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Transactions of the Wisconsin Academy of Sciences, Arts and Letters. volume XVII, Part II, No. 3 1914

Madison, Wis.: Wisconsin Academy of Sciences, Arts and Letters, 1914

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TRANSACTIONS
OF THE
WISCONSIN ACADEMY
OF
SCIENCES, ARTS, AND LETTERS

VOL. XVII, PART II, NO. 3

MADISON, WISCONSIN

1914

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The annual half-volume of the Transactions of the Wisconsin Academy of Sciences, Arts, and Letters is issued in six numbers, under the editorial supervision of the Secretary.

The price of this number is \$1.00.

SPECIES OF PHOLIOTA AND STROPHARIA IN THE REGION OF THE GREAT LAKES.

EDWARD T. HARPER.

Collections made on Neebish Island, Mich. in the autumn of 1911 have enabled us to add three plates to the photographs of species of *Pholiota* published in the Transactions of the Wisconsin Academy of Sciences, Arts and Letters, Vol. XVII, Part I, 470-502. We also give six plates of species of the closely related genus *Stropharia* found in this region with a synopsis of the genus and the species reported from the United States.

PHOLIOTA

THE PHOLIOTA TOGULARIS GROUP.

Pholiota blattaria Fr. Plate LIX

Five plants of the *Pholiota togularis* group which seem to belong to this species were found growing by the side of driftwood in sandy soil on the shore of St. Mary's river and among chips near an old mill on Neebish Island, Mich., in October.

PILEUS thin, conic to broadly campanulate or subumbonate and expanded, smooth or slightly rugose, striatulate on the margin, dark watery ferruginous, becoming paler in drying. **LAMELLAE** close, ventricose, rounded behind and very slightly attached to the stem, whitish, becoming rusty with spores, edge whitish and minutely denticulate. **STEM** equal or slightly enlarged below, fistulose, silky fibrillose below and white prui-

nose above, pallid becoming brown toward the base. ANNULUS white, entire, striate with ridges on the upper surface, only slightly attached to the stem. SPORES ferruginous, elliptical 4—6x9—12 μ .

The plants differ from *Pholiota togularis* in the dark ferruginous, striatulate, hygrophanous pileus and the rounded lamellae only slightly attached to the stem. Fries' remark that *Pholiota blattaria* is "a *Galera* with a ring" fits our plants exactly.

The plants are also very close to *Pholiota rugosa* Pk which is reported from Michigan by Kauffman. Dr. Peck says *Pholiota rugosa* differs from *Pholiota blattaria* in the colors, the adnexed lamellae and the larger spores. In our plants the colors seem to agree with the descriptions of *Pholiota blattaria*, the gills are only slightly if at all adnexed and the spores are somewhat smaller than the measurements given for *Pholiota rugosa*, 6—7x10—12 $\frac{1}{2}$ μ and if we may judge from Cooke's illustration Pl. 1173 about the size of the spores of *Pholiota blattaria*. The striate annulus which is a striking feature of the plant and described by Peck is not mentioned in the descriptions of *Pholiota blattaria* which we have seen but *Pholiota togularis* is said to have a striate annulus and the small variety *Pholiota togularis* var. *filaris* is so figured by Fries. Saccardo's *Sylloge* contains the remark that while very distinct *Pholiota blattaria* is easily confused with the small form of *Pholiota togularis*. Peck suggests that *Pholiota rugosa*, *Pholiota filaris* and *Pholiota togularis* may all be forms of a single species.

Pholiota blattaria is reported from this country by Peck, Rep't 39, p. 40, but it is not included among the New York species in Bull. 122.

SECTION SQUAMOSAE.

Pholiota fulvo-squamosa Pk. Pl. LX

Beautiful plants of the squamose type of *Pholiota* were collected on Neebish Island, Michigan, in October. They grew on

the ground in mixed woods attached to the roots of rotten stumps.

PILEUS convex or lenticular with the margin incurved, becoming plane, obtuse, covered with a tawny fibrous coat, torn into fibrous tufted squarrose scales, the lighter straw colored background showing in the cracks, smoother and appressed scaly in wet weather, center darker and the fibrous coat less torn, margin ragged but not striate. **LAMELLAE** broad, narrower toward the stem, adnate, whitish, becoming dark cinnamon, with a whitish minutely ragged edge. **STEM** even, solid, becoming stuffed or hollow, covered below the ring with white fibrous, tawny tipped, erect or reflexed scales, slightly floccose above the ring. **ANNULUS** membranous, broad, well defined, covered on the under side with a scaly coat like that on the pileus and stem, ragged on the edge, the upper surface striate with ridges where the veil tore from the gills. **FLESH** solid, white. **SPORES** dark ferruginous brown 4—5x6—8 μ .

The plants agree very closely with the description of *Pholiota fulvo-squamosa* Pk. to which species we have referred them. We did not notice the radish odor nor the change to brown when the flesh was cut and there was only a slight collar, shown by the gills remaining attached to each other when separated from the stem, but the marked agreement in size, shape, the tawny, scaly coat covering the whole plant, including the broad under surface of the annulus, the size of the spores and the habitat leave little doubt of the identity of the plants. The type specimens of *Pholiota fulvo-squamosa* were collected about the base of oak trees at Lansing, Mich., by B. O. Longyear.

The identification was confirmed by Dr. Peck.

THE *PHOLIOTA* MARGINATA GROUP.

Pholiota marginata Batsch. Pl. LXI, A.

The plants illustrated in Plate LXI, A. were collected on dead alders in October. The margin of the pileus when expanded was deeply and coarsely striate. Otherwise they agreed exactly with the plants referred to *Pholiota marginata* in the Trans. Wis. Acad. Sci. XVII Plates LIV and LV.

Pholiota discolor, Pk. Pl. LXI, B.

The plants in Plate LXI B. grew on a poplar stump on Neebish Island, Mich., in October. They showed the characteristic feature of *Pholiota discolor*, Pk. Pileus dark tawny brown, watery and viscid when moist becoming bright ochraceous yellow when dry. In other respects the plants resembled *Pholiota marginata*.

Peck's description of *Pholiota discolor*, N. Y. state Mus. Bull. 122, p. 156, is as follows: "Pileus thin, convex, becoming nearly plane, or slightly depressed, glabrous, viscid, hygrophanous, cinnamon rufous and striatulate on the margin when moist, bright ochraceous yellow when dry. LAMELLAE narrow, close, pallid or whitish, becoming ferruginous. STEM equal, hollow, fibrillose, whitish or pallid, sometimes with a white myceloid tomentum at the base, the ANNULUS distinct, persistent, SPORES elliptic $5 \times 7\frac{1}{2} \mu$."

Pileus 8—16 lines broad, stem 1.5—3 inches long, about one line thick.

Single or caespitose, decaying wood and prostrate trunks of trees in woods, not rare, July to October."

Peck remarks that it is separated from *Pholiota autumnalis* by the viscid pileus. Our plants seem scarcely more than a form of *Pholiota marginata* or *Pholiota unicolor*.

STROPHARIA

The genus *Stropharia* is small. Less than twenty-five species have been reported from the United States. The plants of the group are characterized by purple brown spores, adnate lamellae, a well developed annulus and no volva. The genus corresponds to *Pholiota* in the rusty spored series, *Armillaria* in the series with white spores and *Anellaria* among the agarics with black spores. In the purple brown series it is distinguished from *Agaricus* by the adnate gills and from *Hypholoma* by the veil remaining as a well developed ring on the stem rather than clinging in fragments to the margin of the pileus. But the distinctions are not well marked in all the species. It is especially

difficult to draw the line between purple brown and rusty brown spores, and the method of tearing of the veil varies in different plants in the same species.

The genus falls naturally into two groups: plants growing on the ground or on rotten wood, *Mundae* (clean), and plants growing on dung, *Merdariae*. Of the species growing on the ground some have a viscid pileus, *Viscipelles*, and others have the pileus dry and more or less squamose, *Spintrigerae*. The species growing on dung closely resemble forms of *Panaeolus* and are separated by their spore color alone.

With the exception of *Stropharia semiglobata* the species of *Stropharia* are not common and have little value as food plants. Some like *Stropharia aeruginosa* are suspected of being poisonous. As they grow on the ground and rotten logs they do little damage to other plants or to timber and hence have little economic significance.

SYNOPSIS OF THE SPECIES.

A. Growing on the ground, *Mundae*.

I. With a viscid pileus, *Viscipelles*.

The *Stropharia depilata* group. Pileus brown or yellow covered with a thick glutinous pellicle and the stem usually covered with white, floccose, squarrose scales.

Stropharia depilata (Pers.) Pls. LXII, LXIII.

Related species: *Stropharia hardii*, Atk.

The *Stropharia aeruginosa* group. Pileus covered with green gluten. Stem scaly or smooth.

Stropharia aeruginosa (Curt.) Pl LXIV.

Related species: *Stropharia albo-cyanea*, Desmaz., *Stropharia micropoda*, Morg.

The *Stropharia coronilla* group. Pileus viscid but not glutinous, stem smooth. Plants resembling those of the *praecox-dura* group in the genus *Pholiota*.

Stropharia coronilla, Bull. Pl. LXV A.

Stropharia obturata, Fr. Pl. LXVI ABC.

Related species: *Stropharia bilamellata*, Pk. *Stropharia melasperma*, Bull. *Stropharia drymonia*, Morg. *Stropharia caesifolia*, Pk.

The *Stropharia squamosa* group. Pileus viscid when moist and scaly.

Stropharia squamosa, Fr. *Stropharia squamosa*, var. *aurantiaca* (Cke.) Pk.

II. Pileus not viscid, dry and squamose, *Spintrigerae*.

Stropharia caput-medusae, Fr., *Stropharia schraderi*, Pk., *Stropharia magnivelaris*, Pk., *Stropharia feildeni*, Berk.

B. Growing on dung, *Merdariae*.

The *Stropharia merdaria* group.

Stropharia submerdaria, Britz. Pl. LXVI GHI.

Stropharia stercoraria, Fr. Pl. LXVII.

Stropharia semiglobata, Batsch.

Stropharia umbonatescens, Pk. Pl. LXV B.

Stropharia siccipes, Karst. Pl. LXVI DEF.

Related species: *Stropharia merdaria*, Fr. *Stropharia siccipes* Karst., *Stropharia siccipes* var. *radicata* Pk. *Stropharia mammillata*, Kalch.

DESCRIPTION OF THE SPECIES.

A. Growing on the ground or on rotten wood.

I. Pileus viscid.

THE STROPHARIA DIPILATA GROUP.

Stropharia depilata, (Pers.) Pls. LXII and LXIII

Plants of this species are frequent in the northern woods in autumn. We have collected them near Lake Rosseau, Ontario, and on Neebish Island, Mich. They grow on the ground and on rotten logs and stumps. The plants are good size with the pileus very glutinous in wet weather and the stem covered with white curly floccose scales. The photographs show the average size but much larger plants occur.

PILEUS thick and solid, convex to plane or broadly umbonate, obtuse, smooth, even on the margin, very glutinous in wet weather, brown or yellow cinnamon, margin appendiculate with bits of the veil when young. LAMELLAE adnate with decurrent lines on the stem, broad, white, becoming purple black. FLESH whitish, solid. STEM solid, becoming hollow with age, equal, squarrose below the annulus with white floccose scales, floccose

scaly above the annulus, whitish or yellowish. ANNULUS membranaceous with a ragged margin, white floccose below and striate with even ridges on the upper surface. SPORES purple brown, $6-8 \times 10-12 \mu$.

NOTE—*Stropharia hardii*, Atk. in Hard's Mushrooms, Edible and Otherwise, pp. 321-322, is based on plants similar to *Stropharia depilata* if we may judge from the description and photograph. The size, pale bright ochraceous pileus and transversely floccose stem suggest *Stropharia depilata* but the spores are only $3-5 \times 5-9 \mu$ and it is not said whether the pileus is viscid or dry though it appears viscid in the photograph.

Stropharia aeruginosa, (Curt.) Pl. LXIV.

The plants photographed grew on the ground in a grassy place by a brush pile, Neebish Island, Mich., October, 1911. They are smaller than *Stropharia depilata* but have a similar thick glutinous pellicle on the pileus and curly white scales on the stem. The gluten is bright green as in some species of *Hygrophorus* but the plants become white or stained with red or yellow as the dry.

