obtuse. Asci cylindrical. Spores simple, hyaline, fusiform or oblong, 8-10 mic. long and 1.5-2 mic. wide.

Growing on rotten wood. This may be distinguished from *D. virginea* by the more waxy texture of the apothecia and the obtuse ends of the paraphyses.

Coll. Bruce and H. W. Fink, May 2, 1908. Freda M. Bachman, Aug. 8, 1908.

Genus IX. *CORYNE* Tul. Select. Fung. Carp. 3:190. 1865.

Type species, *Lichen sarcoides* Jacq.

Mycelium within the substratum. Apothecia gelatinous, caespitose, hard when dry, sessile or substipitate, exterior smooth, at first concave, becoming nearly plane, generally dark colored, purple or violet, rarely greenish, large. Stipe when present, thick and short. Paraphyses slightly thickened at apices. Asci more or less clavate, attenuated at the base. Spores 8, oblong, fusiform, elliptic or oval, hyaline, 2-8 celled.

Growing on decaying wood, rarely on other vegetation.

+*Coryne sarcoides* (Jacq.) Tul. Select. Fung. Carp. 3:190. pl. 17. f. 1-10. 1865.

*Lichen sarcoides* Jacq. Misc. Aus. Bot. 2:378. pl. 22. 1781.

Apothecia nearly sessile, 1.5-2.5 cm. broad, interior dark, purplish-red, exterior paler or pinkish. Hymenium dull red, hypothecium and central part of the cup paler, outer cells darker. Paraphyses very slender, numerous, slightly adherent. Asci slightly enlarged upwards. Spores 4-7 celled, more or less pointed at the ends, 15-22 mic. long and 4 mic. wide.

Growing in cracks of old logs or stumps. Very common.

Coll. W. G. Stover, Oct. 8, 1907. Freda M. Bachman, Oct. 23, 1907.

Genus X. OMBROPHILA Fr. Sum. Veg. Scand. 357. 1849.

Type species, *Ombrophila violacea* (Hedw) Fr.

Mycelium within the substratum. Apothecia gelatinous, sessile or substipitate, slightly concave becoming either plane or convex, thick. Stipe when present, short and thick. Paraphyses filiform, or somewhat clavate, simple or branched at the base. Asci narrowly clavate. Spores 8, ellipsoid or oblong, hyaline, guttulate.

Growing on decaying wood.

+*Ombrophila violascens* Rehm Discom. 478. 1891.

Apothecia solitary or in groups or caespitose 0.5-2.5 cm. broad, varying in shape, interior faded red or dark reddish purple, exterior of the same color, sessile or with short stipe, gelatinous grisly. Hymenium hyaline or tinged with red, hypothecium of the same color, central part of the cup red and then hyaline, outer cells reddish. Paraphyses filiform, slightly clavate, non-septate. Asci cylindrico-clavate, distended with spores. Spores obliquely uniseriate or straight in the ascus, simple, hyaline, guttulate, broadly elliptic, smooth, 6-9 mic. long and 5 mic. wide.

Growing on old wood among moss.

Coll. Bruce Fink, Freda M. Bachman, Oct 12, 1907.

Family V. MOLLISACEAE.

Mycelium superficial, somewhat superficial or wholly within the substratum. Apothecia fleshy-waxy or cartilaginous, rarely membranous, sessile or stipitate, superficial or at first immersed. Hypothecium forming a distinct layer. Outer cells of the cup dark colored, more or less rounded and thick-walled.

KEY TO GENERA.

- a — Mycelium superficial ..... *Tapesia*
- a — Mycelium within the substratum.
  - b — Apothecia gelatinous, paraphyses with globose ends..... *Orbilia*
  - b — Apothecia fleshy-waxy, paraphyses filiform.
    - c — Minute, texture very soft..... *Pezizella*
    - c — Somewhat larger, texture quite firm..... *Mollisia*

Genus I. MOLLISIA Karst. Mycol. Fenn. 1:187. 1871.

Type species, *Mollisia cinerea* (Batsch.) Karst.

Mycelium within the substratum. Apothecia waxy, sessile, becoming plane, sometimes lobed, small, glabrous, superficial or suberumpent, exterior dark. Paraphyses filiform, somewhat stout, septate only at the base. Asci clavate or cylindrico-clavate. Spores 4-8, usually simple, rarely two-celled, hyaline, ellipsoid, oblong, or fusiform, often granular or minutely guttulate.