PILEUS convex to plane or umbonate, smooth or squamose, even on the margin, covered with a thick green gluten which stains reddish or yellowish or fades to white in drying. FLESH watery white. LAMELLAE close, ventricose, broadly notched and linear decurrent on the stem, whitish turning to pink and dark brown mottled, STEM even or slightly enlarged and white myceloid at the base, smooth or silky above the annulus, floccose scaly below, greenish or bluish becoming white or more or less cinereous at the base. ANNULUS fibrous, stained with the spores, SPORES dark brown with a rusty rather than a purple tinge $4-5 \times 8-10 \mu$.

NOTE—*Stropharia albo-cyanea*, Desmaz occurs in our region. It is smaller than *Stropharia aeruginosa* with a green viscid pileus but a white dry stem. It agrees with *Stropharia aeruginosa* in habit and place of growth. The distinguishing marks are the small size and white dry stem. This is *Stropharia pseudocyanea* in Morgan's Revision of North American species of *Stropharia* Jour. Myc. April, 1908, p. 74.

Stropharia micropoda, Morg., Jour. Myc. April, 1908, p. 73, was described from plants growing subcaespitose on dead branches of oak and hickory at Preston, Ohio. The plants are about the size of *Stropharia albo-cyanea* and have the pileus covered with similar green

gluten, the spores also are of the same size but the stem is pale yellow above, livid below and fibrillose scaly. The species appears to be very close to *Stropharia aeruginosa*. W. G. Stover suggests that it is a form of *Flammula polychroa*.

THE STROPHARIA CORONILLA GROUP.

***Stropharia coronilla*, Bull. Pl. LXV A.**

The plants illustrated grew on the ground in the grass near a garden, Madison, Wis., June, 1911. The general appearance is like that of *Pholiota dura* and the place of growth is similar so that the plants might easily have been taken for that species, but there is no rusty tinge to the spores and the annulus has the ridges characteristic of *Stropharia coronilla*.

PILEUS fleshy, firm, hemispheric to convex and expanded, smooth and slightly viscid, even and white floccose on the margin, sometimes appendiculate with pieces of the veil, whitish or yellow ochraceous, darker in the center. LAMELLAE broad, rounded and adnexed or very slightly notched at the stem, whitish becoming violet and purple black. FLESH firm, solid, white. STEM even or tapering slightly upward and narrowed to a point below, solid or stuffed, smooth, white or with yellowish tints. ANNULUS thick easily separating from the stem, sometimes adhering to the margin of the pileus, floccose below, with radiating ragged ridges on the upper surface which are at first white then stained purple from the falling spores, SPORES purple brown or black 4—6x9—12 μ .

In N. Y. State Mus. Bull. 122, p. 140, Dr. Peck gives a comparison between *Stropharia bilamellata* and *Stropharia coronilla*. Our plants agree with *Stropharia bilamellata* in the white or yellowish rather than the tawny ochraceous pileus, but in the other points of the comparison, stem pointed at the base, annulus sulcate plicate rather than with broad white gills, and smaller spores, our plants agree with *Stropharia coronilla*, hence we do not hesitate to refer them to the European species. The species is distributed in N. A. F. 3511. My copy shows spores 5—6x8—11 μ and the peculiar annulus.

***Stropharia obturata*, Fr, Pl. LXVI ABC.**

I am indebted to Dr. W. S. Moffatt of Wheaton, Ills., for the photograph of this species. The plants grew on the ground among dead leaves in woods at Glen Ellyn, Ills., in September. Dr. Moffatt referred the plants with some doubt to *Stropharia obturata* but did not preserve the specimens. The plants agree well with the description of that species except that they are larger, often larger than the photograph and the stems do not taper downward. The spores are brown, $5 \times 6 \mu$.

Stropharia obturata is described as follows: PILEUS 1—2½ inches broad, fleshy, quite thick, convex to plane, obtuse, nearly dry, even on the margin, becoming rimosely squamulose, light yellow. FLESH compact, white. LAMELLAE adnate without a tooth, whitish becoming purple brown, never rusty. STEM. 1—1½ inches long, 3 lines and more thick, firm, stuffed, slightly attenuated downward, not scaly, white, ANNULUS thick, white, SPORES purple brown $4 \times 7 \mu$ or $6 \times 9 \mu$.

We desire to include the photograph with our illustrations because it shows another form of a group of plants which need further observation. This plant, the one figured in Trans. Wis. Acad. Sciences Arts and Letters XVII Part I Pl. XXV, *Stropharia drymonia*, *Stropharia melasperma*, reported from New York by Peck, *Pholiota howeana*, Pk. and several others are closely related and the differences between them not well known. Sylloge furthermore expresses doubt whether *Stropharia obturata* is distinct from *Stropharia coronilla*.

NOTE—*Stropharia melasperma*, Bull., reported from New York by Peck, N. Y. State Mus. Bull. 105, p. 28, is a small plant with the pileus 1–2 inches broad and stem about 1 inch long growing in grassy places. The pileus is smooth, white or yellowish, viscid in wet weather, never rimose scaly, stem white or yellowish with a medial ring, Lamellae ventricose, rounded or emarginate. It appears to differ from *Stropharia obturata* in the pileus not being rimose scaly and the rounded gills.

Stropharia drymonia, Morg., Jour. Myc. April, 1908, p. 73, was based on plants growing on and near rotten wood at Preston, Ohio. They were large plants with the pileus 2½–4 inches broad and the stem 3–6 inches long, pileus smooth and viscid, pale ochraceous, flesh thick and white and a smooth white stem. The gills were close, narrow, white becoming brown with small brown spores 3–4x5–6μ.

Stropharia caesifolia, Pk. Torr. Bul. 1895, p. 489, is a plant which belongs to this group. Pileus one to two inches broad, convex, white with a brownish center. Lamellae rounded or emarginate blueish brown. Stem solid, white with a white annulus, spores 6—8x10—13 μ . The only characteristic mark of the plant was the color of the gills. The type specimens were collected by E. Bartholomew growing in sandy pastures in Kansas.

THE STROPHARIA SQUAMOSA GROUP.

NOTE—We have no photographs of *Stropharia squamosa*. The species seems to be a variable one. In N. Y. State Mus. Rep't 44, p. 36, Peck remarks "Specimens (of *Stropharia squamosa*) collected near Salamanca agree very closely with this species, but they differ in having the pileus of a beautiful orange red color. In this respect and indeed in many other respects they agree better with the description of *Stropharia thrausta*, but disagree in having the pileus neither hygrophanous nor glabrous. The plants are generally rather slender, though individuals occur having a stout stem and a pileus three or four inches broad. This is viscid and beautifully adorned with whitish superficial scales which are easily destroyed. The margin is often appendiculate. The lamellae are broad and subdistant and the stem is long, hollow, floccose squamose and annulate. The whole plant is fragile, but this may be due in a measure to the fact that it is apt to be infected by the larvae of insects. It is probably to be considered a variety of *S. squamosa* and is apparently equivalent to *Agaricus thraustus* var. *aurantiacus* of Cooke's Illustrations."

Massee in Eu. Fung. Fl. p. 210, gives *Stropharia squamosa*, Fr. with two varieties.

Var. *thrausta* (Ag. *thraustus* Kalch.) Slender, fragile, hygrophanous, not scaly. Spores 6x12—15 μ .

Var. *aurantiaca*, Cke. Pileus orange or brick red.

II. Pileus with no viscid pellicle, dry and squamose.

NOTE—As far as we know no plants belonging to this division have been collected in our region. *Stropharia caput-medusae*, Fr. is reported in Farlow's Index. *Stropharia schraderi*, Pk. is described from specimens collected near Washington, D. C. *Stropharia feildeni*, Berk. and *Stropharia magnivelaris*, Pk. are from the arctic regions.

B. Growing on dung.

THE STROPHARIA MERDARIA GROUP.

Stropharia submerdaria, Britz. Pl. LXVI GHI.

Stropharia merdaria, Fr. appears to have two forms a larger form with the pileus about two inches in diameter and a smaller form with the pileus half as broad. In Stevenson's British Fungi the large form is described and the small form mentioned while the reverse is the case in Sylloge, the small form is de-

scribed and the large form mentioned. Stevenson gives $6 \times 9 \mu$ as the spores measurements and Sylloge $5 \times 8 \mu$ noticing also the larger measurements $6-8 \times 12-16 \mu$ of Karsten and Britzelmayr. The latter author has described what appears to be the small form with large spores as *Stropharia submerdaria*. Morgan has reported this species from Preston Ohio and considers it a form of *Stropharia merdaria*.

We have collected what appears to be the same plant growing on dung at River Forest, Ills. and Blue Mounds, Wis. The photograph is from the River Forest specimens. Dr. Moffatt has also collected the plant at Wheaton, Ills. The description of *Stropharia submerdaria* is given in Revis. Hymenomyce, III, p. 13. "PILEUS 3 cm. broad, hemispherical, umbonate or depressed, dull yellow, STIPE 6 cm long, 4 mm thick, base either attenuated or thickened, fibrous, white, annulus scanty, LAMELLAE not crowded, yellowish brown, often denticulate, SPORES brown with a violaceous tint, dark violaceous in mass, acute at one or both ends, $6-8 \times 12-14 \mu$."

Our notes give the pileus as "cream color or yellow, lighter on the margin, deeper yellow on the umbo." Dr. Moffatt's notes read "dark watery brown when young and moist becoming pallid tan." The stem is minutely white floccose becoming glabrate, annulus scanty. The photographs show scarcely any remains of the annulus. The dark violaceous brown, almost vinous color of the spores is characteristic. The plants have much in common with *Psilocybe coprophila*, Bull. which also grows on dung, but has no trace of an annulus, the gills are slightly arcuate and the pileus is white and downy when young.

***Stropharia stercoraria*, Fr. Pl. LXVII.**

This, like all the other plants of the group, grows on dung or well manured ground.

PILEUS hemispherical becoming expanded, smooth, viscid, the viscid pellicle cracking as the pileus dries, even on the

margin, whitish or various shades of cream color and yellow. LAMELLAE broad, adnate, sometimes with a broad shallow sinus, decurrent in lines on the stem, white becoming purple black. STEM stuffed with a pith, equal or enlarging and somewhat bulbous at the base, white or cream color, flocculose below the annulus, viscid with the pellicle cracking as on the pileus. ANNULUS slight and evanescent, near the middle of the stem. SPORES elliptical, dark purple, $10 \times 16 \mu$.

This species is not so common as the following *Stropharia semiglobata*. It is distinguished by the more expanded pileus, the stuffed and more floccose stem, the larger size, larger spores and plane not clouded gills. In our observation these distinctions do not always hold good. The plants photographed have all the marks of *Stropharia stercoraria* except that the gills are clouded. We have found *Stropharia semiglobata* with spores as large as any ascribed to *Stropharia stercoraria*. Lloyd's photograph of *Stropharia semiglobata* in Hard's, mushrooms fig. 260 resembles ours. We take Atkinson's illustration, fig. 30 to be more typical *Stropharia semiglobata*.

***Stropharia semiglobata*, Batsch.**

This is the most common species of *Stropharia*. It is found everywhere on dung and manured ground. Illustrations are numerous. Atkinson, Mushrooms, fig. 30 is a good photograph of the species. It resembles *Stropharia umbonatescens*, Pl. LXV A. except that the pileus is exactly hemispherical.

PILEUS fleshy in the center, hemispherical, not expanding, smooth, even on the margin, viscid, light yellow. LAMELLAE, broad adnate, whitish and becoming mottled purple brown or black. STEM equal, smooth, fistulose, viscid, light yellow, sometimes slightly enlarging at the base. ANNULUS a fibrous ring stained with spores. SPORES elliptical $8-9 \times 13-14 \mu$ or larger.

***Stropharia unbonatescens*, Pk. Pl. LXV B.**

The plants were collected on Neebish Island, Mich., in September. They agree well with Peck's description, N. Y. State Mus. Rep't 30 p. 41. The plants are very close to *Stropharia mammillata*, Kalch, and probably belong to that species but the pileus is rather umbonate than papillate and the spores are elliptical rather than ovate or pyramidal as in the description of *Stropharia mamillata*. Peck's description reads: "PILEUS at first conical, subacute, then expanded and umbonate, smooth, viscid, yellow, the umbo inclining to reddish. LAMELLAE, plane, broad, at length ventricose, blackish brown with a slight olivaceous tint. STEM equal, slender, hollow, generally a little paler than the pileus, SPORES purplish brown, almost black, $10 \times 15-18\frac{1}{2}\mu$."

Plant 3—4 inches high, pileus 6—12 lines broad, dung in pastures, September."

Peck remarks that the plant has probably been confounded with *Stropharia semiglobata* and *Stropharia stercoraria* but that he has separated it on account of the peculiar pileus.