Growing on decaying wood or stems.

*Mollisia cinerea* (Batsch) Karst. Mycol. Fenn. 189. 1871.

*Peziza cinerea* Batsch Elen. Fung. 197. f. 137. 1786.

Apothecia in groups or scattered, 2-7 mm. broad, cupshaped with edge thickened and raised, becoming plane, sessile, exterior very dark, interior light to very dark ashy, soft and fleshy, form well-preserved in drying. Hymenium brownish ashy, hypothecium and exciple of darker brownish cells. Paraphyses filiform, numerous, hyaline. Asci cylindrico-clavate. Spores 8, uniseriate, fusiform, 7-11 mic. long and 2-3 mic. wide.

Very common on wood and bark. Summer and autumn.

Coll. Bruce Fink, June 11, 1907. Freda M. Bachman, Oct. 31, 1907, Aug. 7, 1908.

Genus II. TAPESIA Fuck. Symb. Mycol. 300. 1869.

Type species *Tapesia anomala* (Pers.) Fuck.

Mycelium superficial, more or less tomentose, white, yellow, red, or dark brown. Apothecia waxy, becoming somewhat coriaceous, sessile, rarely substipitate, exterior glabrous; scaly or hairy, concave, then more or less plane, small. Paraphyses filiform. Asci elongate, cylindrico-clavate often somewhat acute at the ends. Spores 8, oblong, ovate, cylindrical or fusiform, hyaline.

Growing on decaying wood, seldom on stems.

Distinguished from *Mollisia* by the superficial mycelium.

+*Tapesia cinerella* Rehm Disco. 575. 1891.

Mycelium delicate, radiating, thin. Apothecia scattered or in groups, at first somewhat globose, sessile, 1-3 mm. broad, in-

terior pale grayish, edge paler, exterior dark. Hymenium and hypothecium and central part of cup almost colorless, outer cells darker. Paraphyses filiform. Asci cylindrical. Spores oblong, simple, hyaline, 5-8 mic. long and 3-4 mic. wide.

Found on decaying wood. Saccardo gives the spore measurements 10-12 mic. long and 3-5 mic. wide and the color of the disc as ashy or yellowish.

Coll. Bruce Fink, May 3, 1908.

+*Tapesia lividofusca* (Fr.) Rehm Disco. 576. 1892.

*Peziza lividofusca* Fr. Sys. Mycol. 2: 147. 1822.

Mycelium delicate, not abundant, most apparent when the apothecia are dry. Apothecia lobed, sessile, spreading, 2-3 mm. broad, at first cup shaped, interior pale brownish-ashy, exterior black. Hymenium colorless, hypothecium hyaline, exciple black. Paraphyses few, very slender. Asci cylindrico-clavate narrowed toward the ends. Spores fusiform, 7-10 mic. long and 3-4 mic. wide.

Growing on old or rotting wood. Probably common.

Coll. Freda M. Bachman, Nov. 3, 1907, Aug. 7, 1908.

Genus III. PEZIZELLA Fuck. Symb. Mycol. 299. 1869.

Type species, *Pezizella sordida* Fuck.

Mycelium within the substratum. Apothecia waxy-membranaceous, sessile, somewhat hemispherical, becoming plane, glabrous, pallid, very small. Paraphyses filiform, hyaline. Asci cylindrical or cylindrico-clavate. Spores 8, oblong, fusiform or ellipsoid, simple, hyaline.

Growing on decaying wood stems or leaves.

KEY TO SPECIES.

- a — Apothecia 1 mm. or more broad.
  - b — Apothecia white .....hyalina
  - b — Apothecia yellowish .....xylita
- a — Apothecia less than 1 mm. broad.
  - b — Pale yellow and growing on stems.....dilutella
  - b — Olivaceous and growing on leaves.....hyalinosulfurea

+*Pezizella dilutella* (Fr.) Fuck. Symb. Mycol. 300. 1869.

*Peziza dilutella* Fr. Sys. Mycol. 2: 147. 1822.

Apothecia in groups, minute, 60-120 mic. broad, cup-shaped then plane, very pale yellow. Hymenium and hypothecium almost colorless, exciple darker. Paraphyses filiform and about half the width of the asci. Asci cylindrico-clavate. Spores rod-like or very slightly curved, hyaline, simple, smooth, 7-10 mic. long and 1.5 mic. wide.

Found growing on old stems in very damp woods.

Coll. Freda M. Bachman, Oct. 30, 1907.

*Pezizella hyalina* (Pers.) Rehm Rabenh. Krypt. Fl. 1<sup>3</sup>:653. 1896.

Apothecia in groups, 1-2 mm. broad, white, almost sessile, exterior villous, hairs, hyaline and minute. All parts of the cup hyaline in microscopic section. Paraphyses filiform, slender, few. Asci cylindrico-clavate. Spores simple, hyaline, 8-10 mic. long and 2-3 mic. wide, oblong-elliptic or slightly fusiform.

Growing on rotting wood.

Coll. Bruce Fink, May 25, 1908.

+*Pezizella hyalinisulfurea* Rehm. n. sp.

Apothecia in superiore folii pagina dispersa, sessilia, primitus globoso-clausa, dein patellaria, disco plano tenuissime marginato, extus glabra, versus basim augustata, hyalino-sulfurea, 200-250  $\mu$ . diam., excipulo pseudoparenchymatice contexto, ad marginem cellulis 8/1.5 $\mu$  elongatis obtuse, fimbriato, sicca citrinula, concava. Asci clavati, apice rotundati, 25-30/5-6  $\mu$ , J+, 8 spori. Sporae oblongae, rectae, utrinque rotundatae, 1 cellulares, hyalinae 5-7/2-2.5  $\mu$ , distichae. Paraphyses filiformes, hyalinae 2  $\mu$  cr.

Ad folium Fagi putridum. Oxford, O., U. S. A.

2/1907, leg. Freda M. Bachman.

+*Pezizella xylita* (Karst.) Rehm Disco. 656. 1892.

*Peziza xylita* Karst. Mon. Pez. 190. 1869.

Apothecia caespitose or scattered, 2-3 mm. broad, interior pallid or yellowish, exterior darker, sessile. Hymenium and

hypothecium pallid, outer cells of the cup brownish. Paraphyses filiform, filled with granules. Asci cylindrico-clavate. Spores fusiform, 7-10 mic. long and 3-4 mic. wide, guttulate.

Karsten says the spores are ovoid-oblong or somewhat needle-like and 4-7 mic. long and 1.5-2 mic. wide.

Growing on old wood.

Coll. Freda M. Bachman, Nov. 3, 1907. Bruce Fink, May 30, 1908.

Genus IV. ORBILIA Fr. Sum. Veg. Scand. 357. 1849.

Type species, *Orbilia xanthostigma* Fr. Sys. Mycol. 146. 1822.

Mycelium usually entirely within the substratum. Apothecia subgelatinous, becoming more or less plane, sessile or sometimes very shortly stipitate, glabrous, small, reddish or yellowish, somewhat translucent. Paraphyses simple or branched at the base, the ends clavate, globose, flattened or covered with a mucilaginous epithecium. Asci cylindrico-clavate. Spores 8, small, ovoid, filiform, fusiform or spherical, simple.

Growing on wood or other decaying plant material.

KEY TO SPECIES.

- a—Mycelium partially above the substratum.....auricolor
- a—Mycelium wholly within the substratum.
  - b— Spores spherical .....coccinella
  - b— Spores linear or oblong.
    - c— Spores 4-5 mic. long.....xanthostigma
    - c— Spores 10-14 mic. long.....vinosa

*Orbilia vinosa* (Alb. & Schw.) Karst. Myc. Fenn. 101. 1871.

*Peziza vinosa* Alb. & Schw. Consp. Fung. 308. 1805.

Apothecia scattered or in groups, shortly stipitate, 1-2.5 mm. broad, funnel-shaped then plane, externally smooth, interior and exterior bright red; subgelatinous. Stipe about 1 mm. long, stout. Hymenium pinkish-yellow, hypothecium and exciple pale gray. Paraphyses enlarged at the ends, often globose. Spores needle-like, 10-14 mic. long and 1 mic. wide, hyaline.

Common on old wood and the inside of bark.