***Stropharia siccipes*, Karst. Pl. LXVI DEF.**

The plants photographed grew on cow dung in a pasture at Blue Mounds, Wis., in June. The stems were dry and floccose and the whitish clay color of the caps was quite distinct from the yellow tints of *Stropharia semiglobata*. The species is described as intermediate between *Stropharia stercoraria* and *Stropharia semiglobata*, differing from the former in the shorter dry stem and the color and from the latter in the stuffed, dry, flocculose stipe as well as color. We have collected the species a number of times and also have specimens from New York state.

PILEUS slightly fleshy, from hemispherical to expanded, obtuse, naked, even, or pellucid striate on the margin, viscid, whitish clay color, yellowish when dry. LAMELLAE adnate or subdecurrent, clay color to fuscous. STEM stuffed, soon hollow, straight or flexuous, smooth, finely fibrillose, flocculose, subflocculose or pruinose above the distant, dry, incomplete an-

nulus, pale, dry. SPORES ellipsoid, fuscous and pellucid
7—9x11—14 μ .

NOTE—*Stropharia siccipes radiata* Pk. N. Y. state Mus. Bull. 67 pp. 37—38 is a rooting form of *Stropharia siccipes*. Peck considers the roots due to the fact that the plant grew from manure buried in the earth.

Prof. A. P. Morgan, Journ. Myc. April, 1908, removes *Agaricus* (*Psilocybe*) *sullivantius* Mont and *Agaricus* (*Psalliota*) *foederatus*, B. & M. to the genus *Stropharia*. Both species were described from plants collected in Ohio by Sullivant. Until something more is known of such doubtful plants it seems best to leave them in the genera in which the author placed them.

Stropharia epimyces (Pk.) Atk. Plant World, June, 1907, has quite a history. It is probably the same as *Pilosace algeriensis*, Quel. as identified by Lanzi, Fungi mang. e nocini. Tav. LXII f. 3. See note in *Mycologia* May 1913.

Geneseo, Ills., Feb. 1911.

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mammillata	1023	
melasperma	1019	
merdaria	1020-21	
micropoda	1017-18	
obturata	1019	LXVI A B C
pseudo-cyanea	1017	
schraderi	1020	
semiglobata	1022	
siccipes	1023	LXVI D E F
var. radicata	1024	
squamosa	1020	
var. aurantiaca	1020	
var. thrausta	1020	
stercoraria	1021-22	LXVII
submerdaria	1020-21	LXVI G H I
sullivantia	1024	
umbonatescens	1023	LXV B

DESCRIPTION OF PLATES.

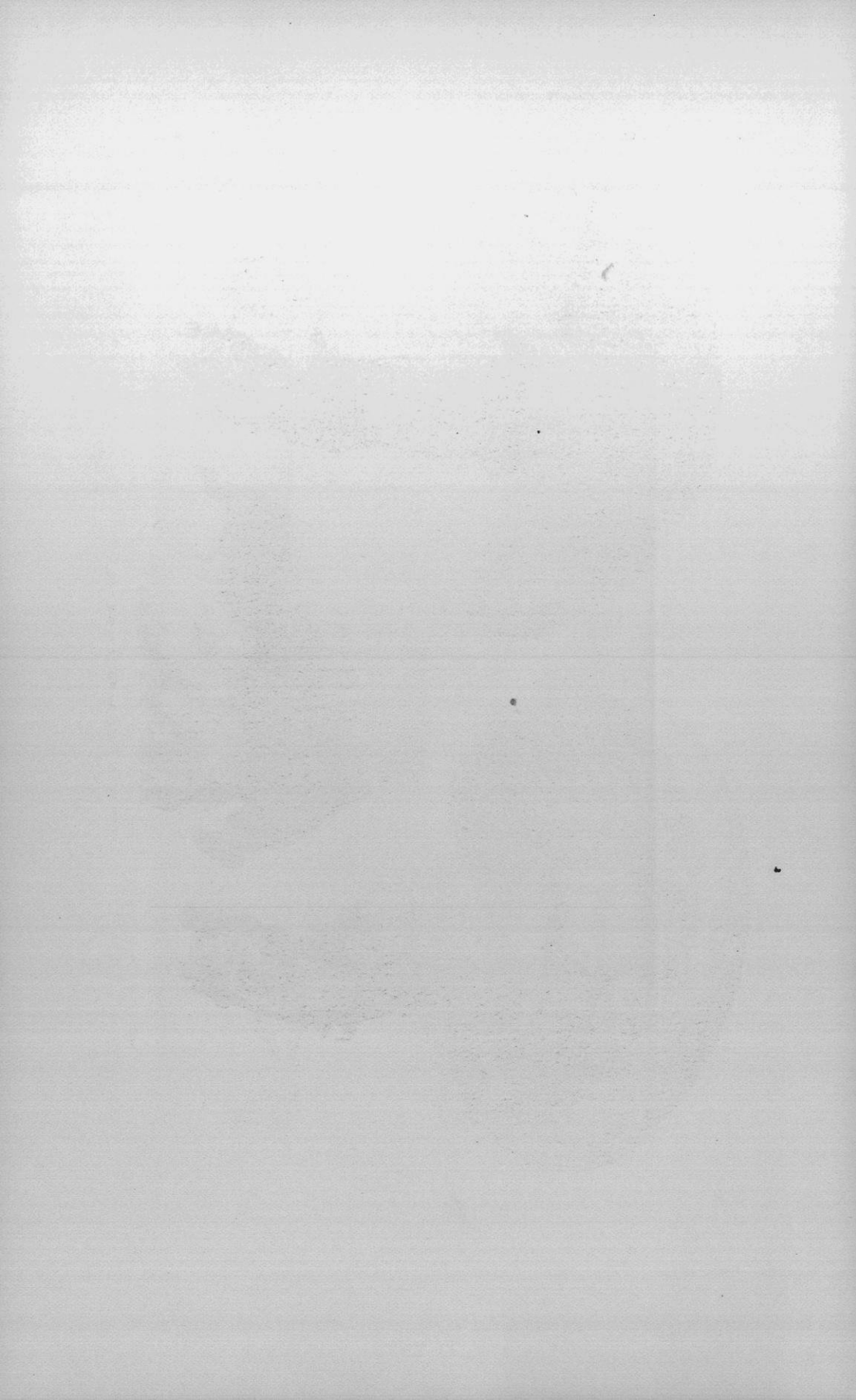
- Plates LIX. *Pholiota blattaria*, Fr. Plants in different stages of growth and part of a stem X4, showing the annulus.
- Plate LX. *Pholiota fulvo-squamosa*, Pk. Showing the stem, the upper and under surface of the pileus and part of a stem X4, showing the annulus.
- Plate LXI. A. *Pholiota marginata*, Batsch, showing the striate pileus, the gill surface and a young slender plant. B. *Pholiota discolor*, Pk., showing plants in different positions.
- Plate LXII. *Stropharia depilata* (Pers.) A. Cluster of three young plants. B. Part of a stem X4, showing the annulus with the striate upper surface.
- Plate LXIII. *Stropharia depilata*. A. Young plant showing the method of tearing of the veil. B. Older plant with expanded pileus, showing the stem with squarrose scales below the ring and lines decurrent from the gills at the top.
- Plate LXIV. *Stropharia aeruginosa* (Curt.) Fr. A. Two plants showing the scaly stems enlarged and myceloid below, fibrous ring stained with spores, floccose scales below the ring, gills with broad sinus and decurrent lines and umbonate pileus. B. Viscid surface of a pileus. C. Gill surface and hollow stem.
- Plate LXV. A. *Stropharia coronilla*, Bull., different views of plants and part of a stem X4, showing the enlarged annulus. B. *Stropharia umbonatescens*, Pk., showing plants in various positions.
- Plate LXVI. ABC. *Stropharia obturata*, Fr. Plant, upper surface of a pileus and section showing thick white flesh and stuffed stem. DEF. *Stropharia siccipes*, Karst., two plants and section showing the gills. GHI. *Stropharia submerdaria*, Britz. Showing two full grown plants and the gill surface.
- Plate LXVII. *Stropharia stercorearia*, Fr., A. Young plant showing the hemispherical pileus, the annulus with striate lines on the upper surface and the semibuinous base. B. Surface of a pileus with the viscid coat cracking into areas. C. Older plant with expanded pileus showing the stem and gill surface.

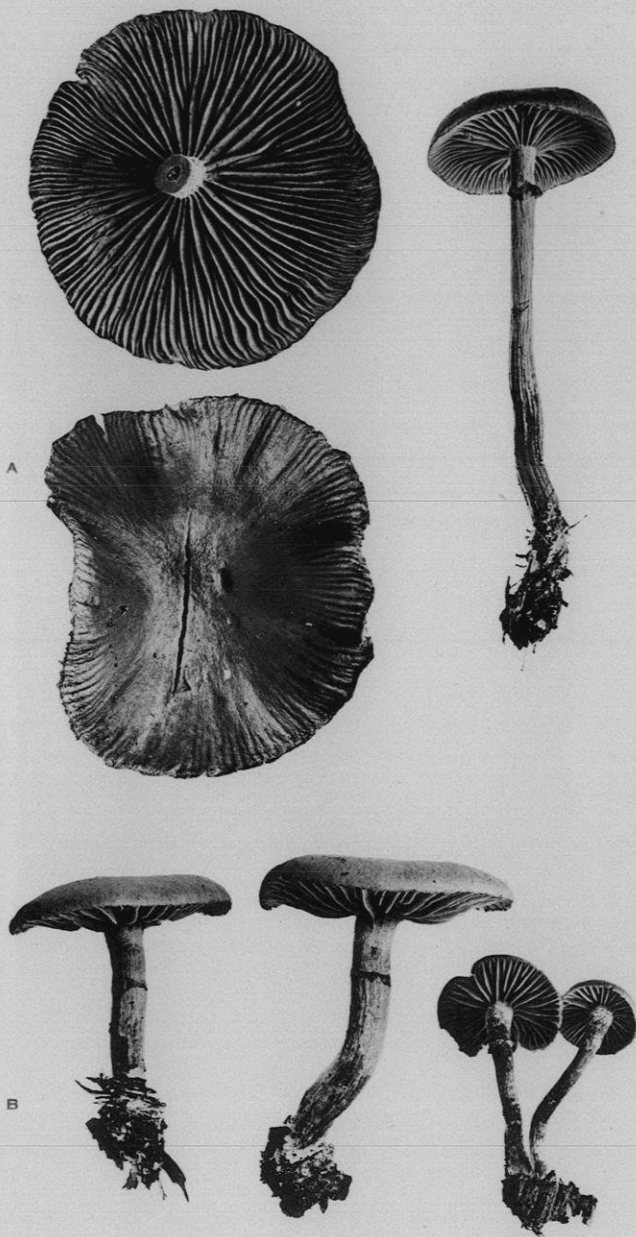


PHOLIOTA BLATTARIA, FR.



PHOLIOTA FULVA—SQUAMOSA, PK.





A. PHOLIOTA MARGINATA, BATSCH
B. PHOLIOTA DISCOLOR, PK.



STROPHARIA DEPILATA (PERS.)



B

A

STROPHARIA DEPILATA (PERS.)

HARPER-STROPHARIA



STROPHARIA AERUGINOSA (CURT.)

HARPER—STROPHARIA

COCKAYNE, BOSTON



STROPHARIA UMBONATESCENS, PK.

STROPHARIA CORONILLA, BULL.



A. B. C. STROPHARIA OBTURATA FR.
D. E. F. STROPHARIA SICCIPIES. KARST
G. H. I. STROPHARIA SUBMERDARIA BRITZ

HARPER STROPHARIA



STROPHARIA STERCORARIA, FR.

WISCONSIN DISCOMYCETES

B. O. DODGE.

The following list is based on specimens collected in Wisconsin by the writer and others whose names are indicated in the notes accompanying the species, and the specimens are incorporated in the herbarium of the University of Wisconsin. Much difficulty has been encountered owing to the unsatisfactory condition of the generic descriptions and through our lack of knowledge of the species of the Discomycetes occurring in North America. Until the North American species have been more fully compared with European species, any such list must be of a tentative nature.