Coll. Freda M. Bachman, Oct. 30, 1907. L. O. Overholts, May 2, 1908. Bruce Fink, Aug. 7, 1908.

+*Orbilia coccinella* Fr. Sum. Veg. Scand. 357. 1849.

Apothecia scattered or in groups, subsessile, 1-2 mm. broad, funnel-shaped, then plane, interior and exterior dingy yellowish-red changing to brick-red when dry; subgelatinous. Hymenium, hypothecium and exciple pale yellow. Paraphyses slender, hyaline, with globose ends. Spores spherical, smooth, uniseriate, 2-3 mic. in diameter.

Common on old logs, etc.

Coll. Freda M. Bachman, Nov. 3, 1907, July 4, 1908, Aug. 6, 1908.

*Orbilia xanthostigma* Fr. Sys. Mycol. 146. 1822.

Apothecia scattered or caespitose, 1-3 mm. broad, becoming plane, exterior and interior reddish when growing, reddish yellow when dry, subsessile. Hymenium, hypothecium and exciple hyaline. Paraphyses slender, ends globose. Spores elliptic, hyaline, 3-4 mic. long and 1.5 mic. wide.

Growing on old logs, etc.

Coll. Bruce Fink, June 6, 1908. Freda M. Bachman, July 4, 1908.

+*Orbilia auricolor* (B. & Br.) Sacc. Syl. Fung. 8: 625. 1889.

*Peziza auricolor* B. & Br. Ann. & Mag. Nat. Hist. III. 15. No. 90. 1865.

Apothecia attached to the substratum by numerous white septate hyphae which later become brown. Apothecia scattered or crowded, sessile, becoming plane, interior and exterior yellowish or reddish-yellow, 1.5-3 mm. broad. Hymenium and hypothecium hyaline, outer cells of the exciple somewhat dark. Paraphyses slender, the ends flattened as a nail. Asci clavate. Spores fusiform or oblong, 4-5 mic. long and 1-1.5 mic. wide.

Growing on decaying wood.

Coll. G. D. Smith, Freda M. Bachman, Aug. 5, 1908.

Family VI. PATELLARIACEAE.

Mycelium wholly within the substratum. Apothecia leathery or horny, superficial or at first immersed, dark-colored, usually small. Exciple and hypothecium well-developed. Paraphyses more or less adherent near the ends.

KEY TO GENERA.

- a— Spores simple or two-celled.
  - b— Spores simple .....Patinella
  - b— Spores two-celled .....Karschia
- a— Spores several celled.
  - b— Spores 24-33 mic. long.....Durella
  - b— Spores 46-56 mic. long.....Patellaria

Genus I. KARSCHIA Körb. Parerg. Lich. 459. 1865.

Type species, Karschia talcophila (Ach.) Körb.

Apothecia coriaceous, sessile, superficial or slightly erumpent, disc round, plane, becoming more or less convex, very dark or black, small. Paraphyses thickened near the ends and united into a gelatinous epithecium. Asci clavate. Spores 8, ovate-oblong, or oblong-elliptic, two-celled, somewhat constricted at the septum, at first hyaline, then brown or brownish.

The apothecia appear like those of the lichen genus Lecidea. Körber says the paraphyses are branched.

Growing on decaying wood and stems.

*Karschia lignyota* (Fr.) Sacc. Syl. Fung. 8: 779. 1889.

*Patellea lignyota* Fr. Sys. Mycol. 2: 150. 1822.

Apothecia usually in groups, minute, black, sessile, edge uneven or crenulate. Hymenium olivaceous, hypothecium almost hyaline, exciple black. Paraphyses slightly enlarged at the ends, rather stout. Asci broadly clavate. Spores crowded in the ascus, brownish, oblong-elliptic, 9-11 mic. long and 4 mic. wide, often breaking apart at the septum.

Very common on old wood.

Coll. Freda M. Bachman, Nov. 22, 1907.

GENUS II. DURELLA Tul. Select. Fung. Carp. 3:177. 1865.

Type species, *Peziza compressa* Pers.

Apothecia tough-coriaceous, twisted when dry, subsuperficial, sessile, somewhat concave, black or olivaceous. Paraphyses hyaline and somewhat branched near the ends. Asci clavate, shortly attenuated at the base. Spores 8, oblong or elliptic, colorless or very rarely dark, 4-6 celled, somewhat constricted at the septa.

Growing on decaying wood and stems.

*Durella clavispora* (B & Br.) Sacc. Syl. Fung. 8:794. 1889.

*Patellaria clavispora* B. & Br. Ann. & Mag. Nat. Hist. II. 13:465. no. 774.

Apothecia in groups 1-1.5 mm. broad, black, sessile, plane or somewhat convex. Hymenium hyaline except near the ends of the paraphyses, hypothecium, exciple and the ends of the paraphyses dark green. Paraphyses sometimes branched at the ends. Asci clavate. Spores hyaline, clavate, curved, 8-9 celled, usually a single large oil globule in each cell, 24-33 mic. long and 7-9 mic. wide.

On old wood and stems. Probably common.

Coll. Freda M. Bachman, Oct. 23, 1907. Bruce Fink, March 31, 1908, Aug. 11, 1908.

GENUS III. PATELLARIA Fr. Sys. Orb. Veg. 113. 1825.

Type species, *Patellaria atrata* Fr.

Apothecia coriaceous, blackish, sessile, small, circular or elongated, plane then slightly convex, superficial. Paraphyses granular, colored near the ends, somewhat adherent forming a dark epithecium. Asci clavate. Spores 8, fusiform, often clavate and curved, 4 or more celled.

*Patellaria atrata* (Hedw.) Fr. Sys. Orb. Veg. 114. 1825.

*Lichen atratus* Hedw. Desc. Spec. Mus. Frond. 2:61. pl. 21. f. a. 1789.

Apothecia usually in groups 1-1.5 mm. broad, black, sessile, somewhat elongated. Hymenium hyaline except at the ends of

the paraphyses, the hypothecium, exciple and ends of the paraphyses dark green. Paraphyses sometimes branched near the ends, granular. Asci clavate, attenuated at the base and somewhat smaller at the ends. Spores clavate and curved, containing 6-10 large oil globules, 7-10 septate, 46-56 mic. long and 10-11 mic. wide.

Probably very common on decaying wood and stems.

Coll. Freda M. Bachman,, Oct. 31, 1907.

Genus IV. *PATINELLA* Sacc. Grev. 4:22. 1875.

Type species, *Patinella hyalophaea* Sacc.

Apothecia plane or somewhat concave, sessile, blackish or dark colored, somewhat horny. Ends of the paraphyses slightly enlarged or equal. Asci cylindrical. Spores 8, ellipsoid or oblong, rarely globose, simple, hyaline.

+*Patinella olivacea* Sacc. Syl. Fung. 8:770. 1889.

*Peziza olivacea* Batsch Elench. 127. f. 51. 1786.

Apothecia solitary or in groups, 3-7 mm. broad, interior and exterior dark olivaceous, edge paler but greenish, sessile, attached to the substratum by many brownish, septate, simple rhizoids, exterior somewhat roughened. Hymenium light olivaceous, hypothecium more brown, exciple of vesiculose brownish cells, larger and somewhat polygonal near the outside. Paraphyses sometimes branched, hyaline, ends surrounded with a green gelatinous substance. Asci cylindrical. Spores arranged end to end, containing two oil globules, hyaline, later becoming brownish, simple, oblong, 8-10 mic. long and 4 mic. wide.

Very common on rotting logs.

Coll. Freda M. Bachman, June 27, 1908, Aug. 11, 1908.  
Bruce Fink, Aug. 12, 1908.

Family VII. *CENANGIACEAE*.

Mycelium within the substratum. Apothecia leathery, waxy or gelatinous, at first more or less immersed then superficial, often enclosed within a membrane at first.

## KEY TO GENERA.

- a — Apothecia leathery, dark.....Urnula  
 a — Apothecia gelatinous .....Sarcosoma

Genus I. URNULA Fr. Sum. Veg. Scand. 364. 1849.

Type species, *Urnula craterium* (Schw.) Fr.

Apothecia leathery, tough, stipitate, urnshaped, exterior dark, furfuraceous or pubescent, interior dark, at first closed later opening by a round or irregular aperture. Stipe stout and about equal in length with the cup. Asci cylindrical. Spores 8, oblong, hyaline.