Several local papers dealing with the Discomycetes of this country have been consulted freely in preparing this list. A number of American species have been described by Cooke and by Phillips & Plowright in various volumes of *Grevillea*. As early as 1876 Farlow began listing the fungi from the region about Boston. He notes some 25 species of Discomycetes in his "List of fungi found in the vicinity of Boston" (Bull. Bussey Inst., vol. 1:404-454, 1876; vol. 2:224-252, 1878), and later under "Notes on the Cryptogamic flora of the White Mountains" (Appalachia, vol. 3:232-277, 1884), he furnishes an additional list of 12 species of this class. The "Catalogue of the Pacific coast fungi" (Harkness and Moore, 1880) contains a list of 140 species. Earle (Contrib. U. S. Nat. Herb., vol. 6:150-263, 1901) brings together all of the species of the Alabama Discomycetes noted in the "Preliminary list of Alabama fungi" of Underwood and Earle (Alabama Exp. Sta. Bull 80, 1897), those mentioned by Atkinson in "Some fungi from Alabama" (Bull. Cornell Univ., vol. 3:1-50, 1897), and spe-

cies collected in that state since the publication of the previous lists. About 75 species are included in Earle's list.

Morgan (Discomycetes of the Miami valley, *Jour. Mycol.*, vol 8: 179-192, 1902) has described several new species from that region and has given the synonymy as he understood it of the 120 species listed. Miss Bachman has discussed about 70 species of Discomycetes from the vicinity of Oxford, Ohio (*Proc. State Acad. Sci.*, vol. 5: 19-61, 1908). The Minnesota Discomycetes have been well described by Miss Hone (*Minnesota Helvellineae. Minn. Bot. Stud.*, 3: 209-321, 1904; Pezizales, Phacidiales, and Tuberales of Minnesota. *Minn. Bot. Stud.*, 4: 65-132, 1909). Her papers include about 100 species, several of which are illustrated. A local paper which is of great help to a student beginning the study of this group has been issued by Seaver (*Iowa Discomycetes, Bull. Lab. Nat. Hist. State Univ. Iowa.*, vol. 6: 41-219, 1910). His keys to the families, genera, and species, and also his illustrations showing the diagnostic characters of the species which he has noted are especially helpful. The "Report of the State Botanist, 1908" (*N. Y. State Mus. Bul.* 131) contains a list of 135 new species of Discomycetes from America that have been described by Peck. A complete monograph of the North American Geoglossaceae was issued by Durand (*Ann. Myc.*, vol. 6, 1908). Very complete bibliographies of the literature dealing with the Discomycetes of America may be found in certain of the papers cited above.

The writer wishes to acknowledge his appreciation of the services rendered him by Dr. H. Rehm in determining a large number of the species. The descriptions of all the new species which have been sent to Rehm from Wisconsin by the writer and others are copied here without change except where there was evidently a misunderstanding of the data furnished by the collectors. The types in all cases are in Rehm's herbarium. The collection first mentioned after the description is the one sent to him. This material was divided and a part was retained in the herbarium of the University of Wisconsin. I have made these specimens the basis of comparison for other collections. The species are arranged according to the classification given in Rehm's "Discomycetes."

DERMATEACEAE.

Cenangium furfuraceum (Roth) De Not.

Specimens with apothecia up to one centimeter broad were found on old alder limbs about January 1. The asci were well developed but the spores were not mature. These forms are figured by Roth, Cat. Bot. vol. II, pl. 9, fig. 2; Sacc., Fungi Ital., pl. 1312. Perry's woods Algoma, 1909 (Dodge) Bresadola *vid.*

Cenangium populneum (Pers.) Rehm.

On small decayed limbs, Schmeiling's swamp, Algoma, August 1909 (Dodge).

Karschia lignyota (Fr.) Sacc.

On ash log, Krohn's Lake, Algoma, September 1912 (Dodge).

BULGARIACEAE.

Orbilbia chrysocoma (Bull.) Sacc.

These specimens are similar to those figured by Patouillard, Tab. An., no. 293. On old logs, Blahnik's grove, Algoma, July 1907 (Dodge).

Orbilbia coccinella (Sommf.) Karst.

Gregarious on old pieces of wood. Star lake, August 1901 (no. 46, Overton); No. 344, Edgewood, July 1903 (Rehm *vid.*); Awe's woods, Algoma, August 1905 (Dodge). Rehm *vid.*; Blue Mounds, July 1907.

Orbilbia delicatula Karst.

The apothecia are sessile, orange colored, one millimeter across, very much crowded. On blocks of ash, Blahnik's grove, Algoma, August 1909 (Dodge). Rehm *vid.*

Orbilbia epipora Karst.

On pore surface of *Fomes fomentarius*, Devil's Lake, July 1904.

Coryne urnalis (Nyl.) Sacc.

On insect gall, Blue Mounds, June 1907; Superior, September 1907 (Gilbert).

Bulgaria polymorpha (Oed.) Wett.

A tough, black gelatinous Discomycete frequently found on oak cordwood. It is well figured by Hussey, *Illustr. pl. 32*; Fl. dan., *pl. 464*.

Berkley, Out, *pl. 22, fig. 7.* Devil's Lake, September 1904 (Harper); Blue Mounds, September 1904; Devil's Lake, June 1905; Madison, July 1905; Madison, July 1906 (Gilbert); Algoma, May 1906 (Dodge); Blair, August 1906.

***Bulgaria rufa* Schw.**

The hymenium checks like that of *Urnula Craterium* in the partly dried plant. Madison, 1903; Devil's Lake, July 1903; Burlington, July 1903 (Denniston); Blue Mounds, August 1903; Watertown, August 1903 (Marquette); Cemetery woods, Madison, July 1904 (Denniston); Devil's Lake, September 1904; Devil's Lake, June 1905; Devil's Lake, July 1905 (Harper); La Crosse, July 1906 (Jolivette); The Dells, Kilbourn, July 1907 (Harper); Algoma, June 1906 (Dodge).

MOLLISACEAE

***Mollisia cinerea* (Batsch.) Karst.**

On wet logs, May 1904; Krohn's Lake, Algoma, August 1905 (Dodge).

Mollisia cinerea* (Batsch) var. *obscura* Rehm *in litt.

East Madison, September 1903 (no. 406, Harper). Rehm *vid.*

***Mollisia cinerascens* Rehm.**

Blue Mounds, July 1907 (Harper).

***Mollisia uda* (Pers.) Gill.**

The apothecia sometimes cohere in chains and are olivaceous-gray when dry. (Dodge). Rehm *vid.*

***Pseudopeziza trifolii* (Bernh.) Fckl.**

On leaves of red clover, Fairview farm, Mauston, September 1912. (Dodge).

***Pseudopeziza Dehnii* (Rabh.) Fckl.**

On leaves of *Potentilla norvegica* L., Madison; La Crosse (Pammel).

***Pseudopeziza repanda* (Fr.) Karst.**

On *Galium trifidum* L., Racine (Davis).

***Pseudopeziza singularia* Peck.**

On *Ranunculus Pennsylvanicus* L., Vilas county (Davis).

HELIOTIACEAE

***Pezizella subcinerea* Rehm (Ann. Myc., 2: 37, 1904; 9, 1907).**

Apothecia scattered broadly sessile, at first globose then urceolate, orbicular, disk subcinereous, exciple glabrous with elongated cells at the base, context almost prosenchymatous toward the margin, yellowish, hyaline within, waxy, when dry involute, 1–2 mm. in diameter. Asci clavate, rounded at the apex, 50–55x6–7 mic., 8-spored. Spores oblong, straight or slightly curved, 1-celled, hyaline, 6–8x2 mic., distichous. Paraphyses filiform, hyaline, septate, prominent, 3 mic. thick. Pore of ascus 1+.

On decayed wood, Madison, 1902 (no. 325, Harper). Differing from *Mollisia cinerea* in the structure of the thicker apothecia. Approaching *Pezizella subcinerea* (Schum.) Rehm. Known only from the type locality and collected but once.

***Arachnopeziza Aurelia* (Pers.) Fckl.**

These specimens show the spores have appendages as figured by Rehm, Disc., p. 694, figs. 1–5. Currey, Linn. Trans., XXIV, Pl. 51, figs. 15, 16, and Patouillard, Tab. An., fig. 285, represent these forms except as to the appendages of the spores. On acorn cups, Devil's Lake, July 1903.

***Cholorsplenium aeruginascens* (Nyl.) Karst.**

The spores of these plants are only 1–1.5x6–7 mic. and have two to four greenish granules. So far as I find this species differs from the following only in the size of the spores. In the mature spores we find that there is a distinct septum, the wall appearing in sections as a fine straight line. On oak stub, Mauston 1909 (Dodge); on dead alder limbs, Serrahn's swamp, Algoma, September 1909 (Dodge).

***Chorosplenium aeruginosum* (Oed.) De Not.**

Like the preceding species this blue-green fungus colors both heart and sap wood a greenish blue. The mature spores, 10–14x2.5–3.5 mic., are also septate as figured by Saccardo, Fungi Ital., Pl. 1348. Boudier, Icones Myc., pl. 485, shows the general appearance of the species as we find it. Blue Mounds, July 1902 and August 1903; Crandon, August 1903 (Neuman); Eagle Heights, July 1904; Ladysmith, August 1905; (no. 360, Neuman); Detjen's swamp, Algoma, August 1905 (Dodge); Devil's Lake, July 1907; Blue Mounds, August 1908; Lake Nehagaman, August 1908; Krohn's Lake, September 1912 (Dodge).

Chlorosplenium chlora (Schw.) Masee

Probably belongs to another genus. The species is known to me only by the specimens identified by Rehm. Blue Mounds, October 1902; Blue Mounds, September 1903 Rehm *vid.*

Cholorosplenium versiforme (Pers.) De Not.

The color of the apothecium distinguishes this species from the two preceding. It varies considerably, being purplish-brown, rusty-yellow, very dark-olivaceous, or deep bottle-green. It is generally larger. The disk may be as much as four centimeters broad, and like the others it is either cup-shaped or irregularly developed, often ear-shaped, and tapers downward, forming a much wrinkled, depressed, stem-like portion 1-2 cm. long. In drying the dark lustrous olive colors are much more evident, or they may dry rusty-yellow, while the others are generally brilliantly colored when dry. Persoon, *Icones et Descr.*, *Pl.*, *fig.* 7 figures the dark-olive forms. The color of the exterior of fresh specimens is well shown by Berkeley, *Out.*, *pl.* 2, *fig.* 6, but the interior is too bright green for our forms. Mature spores often show a fine clear-cut septum not mentioned in descriptions. Logs on which some specimens were found had been recently cut across and it was noticed that portions of the wood were colored blue-green. As the mycelium of this species is said by preceding authors not to possess this characteristic, careful examination was made of other logs from which specimens had been collected. In a few cases the color in the wood could be traced directly to the fruiting bodies, but in general the colored portions were rather deep seated. I have also collected fine specimens from Fort Lee, N. J., where the more decayed parts of an ash log were deeply colored yet only slight traces of the color were found in contact with the apothecia; still I am convinced that it was due to this species rather than to either of the others accidentally present. Homewood, August 1903; Sturgeon Bay, July 1906 (R. Allen); Blue Mounds, July 1906 (Gilbert); as *Coryne viridescens* Rehm, Blue Mounds, August 1908; Krohn's lake, August 1909 (Dodge); Rehm *vid.*, Seaver *vid.* Otto's woods, September 1912 (Dodge).

Ciboria fuscocinerea Rehm (*Ann. Myc.*, 7: 525, 1909).

Apothecia gregarious, sessile, at first globose and closed, then cyathiform, finally the disk more or less explanate, orbicular, with a very thin margin, sometimes umbilicate in the middle, 0.3-1 cm. in diameter, with a cylindrical stipe, glabrous without, attenuated and tawny towards the base, 0.5-0.7 mm. thick, 1-5 cm. long, context hyaline ashy, finally alutaceous-fuscous, waxy, and prosenchymatous. Asci cylindrical, rounded and thickened at the apex, 150x10-12 mic., 8-spored. I+. Spores oblong-clavate, obtuse at the upper apex, often

subcurved, 1-celled with a large central oil globule, hyaline, 20–24x5–6 mic., monostichous. Paraphyses filiform, septate, hyaline, 2.5 mic. thick, apex obtuse, 3 mic. thick. On decaying wood of conifers buried in the ground.

"A very beautiful discomycete with large spores similar to *Ciboria Dallasiana* E. & E. (Sacc. Syll. XVIII, p. 45), but different in the color of the disk and does not have spindle-shaped spores; the paraphyses are also different."

Small plants are similar in appearance to what is commonly called *Geopyxis nebulosa* (Cooke) Sacc. In mature plants the apothecia are nearly plane or salver-shaped. The writer found the spores were often larger than the measurements given by Rehm. The spores of *G. nebulosa* are rough (Cooke, *Mycog. fig. 163*), while those of *Ciboria fusco-cinerea* are perfectly smooth. See also under *Tarzetta cinerascens* Rehm. No. 1853, Rehm *Ascom. Exs.*, Krohn's Lake and Perry's swamp, Algoma, August 1909 (Dodge.)