Distinct from *Sarcoseypha* in color and villous stipe.

*Urnula craterium* (Schw.) Fr. Nov. Symb. 106. 1851.

*Peziza craterium* Schw. Syn. Fung. Carol. no. 1175.  
 pl. 1. f. 7-11. 1822.

Apothecia solitary or caespitose, 3-5 cm. broad and 5-8 cm. high, interior brown to dark purplish brown, exterior dark brown, somewhat scaly and covered with dark brown appressed hairs, edge involute and jagged caused by the irregular rupture of the cup. Hymenium brown, outer part of the exciple very dark brown. Paraphyses hyaline, septate, branched, numerous. Asci very long, curved near the ends, cylindrical. Spores uniseriate, guttulate, granular, 26-29 mic. long and 10 mic. wide.

Growing on the ground or on buried sticks. Spring.

Coll. Bruce and H. W. Fink, Mch. 16, 1908. Freda M. Bachman, Apr. 11, 1908.

Genus II. SARCOSOMA Casp. in Rabenh. Krypt. Fl. 1<sup>3</sup>:497. 1891.

Type species, *Sarcosoma globosum* (Schmid.) Rehm.

Apothecia gelatinous, large, spherical, becoming more or less plane, exterior brown, interior paler. Paraphyses linear, much branched, scarcely thickened at the apices. Asci long, operculate. Spores elliptic 8, with or without oil globules, nearly hyaline.

Growing on decaying leaves, sticks, etc.

*Sarcosoma rufa* (Schw.) Rehm in Raben. Krypt. Fl. 1<sup>3</sup>:497.  
1891.

*Bulgaria rufa* Schw. Syn. N. Am. Fung. 178. 1834.

Apothecia solitary or caespitose, 3-6 cm. broad, stipitate, exterior dark, almost black, interior very light brown, concave, becoming plane. Stipe 1-2 cm. long. Hymenium pale or slightly tinged with brown, hypothecium brownish, central portion hyaline outer cells dark brown. Paraphyses slender, filiform. Asci cylindrical. Spores hyaline, ellipsoid, 15-20 mic. long and 8-10 mic. wide.

Growing on partly buried sticks in the woods.

Coll. Bruce Fink, W. G. Stover, Freda M. Bachman, July 19, 1907. Bruce Fink, W. G. Stover, June 22, 1908. Freda M. Bachman, Aug. 6, 1908.

### Order III. HELVELLALES.

Mycelium within the substratum. Receptacle sessile or stipitate, upper portion pileate, mitrate or clavate. Hymenium on the upper surface and exposed from the first. Fleshy or waxy, rarely gelatinous.

#### Family I. HELVELLACEAE.

Receptacle fleshy, stipitate, pileate or mitrate. Asci opening by opercula.

#### KEY TO GENERA.

- a — Pileus more or less deeply pitted.....*Morchella*  
a — Pileus more or less lobed.....*Helvella*

Genus I. MORCHELLA (Dill.) Pers. Sym. Meth. Fung. 618.  
1801.

Type species, *Morchella esculenta* (L.) Pers.

Mycelium within the substratum. Ascophore composed of pileus and stipe, 7-24 cm. high. Pileus wholly adnate to the stipe or partially free, clavate, globose or conical, irregularly and more or less deeply pitted by the prominent anastomosing ribs, gray or brownish. Stipe hollow, bulbous near the base or cy-

lindrical throughout, narrowed at the base, granular or smooth, even or ribbed, white or light colored, interior more or less papillate or granular. Paraphyses colorless often stout. Asci cylindrical, long. Spores hyaline 8, smooth, elliptic or oblong-elliptic. Growing on the ground in spring. Edible.

## KEY TO SPECIES.

- a—Pileus partially free from the stipe.....*semilibera*  
 a—Pileus attached to stipe.  
   b—Stipe granular .....*crassipes*  
   b—Stipe not granular.  
     c—Pileus rounded .....*esculenta*  
     c—Pileus conical .....*esculentaconica*

*Morchella esculenta* (L.) Pers. Syn. Fung. 618. 1801.

*Phallus esculenta* L. Sp. Pl. 4: 1178. 1753.

Solitary or in groups, 8-12 cm. high. Stipe frequently bulbous, white, smooth, or granulose, often somewhat wrinkled about equal to the pileus in length, 1.5-2.5 cm. thick. Pileus very irregular in shape, ribs branching in any direction and thick with quite broad edges and these usually white, pits deep, varying in size and shape, brown or brownish-gray. Hymenium and hypothecium almost colorless. Paraphyses filiform, septate, stout. Asci long cylindrical. Spores elliptic, 15-23 mic. long and 8-12 mic wide, hyaline.

Very common on the ground in spring, most often under trees.

Coll. Freda M. Bachman, April 20, 1908. W. G. Stover, April 29, 1908. H. W. Fink, L. O. Overholts, May 2, 1908.

+*Morchella esculenta conica* Fr. Sys. Mycol. 2: 7. 1822.

Pilus conical, pits more or less rectangular and usually quite narrow, ribs extending longitudinally with transverse branches. Spores oval, hyaline, 15-17 mic. long and 9-12 mic. wide.

Very similar to *Morchella esculenta* (L.) Pers. and found with it.

Coll. Freda M. Bachman, April 18, 1907.

Fries in Sys. Mycol. 2: 7. 1822 gives this as a subspecies of *M. esculenta*. Boudier in Histoire et Classification de Discomycètes d'Europe gives *conica* as a distinct species and describes it as having a partially free pileus. It is evident that our plant is the one described by Fries and not the species now often described by Europeans as *M. conica*.

+*Morchella crassipes* Pers. Syn. Fung. 621. 1801.

Solitary or in groups, 16-24 cm. high. Stipe much larger near the base but constricted just at the base, white or yellowish, very granular, much furrowed, usually somewhat longer than the pileus. Pileus oblong or somewhat conical, the ribs extending in various directions, and quite thick but with thin edges, pits deep, varying in size and shape, yellowish-brown. Hymenium and hypothecium almost colorless. Paraphyses septate, sometimes slightly enlarged upward, stout. Asci cylindrical. Spores oval, hyaline, 22 mic. long and 14 mic. wide.

Growing on the ground in the woods.

Coll. L. O. Overholts, May 2, 1908.

+*Morchella semilibera* De Cand. Fl. Fr. 2: 212. 1805.

Solitary or in groups, 10-15 cm. high. Stipe 10-12 cm. long, narrowed at the base, mealy, fragile, very pale yellow. Pileus bell shaped, 2-3 cm. long, except at the apex free from the stipe, pits shallow and radiating from the apex of the pileus, ribs narrow with few branches. Paraphyses septate, filiform. Asci cylindrical. Spores hyaline, oval, 24 mic. long and 15 mic. wide.

On the ground in rather shady places in spring.

Coll. Bruce Fink, W. G. Stover, May 2, 1907. Freda M. Bachman, April 25, 1908.

Genus II. *HELVELLA* L. Gen. Pl. 493. 1754.

Type species, *Helvella mitra* L.

Mycelium within the substratum. Ascophore consisting of stipe and pileus, 3-16 cm. high. Pileus irregular, often lobed, margin often adhering in several places to the stipe, fruiting surface above, glabrous, pruinose or villous beneath, waxy-mem-

branaceous, variously colored. Stipe hollow or stuffed, stout or slender, even, lacunose or ribbed, attached to the pileus at its center. Paraphyses linear, often clavate, hyaline or colored. Asci long, cylindrical. Spores 8, smooth, elliptic or oblong elliptic, hyaline.

Growing in the ground or decaying wood. Most of the species are said to be edible.

*Helvella elastica* Bull. Champ. 289. pl. 242. 1791-98.

Solitary, about 10 cm. high. Stipe slender, whitish, attenuated upward, even or somewhat ribbed near the base, pruinose or smooth, at first stuffed, later hollow. Pileus saddle-shaped, grayish above, white or whitish beneath, 2-3 cm. broad. Paraphyses septate, ends clavate. Asci cylindrical. Spores containing one large oil globule, broadly elliptic, 18-20 mic. long and 10-12 mic. wide.

Found growing on the ground under trees.

Coll. Freda M. Bachman, May 25, 1908.

Genus III. *GYROMITRA* Fr. Sum. Veg. Scand. 346. 1849.

Type species, *Gyromitra esculenta* (Pers.) Fr.