***Ciboria pachyderma* Rehm.**

Madison (no. 419, Harper). Rehm *vid.*

***Ciboria pygmaea* (Fr.) Rehm.**

These specimens were at one time identified as *Dasyscypha pygmaea* by Morgan. The figures in *Linn. Trans.* XXV, p. 432, *pl. 55, figs. 7–9, 13*, seem to be fairly good for these forms. Devil's Lake, July 1903; Madison, June 1906.

***Ciboria renispora* (Ellis) Sacc.**

On oak leaves, Palmyra, October 1903 (Harper) Rehm *vid.*

***Ciboria sulfurella* (E. & E.) Rehm.**

Durand, *Bull. Tor. Bot. Club*, 29: 461, 1902, gives a good description of this species. The characteristic sulphur color is entirely lost in drying and the specimens generally become dark brown, almost black. This no doubt accounts for a second description of the species under the name *C. tabacina* Ellis & Holw. in *Bull. No. 3, Minn. Nat. Hist. Surv.*, p. 35, 1886, where it is stated that the description of the colors, etc., was taken from the dried specimens. An examination of the type specimens shows that the species are identical. The type material distributed as no. 1880, Rehm *Asc. Exs.* as *C. tabacina* (?), were all collected on ash petioles, Perry's swamp, Algoma, August 1909 (Dodge)

***Ciboria subrubescens* (Rehm.) *Ann. Myc.*, 7; 524, 1909.**

Apothecia gregarious, occasionally many closely aggregated together on the thickened bark of decaying roots, at first globose, closed, then

cyathiform, thickly margined, 1-4 mm. in diameter, folded and involute when dry, tapering downward into a cylindrical subcurved stipe 1-2 cm. long, 0.5-1 mm. thick, exterior glabrous, pale rubescent, dilute alutaceous when dry, whitish pruinose waxy, context prosenchymatous. Asci cylindrical-clavate, rounded at the apex, 60x5 mic., 8-spored. I+. Spores rod-shaped to subclavate, straight, 1-celled, hyaline, 7-8x1.5 mic., distichous. Paraphyses filiform, subacute, slightly protruding, hyaline, 2-2.5 mic.

The specimens sent to Rehm were growing on decayed roots, Madison, 1909. Rehm, l. c., says that this species could be classed among either the *Ciborias* or the *Helotiums*, and is near *C. tenella* Karst. in color, but that species has spores 3 mic. broad. *Helotium cupreum* Bres. differs in color, while *Helotium fusco-brunneum* Pat. & Gaill. has a very short stipe. Devil's lake, June 1906, July 1909; no. 1852, Rehm Ascom. Exs., Cemetery woods, Madison, June 1909 (Dodge).; Algoma, August 1909 (Dodge).

***Helotium aureum* Pers.**

On decayed wood, Blue Mounds, June 1903, no. 335; Morgan *vid.*

***Helotium citrinum* (Hedw.) Fr.**

Judging from the large number of collections in the university herbarium this species is the one most commonly found and most easily identified. No. 319, Madison, September 1901, Peck *vid.*; Superior, September 1907 (Gilbert); Burlington, August 1905 (Denniston); Algoma, July 1909 (Dodge), Rehm *vid.*; various other collections from Blue Mounds, Devil's Lake, Madison, Milwaukee, and Parfrey's glen.

***Helotium citrinum* var. *lenticulare* Bull.**

The following specimens seem to be somewhat different from the preceding species on account of the sessile apothecia cohering in chains, or forming a compound apothecium 1-2 cm. long. Such specimens as are mentioned by Rehm, Disc., p. 490, were collected at Fort Lee, N. J. These were light yellow and formed a compound apothecium about 1.5 cm. in diameter. Madison, October 1900; Star Lake, August 1901 (Overton); Watertown, August 1903 (Marquette); Blue Mounds, September (Harper); Devil's Lake, October 1904 (Marquette); Algoma, 1905 (Dodge); Blueberry, September 1907 (Overton).

***Helotium epiphyllum* (Pers.) Fr.**

Blue Mounds, August 1903 (R. A. & A. M. Harper).

***Helotium foliolum* Schroet.**

On midrib and petiole of alder leaves in muddy places, Perry's swamp, Algoma, August 1909 (Dodge); Rehm *vid.*

Helotium fructigenum (Bull.) Karst.

On acorns, hickory nut shells, etc., Several sessile forms have been collected at Blue Mounds, Mauston, and Algoma. Typical forms with stipes 1–3 cm. long as figured by Sowerby, Eng. Fung., *pl. 117*; Bulliard, Herb. Franc., *pl. 228*, are perhaps more abundant. Rehm *vid.*

Helotium imberbe (Bull.) Fr.

The apothecia are 1–3 mm. in diameter, waxy white, either nearly sessile or tapering into a stipe 1 cm. long. Figured by Bulliard, Herb. Franc., *pl. 467, fig. 2*. On small maple limbs under leaves, Otto's woods, Algoma, August 1909 (Dodge); Rehm *vid.*

Helotium limonicolor Bres.

Bresadola, Fung. Trid., *pl. 195, fig. 3*, represents a form found on *Thuja orientalis*, which is undoubtedly the same as those found here on leaves of *Thuja occidentalis*. Blueberry, September 1907 (Overton); Perry's swamp, Algoma 1909 (Dodge).

Helotium scutula (Pers.) Karst.

Figured by Saccardo, Fungi Ital., *pl. 1339–1340*; Patouillard, Tab., An. *fig. 93. No. 118*. Palmyra, October 1901, Rehm *vid.*; Blue Mounds, September 1904; Casco, September 1905 (Dodge); Algoma, August 1909 (Dodge), Rehm *vid.*

Helotium sordidatum Karst. & Starb.

The specimens dry a blackish brown. The spores are clavate, sharply pointed at one end, and not guttulate. This collection was identified by Dr. Rehm as *H. phyllophilum* (Desm.) Karst., which according to his description (Rehm, Disc., p. 796) does not have pointed spores but the spores often do have two large oil globules. We find the size of the spores to be 17–19x4 mic. The short asci, 80 mic., distinguish the species from *H. epiphyllum* (Pers.) Fr.

Helotium sublenticulare (Fl. dan.) Fr.

On dead alder limbs, Fellow's woods, Foscora, August 1905; Rehm *vid.*

Sclerotinia Candolleana (Lev.) Fekl.

A good figure of the species will be found in Ann. Sci. Nat. 20: 233, *pl. 7, fig. 4*, 1843. Among decayed leaves under *Geranium maculatum*, Cemetery woods, Madison, June 1909 (J. Dodge); Rehm *vid.*

Sclerotinia fructigena (Pers.) Norton.

Very common on old plums University of Wisconsin orchard, Madison, May 1909 (Arzberger).

Sclerotinia tuberosa (Hedw.) Fekl.

Milwaukee, April 1905; Madison, May 1909 (R. Allen); Cemetery woods, Madison, June (J. Dodge); The Dells, Kilbourn, June 1909 (Dexter).

Sclerotinia Wisconsinensis Rehm (*Ann. Myc.*, 6: 317, 1908).

Apothecia from a suborbicular sclerotium convex below in upper part plain or umbilicate, exterior black, interior white, wrinkled when dry, 3-6 mm. broad, 2.5-3 mm. thick, in clusters of 2-5, rarely solitary. At first spheroid, then disk-shaped, with a thin margin, 1.5-3 mm. broad and high, yellowish-brown, glabrous, when old tawny brown with a long stipe. Stipe cylindrical, about 0.15-0.2 mm, thick, expanding below the excipulum, 2-3 cm. long, glabrous, erect, curved, brownish-yellow. Apothecium with the stipe longitudinally wrinkled when dry, the disk variegated whitish. Asci clavate, apex rounded, 150-180x12-15 mic., 8-spored. I+. Spores fusiform, more or less rounded at the the ends, generally with one or two large oil globules, hyaline, 20-22x7 mic., monostichous, rarely distichous. Paraphyses filiform, projecting, obtuse, septate, hyaline, 3-4 mic thick. In damp woods, Madison, March 1908 (no. 75, Arzberger).

"The specimens were slightly imbedded in earth mixed with decayed plants and small dry twigs of ash. *Isopyrum biternatum* and *Osmorrhiza longistylis* grew abundantly in the neighborhood, but Arzberger found no connection between these plants and the sclerotia, though this must probably be assumed to exist. *S. gracilis* Clements (Sacc., Syll. XVI, p. 723) is distinguished by its larger lobed sclerotia and its spores 26-32 mic. long."

Dasyscypha Agassizii (B. & C.) Sacc.

Common on *Abies balsamea* of brush piles, Blahnik's woods, Algoma, 1909 (no. 1854, Rehm. Asc. Exs., Dodge); near Duluth, May 1908 (Gilbert).

Dasyscypha nivea (Hedw.) Sacc.

Eagle Heights, October 1904 (Denniston); near Duluth, May 1908 (Gilbert).

Lachnella corticalis (Pers.) Fr.

On bark at base of living poplar, Ihlenfeld's woods, Algoma, September 1909 (Dodge). Rehm *vid.*

Lachnum ciliaris (Schrad.) Rehm.

On oak leaves, Blue Mounds, July 1904; campus, Madison, June 1909 (Dodge).

Lachnum virgineum (Batsch.) Karst.

Nelson's woods, Madison, May 1903 (R. A. and A. M. Harper); Blue Mounds, June 1904 (R. A. and A. M. Harper); Devil's Lake, July 1904; Eagle Heights, July 1904; Devine's woods, Algoma, August 1905 (Dodge).

PEZIZACEAE.

Detonia Constellatio (B. & Br.) Rehm *in litt.*

Easily distinguished by the hook-shaped paraphyses as figured by Cooke, *Mycog.*, *pl. 2, fig. 81*. On the ground among moss, Mile Bluff, Mauston, June 1909 (J. Dodge); on rich black earth, Krohn's lake, Algoma, August 1909 (Dodge). Rehm *vid.*

Detonia convexella (Karst.)

On burned places, Devil's Lake, June 1905, 1907.

Detonia fulgens (Pers.) Rehm.

The greenish spots on the exterior and the round spores, 4–6 mic. across, serve to distinguish this species from other orange-colored forms. Boudier, *Icones Myc.*, *pl. 319 a, no. 477*, and Patouillard, *Tab. An.*, *fig. 377*, give good figures of the species. Among needles under-hemlock and white cedar, covering the ground for several feet, Schmeiling's grove, Algoma, May 1905, (Dodge.)

Detonia laeterubra Rehm (*Ann. Myc.*, 3: 516, 1905).

Apothecia sessile, gregarious, at first closed globose, finally plate-shaped, then irregularly orbicular, with a distinct margin, the disk bright red, exterior glabrous and paler reddish, 1–4 mm. in diameter, fleshy. Asci cylindrical, rounded at the apex, 180–200x12 mic., 8-spored. Spores globose, glabrous, with one large oil globule, hyaline, 10 mic. in diameter, monostichous. Paraphyses filiform, septate, hooked at the apex, 1.5 mic. thick, hyaline. II.—Cemetery woods, July 1904 (Harper).

Rehm, *l. c.* says that the species is distinguished from *D. convexella* Karst. by the color of the disk and the much smaller spores, and from *D. globifera* B. & C. in the color and in the hooked paraphyses. A second collection from Devil's lake, July 1904 (Harper).

Detonia miniata (Crouan) Rehm *in litt.*

This species is larger than *D. constellatio*, 5–8 mm. broad, dark red to golden brown. The spores are rough and the paraphyses are straight, Cooke *Mycog.*, *pl. 5, fig. 17*, notes these differences. On the ground, Mile Bluff, Mauston, June 1909 (Dodge); Rehm *vid.*

***Detonia trachycarpa* (Curr.)**

On burned ground, McDonald's, Algoma, September 1912 (Dodge).
***Humaria lacteo-cinerea* Rehm (*Ann. Myc.*, 3: 517, 1905).**

Apothecia gregarious, sessile, patellate, the disk irregularly expanded, repandly marginate and the margin soon irregular, whitish-cinereous, 0.5—2 cm. in diameter, exciple glabrous, whitish, tapering into a very short, subcylindrical stipe, waxy. Asci cylindrical, subtruncate at apex, 120—150x10—12 mic., 8-spored. I—. Spores ellipsoid with blunt ends, one-celled, one large central oil globule, hyaline, the epispore thick and warty, 12—13x7—8 mic., monostichous. Paraphyses filiform, septate, 3—4 mic. thick, subclavate toward the apex, 5 mic. thick, hyaline. On pine drain, greenhouse, Madison, December 1903 (Harper).