Mycelium within the substratum. Ascophore composed of pileus and stipe. Pileus fleshy, varying in shape, attached to the stipe, more or less inflated, upper surface ribbed, ribs variously branched, hymenium on the outer surface. Paraphyses linear. Asci cylindrical. Spores 8, elliptical, smooth.

Growing on the ground or decayed wood.

*Gyromitra brunnea* Underwood Proc. Ind. Acad. Sci. for 1893. 33. 1894.

Solitary or in groups, 6-9 cm. high. Stipe stuffed, later hollow, pubescent near the base, smooth above, white or creamy in color, usually larger at the base, 1.5-2 cm. thick. Pileus quite irregular, attached at various points to the stipe, surface convoluted, reddish brown in color, under side almost white and finely pubescent. Hymenium and hypothecium brownish. Paraphyses stout, septate, clavate, sometimes branched, dark brown

at the ends. Asci cylindrical. Spores elliptical, containing 1-3 oil globules, hyaline, 20-24 mic. long and 12-14 mic. broad.

Found growing in the ground in the woods.

Coll. Freda M. Bachman, May 2, 1908.



## INDEX TO ORDERS, FAMILIES, GENERA AND SPECIES.

	PAGE.		PAGE.
aeruginosum .....	48	erinaceus .....	36
Arachnopeziza .....	49	esculenta .....	64
Ascobolaceae .....	37	esculentaconica .....	64
Ascobolus .....	37		
Ascophanus .....	40	faginea .....	26
atrofuscus .....	39	flöccosa .....	45
atrata .....	60	furfuraceus .....	38
aurelia .....	49	fuscocarpa .....	32
auricolor .....	58	fusicarpa .....	34
badia .....	30	Geopyxis .....	33
brunnea .....	66	Gyromitra .....	66
Cenangiaceae .....	61	Helvella .....	65
chlora .....	47	Helvellaceae .....	63
Chlorosplenium .....	46	Helvellales .....	63
ciliaris .....	51	Helotiaceae .....	41
cinerea .....	54	Helotium .....	42
cinerella .....	54	hemispherica .....	34
citrinum .....	43	herbarum .....	42
clavispora .....	60	Humaria .....	32
coccinea .....	46	hyalina .....	56
coccinella .....	58	hyalinosulfurea .....	56
confluens .....	36		
convexula .....	32	immersus .....	38
Coryne .....	52		
craterium .....	62	Karschia .....	59
crassipes .....	65		
		Iachnea .....	33
Dasyscypha .....	50	Lachnella .....	44
delicatula .....	49	Lasiobolus .....	41
depauperatus .....	39	lignyota .....	59
dilutella .....	56	lividofusca .....	55
Discina .....	28		
Durella .....	60	Morchella .....	63
elastica .....	66	Mollisia .....	54
equinus .....	41	Mollisiaceae .....	53



70 *Index to Orders, Families, Genera and Species.*

	PAGE.		PAGE.
nebulosa .....	33	saccharinus .....	40
nivea .....	52	Saccobolus .....	39
occidentalis .....	46	sarcoides .....	52
olivacea .....	61	Sarcoscypha .....	45
Ombrophila .....	53	Sarcosoma .....	62
Orbilina .....	57	Sclerotinia .....	48
		scutellata .....	35
		scutula .....	44
pallescens .....	43	semilibera .....	65
papillaris .....	44	setosa .....	35
Patellaria .....	60	stevensoniana .....	31
Patellariaceae .....	59	Stictidaceae .....	26
Patinella .....	59		
patula .....	50	Tapesia .....	54
Peziza .....	28	tuberosa .....	48
Pezizaceae .....	27	turbinulata .....	51
Pezizales .....	27		
Pezizella .....	55	Urnula .....	62
Phacidiales .....	26		
Phialea .....	43	venosa .....	29
Plicaria .....	29	versiforme .....	47
Propolis .....	26	vesiculosa .....	31
Pustularia .....	31	Vinosa .....	57
Pyronema .....	36	violascens .....	53
Pyronemaceae .....	36	virginea .....	51
repanda .....	30	xanthostigma .....	55
reticulata .....	28	xylita .....	56
rufa .....	63		



Q

11

G22

NH

Proceedings  
Special papers

no. 9-12, 14