"Grayish throughout. This fine fungus with its white color and its warted spores seems to have remained unknown up to the present. Still the specimens kindly sent to me were old and for this reason the description is perhaps uncertain."

Specimens with the same number in the Wisconsin herbarium show a distinct iodine reaction, and the size of the apothecia also indicates that the species might be placed in the genus *Plicaria*. Two collections from Devils lake agree entirely with that from the greenhouse. In most of the specimens the spores tend to lie across the ascus as figured by Boudier, *Icones Myc.*, pl. 297, no 432, for *Galactinia badio-fusca*, which differs from this species in having much longer asci Devil's Lake, June 1905, July 1907.

***Humaria rhodoleuca* Bres.**

The apothecia are 3—5 mm. broad and high, with a pink disk which is at first concealed by the inrolled margin. The exterior is pure white, furfuraceous. The spores are also characteristic, 30—40x14 mic., with one or two large oil globules and numerous smaller ones. Well figured by Bresadola, *Fungi Trid.* p. pl. 193, fig. 2. On the ground, under tamarack and spruce, Perry's swamp, August 1909 (J. Dodge).

***Humaria Wisconsinensis* Rehm (*Ann. Myc.*, 3: 517, 1905).**

Apothecia gregarious, sessile, at first globose, soon patellate, orbicular, the disk with a distinct margin, plane, orange-yellow, by no means cup-shaped, the exterior glabrous, pale, waxy, attached to the substratum by white hyphae, 0.5—5 mm. in diameter. Asci clavate, rounded at the apex, 40—45x5—6 mic., 8-spored. I—. Spores ellipsoid, one-celled, sometimes somewhat subcurved, hyaline, 6—7x3 mic., distichous. Paraphyses filiform, septate, 2—2.5 mic., thick, not at all clavate, yellowish. Excipulum thick, parenchymatous, context

pseudo-prosenchymatous toward the margin. On decayed culms of *Carex*, Blue Mounds, June 1904 (no. 424, R. A. and A. M. Harper).

H. flavotagens B. & Br. differs especially in its cyathiform apothecium and the yellow mycelium.

***Pyronema omphalodes* (Bull.) Fckl.**

On burned places, Eagle Heights, August 1903; Devil's lake, August 1906; Hale's woods, Mauston, August 1909 (Dodge).

***Aleuria aurantia* (Mueller) Fckl.**

Star lake, August 1909 (Overton), Morgan *vid.*; Blue Mounds, September 1903, Rehm *vid.*; Blue Mounds, September 1904; Madison, June 1909 (Overton); Madison (no. 30, Harper), Morgan *vid.*; Schmeiling's woods, Algoma, September 1909 (Dodge).

***Aleuria bicucullata* Boud.**

The spores are very characteristic, being reticulately warted, and each end is provided with a cap-like appendage as figured by Boudier, *Soc. Bot.*, 28: 93, *pl. 3, fig. 1*, 1881. In Wisconsin forms the paraphyses are usually bent at right angles instead of being straight. On the ground roadsides, Mile Bluff, Mauston, June 1909 (Dodge), Rehm *vid.*

***Aleuria Wisconsinensis* Rehm (*Ann. Myc.*, 2: 34, 1904).**

Apothecia gregarious, sessile, patelliform, contracted at the base to form a slightly stipe-like elongation, margin thick and entire, at length folded, the disk plane, flat, finally sinuous, red, the exterior pale fuscous, the context of the excipulum parenchymatous and subhyaline, provided with single hyaline septate pileiform hyphae made up of large cells, 150x10 mic., the disk 0.5—2 cm. in diameter, fleshy, when dry more or less contorted, rose colored, the excipulum whitish, mealy. Asci cylindrical, rounded at the apex, about 200x10 mic., 8-spored. Spores ellipsoid, epispore broadly areolate, capped at each end, the upper end with a very short appendage, often doubly crenate the lower end with a filiform appendage, one-celled, often stuck together, generally containing two large oil globules, hyaline, 14—15x7 mic., monostichous. Paraphyses hyaline, filiform, septate, 3 mic., at the apex even 5 mic. thick. I—. Madison, October 1899 (no. 322, R. A. and A. M. Harper).

"Nearest *A. bicucullata* Boud., but it differs plainly in the orange color of the excipulum and the much smaller size and the spores never warty areolate." Further collections which I have examined agree well with No. 322, but in my opinion the species is nearest to *Aleuria aurantia* and perhaps should not be distinguished from it. Miss

Hone has also reported the same form from Minnesota and regards it as different from *A. aurantia*. Blue Mounds, August 1903; Devil's Lake (immature), October 1906.

***Geopyxis cupularis* (L.) Sacc.**

The apothecia are usually alutaceous, and only occasionally egg-yellow as described by Rehm, *Disc.*, p. 972. The edge is delicately scalloped as figured by Boudier, *Icones Myc.*, pl. 338. On wet clay soil, Blahnik's woods, August 1909 (Dodge.) Rehm *vid.*

***Geopyxis nebulosa* (Cooke) Sacc.**

This form in which the apothecium tapers downward into the stipe is well illustrated by Cooke, *Mycog.*, pl. 73, fig. 281. I include this form under *Geopyxis*, although it does not belong with the preceding and would not be included in the group according to Rehm's conception of the genus. Sturgeon Bay, August 1906 (R. Allen); on old wood, Shaw's swamp, Algoma, October 1905 (Dodge); Wisconsin (Trelease, Ellis herbarium).

Discina ochracea* (Boud.) Rehm *in litt.

The character of the exterior, which is densely warted, is figured by Bresadola, *Fung. Tril.*, pl. 185, under the name *Aleuria pustulata* (Hedw). Some specimens show that the paraphyses have tubercular tips as shown by Boulder, *Icones Myc.*, pl. 337; others correspond to the ones figured by Patouillard, *Tab. An.*, no. 374. On humus, East Madison, September 1903; Blue Mounds, July 1908; Krohn's lake and Otto's woods, Algoma, August 1909 (Dodge), Rehm *vid.*

***Discina venosa* (Pers.) Sacc.**

The young forms are saucers-shaped with the margin erect or incurved, while in older specimens, the margin expands and the whole becomes flat, bringing the center up showing the wrinkled, light-brown interior. The exterior is flesh-colored, becoming whitish with age. Figures well representing these forms are those of Richon, *Atlas Champ.*, pl. 70, fig. 6; Boudier, *Icones Myc.*, pl. 254, no. 180; *Diet., Deutsch. Crypt.*, pl. 42. On the ground and on decayed logs, Madison, July 1907; Otto's woods, Algoma, June 1905 (Dodge).

***Acetabula leucomelas* (Pers.) Sacc.**

The only good specimen found was sent to Dr. Rehm for determination. Figured by Boudier, *Icones*, pl. 249, no. 153. On the ground Otto's woods, Algoma, July 1909 (Dodge); Rehm *vid.*

Acetabula sulcata (Pers.) Fckl.

The apothecia are plane, not cupshaped, the stipes are long and deeply sulcate. Both characteristics are well brought out by Cooke, *Mycog.*, pl. 47, fig. 185. One specimen from Blue Mounds, had a disk 8 cm. broad with a stipe 8–9 cm. long, exceptionally large for the species. On the ground, Devil's Lake, June 1909 (Harper); Blue Mounds, 1909 (Dodge); T. Nelson's woods, Mauston, July 1909 (J. Dodge).

Acetabula vulgaris Fckl.

The species grows as large as 13 cm. broad and 10 cm. high in the rich black soil of "the bottoms" near Krohn's Lake. Good figures of these forms are given by Rolland, *Atlas Champ.*, pl. 118, fig. 273; Boudier, *Icones Myc.*, pl. 243, no. 155. Windsor road, Madison, June 1905; Second lake, Madison, June 1905; Krohn's lake, June 1905 (Dodge); Sturgeon Bay, July 1905 (R. Allen); Milwaukee, 1905; Devil's lake, June 1909. A small form sent to Dr. Rehm was determined as *Acetabula vulgaris* var. *minor* (no. 475, Mauston, (Dodge).

Macropodia Corium (Weberb.) Sacc.

University drive, Madison, May 1904 (no. 415, Harper); University drive, June 1907 (Denniston).

Macropodia macropus (Pers.) Fckl.

This species is even more variable than the preceding in the form and size of the apothecia. Some have a stipe only 0.5 cm. long, in others the stipe is 6–8 cm. long, the spores being alike in both forms. Frequently parasitized by a species of *Asterophora* (Rehm *vid.*). Waukesha, July 1903; East Madison, September 1903; Warner's woods, Algoma, August 1904; Crandon, August 1905 (Neuman); Devil's Lake, July 1905; Sturgeon Bay, July and August 1907 (R. Allen and Jolivet); Fond du Lac, August 1907 (Cheney); West Superior, August 1907 (Cheney); Devil's Lake, June 1909; Mile Bluff, Mauston, June 1909 (Dodge), Rehm *vid.*; Krohn's lake, August 1909 (Dodge), Rehm *vid.*

Macropodia platypodia (Boud).

The spores are more fusoid than figured by Boudier, *Icones Myc.*, pl. 241, no. 647, otherwise the specimens are as he described. Crandon, August 1905 (Neuman).

Urnula Craterium (Schw.) Fr.

On decayed wood and on the ground, Madison, June 1889 (R. A. Harper); Devil's lake, June 1900; Madison, May 1902 (Harper); Blue

Mounds, April 1904; Vilas' woods, April 1905; Devil's lake, May 1905; Danek's woods, Algoma, May 1905 (Dodge).

Urnula terrestris (Niessel) Sacc.

The bright sulphur color of the disk is in striking contrast to the rough, dark brown exterior. The paraphyses may be either T-shaped or merely hook-shaped at the apex. Among needles and moss on old coniferous trunks and roots, Perry's swamp, Algoma, August 1909 (J. Dodge).

Plicaria alutacea (Pers.) Fekl.

Rehm, *Ann. Myc.*, 7: 523, 1909, found that these specimens differed from the European forms in having only one large oil globule in the spore and in being much rougher. The cups are sometimes divided on one side and are often alutaceous. Cooke, *Mycog.*, pl. 54, fig. 214, and Boudier, *Icones Myc.*, pl. 327, no. 238, give good figures. Krohn's lake, Algoma, August 1909 (no. 1856, Rehm. Asc., Dodge); Devil's lake, June 1909.

Plicaria badia (Pers.) Fekl.

Some forms of our plants show a purplish or even violet tinge. Figures usually given for the American forms agree well with the large plants found in woods; cf. Boudier, *Icones Myc.*, pl. 283; Berkeley, *Out.*, pl. 23, fig. 4. Specimens distributed as No. 1860, Rehm Asc. Exs., from rich black soil near Krohn's Lake are very small and almost black. These are quite different plants, but may be the same species. Blue Mounds, August 1903; East Madison, September 1903; Burlington, September 1903 (Denniston). Morgan *vid.* Eagle Heights, July 1904 (Denniston); Windsor road, May 1905 (Harper); Blue Mounds, May 1905; Devil's Lake, July 1905; Sturgeon Bay, July 1905 (R. Allen); (?) Blue Mounds, August 1906 (Jolivette); Hammersley's drive, August 1906; Blue Mounds, June 1907; Sturgeon Bay, August 1907 (R. Allen); Awe's woods, Foscora, August 1905 (Dodge).

Plicaria brunneo-atra (Desm.) Rehm.

This species is well represented by Boudier, *Icones Myc.*, pl. 298, no. 380. Blue Mounds, 1903.

Plicaria chrysopela (Cooke) Rehm.

On flower pot in greenhouse, Madison, January (no. 414, Harper), Rehm *vid.* Cooke describes the spores as 12x6 mic., *Mycog.*, p. 156. Rehm, *Disc.*, p. 1005, gives the measurements 15-17x3 mic. The spores of these specimens are 19-20x10 mic. *Pustularia vesiculosa* is often

found on dung in greenhouses, and this specimen may be a small, less fleshy form of that species.

***Plicaria coerlueo-maculata* Rehm (*Ann. Myc.*, 2: 351, 1904).**

Apothecia chiefly globose, sessile with a narrowed base, disk sub-orbicular, explanate, distinctly margined, pale, exciple glabrous, context parenchymatous, made up of subcinerous cells, 25–30 mic. broad, slightly tawny, blue-spotted, when dry wrinkled, 3 cm. in diameter. Hypothecium especially blue-stained. Asci cylindrical, rounded at the apex, 180–200x10–12 mic., 8-spored. I+. Spores ellipsoid, rounded at each end, epispore slightly roughened, 1-celled, enclosing the large oil drops, hyaline, 15–18x9–10 mic., in one row. Paraphyses filiform, septate, 3 mic. thick, hyaline, towards the apex up to 5 mic. thick. East Madison, 1903 (Harper).

"The species is to be placed near *Plicaria Howsei*. So far as color is concerned it is nearest *Peziza lividulae* Phil. (Cf. Cooke, *Mycog.*, pl. 72, fig. 277), but in the latter the color almost disappears in the dried out specimens."

In general appearance this species is certainly close to *P. badia*, and I am inclined to think that perhaps all the violet-stained forms may be put together as a single species. On the ground, Parfrey's glen, August 1906; Devil's Lake, July 1905; Blue Mounds, June 1907 (Harper); Blue Mounds, September 1903 (Harper); Alaska, August 1905 (Dodge).

***Plicaria pustulata* (Hedw.) Fckl.**

Depauperate specimen, Devil's Lake, July 1903 (no. 346, Harper), Morgan *vid.* *P. pustulata* var. *minor* Rehm, Devil's Lake, July 1903, Rehm *vid.* The specimens from Eagle Heights, July 1904, perhaps belong here.

***Plicaria repanda* (Wahl.) Rehm.**

As indicated below, a number of specimens sent to Rehm were identified as this species. The Wisconsin forms agree well, so far as habit is concerned, with the figures by Bresadola (*Fungi Trid.*, pls. 188, 189), *P. varia* (Hedw.) Fr., and *P. repanda* Wahl. Madison, September 1899, October 1899, (Rehm *vid.*), June and October 1907; Star Lake, September 1901 (Overton); Homewood, August 1903; Milwaukee, August 1904; Eagle Heights, July 1905; Devil's Lake, May 1905, July 1907 (Harper); Glens, July 1907; Blue Mounds, August 1909; Ihlenfeld's woods, August 1909 (Dodge), Rehm *vid.*

***Plicaria violacea* (Pers.) Fckl.**

On burned ground, Krohn's Lake, September 1912. (Dodge).

Galactinia subumbrina Boud.

The spores are 10-11x17-20 mic., very coarsely warted, usually with two tubercles at one end as figured by Cooke, *Mycog.*, pl. 108, fig. 385; Boudier, *Icones Myc.*, pl. 296, no. 80. Devil's Lake July 1903; Blue Mounds, August 1903, September 1904; Milwaukee, July 1905; Hammersley's drive, August 1906; Devil's Lake, July 1907; campus, Madison, 1907.

Galactinia succosa (Berk.) Sacc.

Cemetery woods, Madison, July 1905; campus, Madison, June 1909 (Overton); Devil's Lake, June 1909 (Harper); on the banks and beds of gullies in rocky ravines, Trumble's woods, Mauston, June 1909 (Dodge), Rehm *vid.*; Blue Mounds, August 1909.

Pustularia Stevensoniana (Ellis) Rehm. Cf. *Ascom. Lojk.*, p. 3. Description given in Rehm, *Disc.*, p. 1019.

This is a common form around Madison on rotten logs especially of poplar. Bresadola's figures (*Fungi Trid.*, pl. 190) of *P. varia* (Hedw.) Fr. f. *terrestris*, with the exception of the figure in the lower right hand corner, are excellent representations, so far as habit is concerned, of Wisconsin forms which I have included here. Maple Bluff, Madison, June 1903 (no. 343, R. A. and A. M. Harper), Rehm *vid.*; Nelson's woods, August 1903; Cemetery woods, Madison, July 1905; Parfrey's glen, September 1905; Blue Mounds, August 1903, 1904; Devil's lake, July 1904, June 1909; Crandon, August 1905 (Neuman); Sturgeon Bay, August 1907 (R. Allen); Blueberry, September 1907; Milwaukee, October 1907; Dorward's glen, June 1909; in lumber yards and cellars, June to August, Algoma, (Dodge), Rehm *vid.*

Pustularia vesiculosa (Bull.) Rehm.

"Covered celery fields," Milwaukee, July 1905 (Wansok); Madison, June 1907, on horse dung; in pastured woods, Krohn's Lake, Algoma, June (Dodge); on burned ground, Cemetery woods, Madison, May 1909 (J. Dodge). Boudier, *Icones Myc.*, pl. 257, no. 62, represents exactly the external appearance of this last collection. *Peziza umbrina* Boud. is said to grow in burned places and is quite similar in its external characters to those found here on burned ground.

Tarzettia cinerascens Rehm. *Ann. Myc.*, 2: 352, 1904.

Apothecia gregarious, for the most part cyathiform, stipitate, but soon with the orbicular disk explanate, finally slightly convex, acutely margined, 0.5-1.5 cm. broad, stipe subcylindrical 1-3 mm. long, 0.5 mm. thick, excipulum glabrous, parenchymatous at the base, yellowish, context prosenchymatous toward the margin, cinereous, drying yel-

lowish-cinereous, subcoriaceous. Asci cylindrical, rounded at the apex, 150–180x10–12 mic., 8-spored. I+. Spores oblong, straight or subcurved, rounded at the ends, glabrous, 1-celled, one large oil globule, hyaline, 20–22x5–5.5 mic., monostichous. Paraphyses filiform, 1.5 mic. thick, 2.5 at the apex, hyaline. On wood, East Madison, 1903 (Harper).

"Similar in form and in iodine reaction to *Geopyxis perforata* (Karst.) Sacc., but differs in color and in spore characters. Very near *Peziza nebulosa* Cooke, Mycog., pl. 73, fig. 281. Exs. Ellis N. A. F., no. 437. The apothecia are always cyathiform and the spores are pointed at both ends, 30–35x5–7 mic., and according to Cooke they are slightly rough."

This species differs from *Ciboria fuscocinerea* mainly in the length of the stipe. The two forms are certainly very close together and perhaps should not be distinguished from *Peziza nebulosa* Cooke. As the number of the collections shows, this is a common and fairly abundant form and the material is reasonably uniform.

Blue Mounds, August 1903, September 1908; Madison, September 1903; Blue Mounds, July 1908 (Gilbert); Parfrey's glen, August 1908 (Arzberger).

***Otidea auricula* (Schaeff.) Rehm.**

Sturgeon Bay, July 1905 (R. Allen); Elkhart Lake, June 1909.

***Otidea cochleata* (L.) Fckl.**

Devil's Lake, July 1905.

***Otidea Harperiana* Rehm (*Ann. Myc.*, 2: 34, 1904).**

Apothecia sessile, at first subcyathoid, vertically split on one side from the base, sublacerate here and there on the margin, finally contorted, more or less explanate, not elongated laterally, narrowed towards the base in a slightly stipe-like fashion, disk undulate, reddish brown, excipulum umber bay, rugulose, velutinous, the cortex parenchymatous, made up of yellowish tawny subglobose cells about 30 mic. broad, 4–10 cm. in diameter, 1.5–5 cm. high, tapering into a short stipe, whitish at the base, and drying subcoriaceous, fragile. Asci cylindrical, rounded at the apex, 300x12–14 mic., 8-spored. Spores oblong, ellipsoid rounded at each end, one-celled, not guttulate, smooth, hyaline, 15–17x5–7 mic., monostichous. Paraphyses filiform, septate, 3 mic. thick, toward the apex 4 mic., hyaline. I+. On the ground, Blue Mounds, June 1903 (Harper);

"Near *O. umbrina* (Pers.) Bres.; in color, size, and in the I—it is plainly different. On the contrary *O. Harperiana* tends toward *Discina*,

but the apothecia are for the most part vertically split on one side and this seems to prevent putting it in that genus."

This is according to the description very close to *O. umbrina*. I have not seen material of the latter species. The spores in the specimens left at Wisconsin appear to be roughened. Bresadola's figures (*Fungi Trid. pl. 180*) represent the Wisconsin specimens perfectly as to shape, those of Boudier (*Icones Myc. pl. 330*) less correctly. Madison, September 1903; Blue Mounds, August 1903.

Otidea leporina (Batsch.) Fckl.

Watertown, August 1903 (Marquette), Madison, October 1907, Devil's Lake, July 1907; Blue Mounds, August 1909.

Otidea onotica (Pers.) Fckl.

Blue Mounds, July 1905; Parfrey's glen, August 1907; Devil's Lake, August 1907.

Otidea pleurota (Phil.) Sacc.

The spores are 17×8.5 mic., with one long oil globule, irregularly warted. Iodine does not color the asci blue. Cooke's figures (*Mycog. pl. 97, fig. 351*) represent this form very well. The spore measurements are distinctive. Blue Mounds, July 1905.

Pseudoplectania melaena (Fr.) Sacc.

The apothecium is light brown, chalice-shaped, and dries jet black. The short wrinkled stipe is clothed at the base with brown, non-septate hairs. Boudier, *Icones Myc., pl. 343*, is an excellent figure of this species which seems to be rare in America. On decayed limbs, Parrman's woods, Algoma, May 1905 (Dodge).

Pseudoplectania nigrella (Pers.) Fckl.

Superior, 1908 (Gilbert).

Lachnea amphidoxa Rehm.

On wet clay soil in low places frequented by cows, Blahnik's woods, Algoma, August 1909 (Dodge); Rehm *vid.*

Lachnea Woolhopeia C. & Phil. (*Lachnea coeruleascens* Rehm *sp. nov., in litt.*).

The specimens differ from typical forms described by Cooke, *Grevillea*, 7: 75; *Mycog., pl. 113, fig. 404*, in being about twice as large, 2-4 mm. across, and in the character of the soft brown hairs that cover the exterior. These hairs are brown throughout their entire

length, are much longer, 0.2–0.4 mm., and while they broaden abruptly in the basal cells, these cells, only one or two, are much longer than broad, 12–17x40–50 mic. The color of the apothecia, character of the asci, spores and paraphyses are typical of the species. Only a small collection of plants was made, and they are listed under the above name until more evidence may be obtained of the variations found in Wisconsin plants. On mossy humus at the base of a stump of *Tsuga canadensis*, Krohn's Lake, August 1909 (Dodge).

***Lachnea coprinaria* (Cooke) Sacc.**

On cow dung, Schmeiling's grove, September 1912 (Dodge).

***Lachnea fusicarpa* (Ger.) Sacc.**

Specimens from Blue Mounds (no. 402, R. A. and A. M. Harper, August 18, 1903) were identified by Rehm as *Lachnea semitosta* B. & C. var. *pubida* Berk. The spores are about 42 mic. long, and some of the apothecia are 1½–2 cm. in diameter. Durand, *Jour. Myc.*, p. 28, 1906, discusses the variations and synonymy of the species, but accepts *Macropodia semitosta* (B. & C.) Sacc. as a separate species. In almost any of the specimens in the University of Wisconsin herbarium one can find spores varying from 28 mic. to 40 mic. in length, a difference which is doubtless due to the degree of ripeness of the spores. As originally described, *Macropodia semitosta* has somewhat larger apothecia than *M. pubida*, but smaller spores than that species. Gerard describes *P. fusicarpa* as sessile. It is possible that a distinction can be found between the sessile and the stiped forms in this group which will be of more significance than the proposed distinction on the basis of spore size. It hardly seems probable that Cooke's figure of Gerard's material and that from Michener could be considered as belonging to the same species. Cooke's figure, *Mycog.*, fig. 113, is a good representation of many of the Wisconsin forms. The Dells, Kilbourn, August 1906; East Madison, September 1903; Blue Mounds, August 1903; Parfrey's glen, August 1907; Devil's Lake, July 1907; Blue Mounds, September 1904.

***Lachnea Dalmeniensis* (Cooke) Phil.**

Fresh specimens have rather blunt hairs which are hyaline to yellowish and not tawny yellow nor brownish as described by Cooke., *Mycog.*, p. 84, pl. 39, fig. 151; Rehm, p. 1052. Boudier's illustration of *Lachnea theleboides* (A. S.) Gill., *Icones Myc.*, pl. 330, is a much better figure for our species in the fresh condition. On black soil under white cedar, Blahnik's woods, Algoma, August 1909 (Dodge), Rehm *vid.*

***Lachnea hemispherica* (Wigg.) Gill.**

On decayed wood, Madison, summer 1902, September 1903; Vilas' woods, July 1904 (Dean); Hammersley's drive, August 1906, June 1907; East Madison, September 1903, July 1907; Burlington, July 1902 (Denniston), Elm Grove, August 1903; Homewood, August 1903; Blue Mounds, August 1903; Eagle Heights, October 1904 (Denniston); Devil's Lake, July 1905, July 1907; Eagle Heights, August 1906; Sturgeon Bay, July 1907 (Allen and Jolivette); Luis River, July 1897; Krohn's Lake, Algoma, August 1909 (Dodge), Rehm *vid.*

***Lachnea intermixta* (Karst.) Rehm.**

The specimens show considerable variation in color, young forms being either olivaceous, orange, or reddish-brown. The figures of *Peziza maurilabra* Cooke, *Grevillea*, 6: 64; Cooke., *Mycog.*, pl. 109, fig. 388; Boudier, *Icones*, pl. 389, are very similar to these forms which grew abundantly on burned places. Cemetery woods, Madison, June 1909 (J. Dodge), Rehm *vid.*; Devil's Lake, June 1906.

***Lachnea livida* (Schum.) Sacc. (?)**

Blue Mounds, October 1902 (no. 3, Harper), Rehm *vid.*; this specimen seems to be similar to large pale forms of *L. scutellata*. Vilas' woods, October 1903 (Harper).

***Lachnea Lojkaeana* Rehm.**

On wet clay soil, Blahnik's woods, Algoma, August 1909 (Dodge).

***Lachnea melaloma* (A. & S.) Sacc.**

Fresh specimens are bright orange, 2-4 mm. in diameter, with cellular outgrowths bunched together on the exterior as stated by Phillips, *Disc.*, p. 109. Cf. Patouillard, *Tab. An.*, fig. 275; Boudier, *Icones Myc.*, pl. 387, no. 252. Devil's Lake, July 1907; on the grounds under balsam fir, Blahnik's grove, August 1909 (Dodge), Rehm *vid.*

Lachnea pellita* (C. & Pk.) Rehm *in litt.

Apothecium is attached to the soil by coarse, brown, secondary mycelium. The edge of the cup is much split and torn. The hairs and spores are well figured by Cooke, *Mycog.*, pl. 31, fig. 119. On the ground, Blahnik's swamp, Algoma, August 1909 (Dodge), Rehm *vid.*

***Lachnea pseudogregaria* Rick.**

East Madison, September 1903 (no. 400, Harper), Rehm *vid.*

Lachnea scutellata (L.) Gill.

Port Wing, August 1897 (Cheney); Florence, 1899 (Riley); Madison, June 1903 (no. 334, Harper), Rehm *vid.*; Elm Grove, August 1903; Blue Mounds, September 1903, July 1907; Rock Cut, May 1905; Devil's Lake, June 1905; Fluno's bluff, Mauston, June 1909; Schmelling's grove, Algoma, July 1905, August 1909 (Dodge), Rehm *vid.*; Crandon, August 1905 (Neuman).

Lachnea setosa (Nees.) Phill.

Blue Mounds, August 1903 (R. A. and A. M. Harper), Rehm *vid.*; Blue Mounds, August 1906; Madison, Vilas' woods, October 1903 (Harper); Alaska, June 1905 (Dodge).

Lachnea stercorea (Pers.) Gill.

The characteristic stellate hairs on the apothecium are figured by Cooke, *Mycog.*, pl. 38, fig. 147-148; Boudier, *Icones*, pl. 384. On cow dung, Stewart's pasture, Mauston, June 1909 (J. Dodge), Rehm *vid.*

Lachnea umbrata (Fr.) Phill.

On black clay soil, Blahnik's swamp, Algoma, August 1909 (Dodge), Rehm *vid.*

Lachnea umbrorum (Fr.) Gill.

La Chapelle, July 1897 (Cheney); Blue Mounds, June 1903 (R. A. & A. M. Harper), Rehm *vid.*, September 1908; Devil's Lake, July 1903 (Harper), September 1904, June 1905, June 1907 Eagle Heights, October 1904 (Denniston); Sturgeon Bay, August 1906 (R. Allen & Jollivet); Trumble's ravine, Mauston, June 1909 (Dodge), Rehm *vid.*

Sarcoscypha albopilosa Rehm (*Ann. Myc.*, 2: 33, 1904).

Apothecia scattered, at first cyathiform, then stipitate, 0.5 cm. high, disk scarlet, 7 mm. broad, stipe cylindrical, 1-2 mm. thick, the exterior covered with white, somewhat blunt, septate, hyaline hairs, 10 mic. at the basal expansion, 300x4-7 mic. Asci cylindrical, truncate at the apex, about 300x15 mic., 8-spored. Spores ellipsoid, with one large central oil globule, epispore hexagonally reticulate, hyaline, 18-21x10-12 mic., monostichous. Paraphyses filiform, apex somewhat curved, with golden oil drops, colored blue by iodine, 3 mic., expanding to 5 mic. at the apex. On the ground, Vilas's woods, Madison, (Harper).

"Near *Aleuria Rhenana* Fckl., *Symb. Myc.*, p. 325, pl. 5, fig. 1; *Peziza splendens* Quel., *Champ. Jura*, p. 388, pl. 5, fig. 4."

The Wisconsin material agrees with what Boudier, (*Icones Myc.*, pl. 315), calls *Peziza rutilans* and is much nearer that species than it

is to *Aleuria Rhenana* as figured by Boudier (*Icones Myc. pl. 314*). It is, however, a good *Sarcoscypha*.

Blue Mounds, September 1903, August 1908; Devil's Lake, July 1904 (no. 422, Harper), Rehm *vid.*; Devil's Lake, July 1905, 1907, June 1909; Awe's woods, Foscora, August 1905 (Dodge); Madison, July 1905, June 1909, Parfrey's glen, September 1905; Fluno's woods, Mauston, June 1909 (J. Dodge), Rehm *vid.*; Algoma, September 1912 (J. Dodge).

***Sarcoscypha coccinea* (Jacq.) Cooke.**

Common on old limbs in early spring. Madison, May 1899 (Harper); Devil's Lake, July 1903; Blue Mounds, June 1904 (R. A. and A. M. Harper); Schmeiling's woods Algoma, April 1905 (Dodge); Helenville, April 1908; Milwaukee, May 1908 (Sherman); Star Lake, May 1909 (J. J. Brown).

***Sarcoscypha floccosa* (Schw.) Cooke.**

On basswood, Fuller's woods June 1903, (no. 331, Harper, Rehm, Ascom., no. 1776, *Ann. Myc.* p. 485, 1908); Devil's Lake, July 1903; June 1906; Lake Waubesa, July 1903 (Denniston), East Madison, June 1904 (Harper); Blue Mounds, July 1904, June 1909 (Dodge); Trumble's woods, Mauston, June 1909 (Dodge).

***Sarcoscypha occidentalis* (Schw.) Cooke.**

Madison, November 1901, Fuller's woods, June 1903 (no. 332, R. A. & A. M. Harper, Rehm *vid.*); Windsor road, July 1904; campus, July 1904; Fuller's woods, June 1908 (Lutman); Blue Mounds, June 1903, August 1903, Rehm *vid.*, July 1904, July 1905; East Madison, September 1903; Milwaukee, June 1904; Devil's Lake, July 1905; Detjen's woods, June-September 1909 (Dodge).

Sepultaria avenosa* var. *Dodget* Rehm *in litt.

Distinguished from the species by the smaller apothecia and the spindle-shaped, smaller spores with two oil globules. Boudier, *Icones Myc., pl. 361, no. 412*, shows spores with either one or two oil globules. Partly buried in soil among grass, Blahnik's swamp, Algoma, August 1909 (Dodge).

ASCOBOLACEAE.

Ascophanus carneus (Pers.) Boud.

On cow dung, Stewart's pasture, June, Mauston, 1907 (Dodge);
Schmeiling's grove, August 1909 (J. Dodge).

Ascophanus glaucellus Rehm. (Disc., p. 1080, *fig. 5*).

On cow dung in open woods, Schmeiling's grove, Algoma, August
1909 (J. Dodge).

Ascophanus lacteus Cooke & Phill.

On cow dung, Krohn's lake, and Schmeiling's woods, Algoma, 1909
(Dodge), Rehm *vid.*

Lasiobolus equinus (Muell.) Karst.

On cow dung, Nelson's woods, Madison, May 1903, Rehm *vid.*

Thecotheus Pelletieri (Crouan) Boud.

On cow dung, under dense growth of coniferous trees, Schmeiling's
grove, Algoma, August 1909 (Dodge); Madison (Overton).

Rhyarobius sexdecimsporus (Crouan.) Sacc.

On dry cow dung, Schmeiling's grove, Algoma, August 1909 (Dodge).

Saccobolus Kerverni Crouan.

On cow dung, Blahnik's grove, Algoma, August 1909 (Dodge).

Ascobolus immersus Pers.

Easily recognized by the large spores, 35x60 mic. in many plants.
On cow dung, Blahnik's grove, Algoma, August 1909 (Dodge).

Ascobolus stercorarius (Bull.) Schroet.

Common on cow dung, in dense shade, under coniferous trees,
Krohn's Lake and Schmeiling's grove, Algoma, August 1909 (Dodge).

RHIZINACEAE.

Psilopeziza nummularis Berk. (Hook., *Lond. Jour.*, 1847, p. 235).

A species closely adnate to the wood upon which it grows. Superior, September 1907 (Gilbert).

Psilopeziza orbicularis (Peck). Bull. N. Y. State Mus., vol. I, no. 2, pl. 2, figs. 4-6.

A species closely related to the preceding in the manner in which the apothecia are adnate to the substratum. In very large plants the margin is somewhat free and has the whitish, slimy exterior so well described by Peck. On water-soaked logs, Detjen's swamp, Algoma, September 1909 (Dodge).

GEOGLOSSACEAE.

Microglossum olivaceum (Pers.) Gill.

Superior, September 1907 (Gilbert).

Microglossum rufum (Schw.) Und.

Durand, *Ann Myc.*, 6. 406, 1908 makes *Geoglossum luteum* a synonym of *M. rufum*. Devil's Lake, July 1905 (R. A. and A. M. Harper); Blueberry, September 1907. Tenderfoot Lake, September 1905 (Denniston); Parfrey's glen, September 1905; Devil's Lake, July 1907 (Harper); Devil's Lake, August 1906; Sturgeon Bay, August 1906, 1907 (R. Allen).

Geoglossum velutipes Pk.

Blue Mounds, August 1903 (no. 421, R. A. and A. M. Harper), Rahm *vid.*; Devil's Lake, July 1905 (Harper); Algoma, September 1912 (Dodge).

Geoglossum glabrum Pers.

See *Trans. Wis. Acad. Sci.* 16; 1171-1190, 1910 (Jolivette).

Spathularia clavata (Schaeff.) Sacc.

On the ground among decayed pieces of wood, Ladysmith, August 1904 no. 210, Neuman; Carr Lake, August 1904; Brule, September 1905 (Overton); Tenderfoot Lake, September 1905 (Denniston); Sturgeon Bay, June 1906, August 1907 (R. Allen); Devine's woods, Algoma, September 1905 (Dodge).

Spathularia velutipes Cooke & Farlow.

On decayed wood among moss, Schmeiling's woods, Algoma, August 1905 (Dodge); Muscallonge Lake, August 1904 (Harper); Sturgeon Bay, July 1905, August 1906 (R. Allen and H. Jolivet); Dells, Kilbourn, July 1906 (Harper); Krohn's Lake, Algoma, August 1909 (Dodge).

Leotia atrovirens Pers. (*L. chlorocephala* Schw.)

The specimens all correspond very closely to descriptions and figures as to the color of the species—dark green, drying black. Cf. Cooke, *Mycog.*, pl. 102 fig. 368; Murrill, *Mycologia*, 2, pl. 17, fig. 3. Durand (*Ann. Myc.*, 6:450) after a careful study of the species, basing his final opinion partly on Boudier's statement that there seemed to be a difference in the paraphyses, concluded that *L. chlorocephala* is not what European authors have called *L. atrovirens*. Warner's grove, Algoma, August 1904 (no. 862, Dodge); Devil's Lake, September 1904 Parfrey's glen, September 1905.

Leotia lubrica (Scop.) Pers.

Differs in its yellowish color from the preceding.

Blue Mounds, August 1900 (Lutman), August 1903, September 1904, August 1908; Parfrey's glen, August 1902, September 1906 (Jolivet); Watertown, August 1903, (Marquette); Lone Pine Lake, August 1904 (No. 250, Neuman); Ladysmith, August 1905, (no. 366 Neuman); Eagle Heights, August 1906; Sturgeon Bay, August 1907 (R. Allen); Blueberry, September 1907; Devil's Lake, August 1908.

Leotia stipitata (Bosc.) Schroet.

This form with a bright blue-green cap is accurately figured by Murrill, (*Mycologia*, 2, pl. 17, fig. 2.) Perry's woods, Algoma, July—September 1909 (Dodge). Krohn's Lake, Algoma, September 1912 (Dodge).

HELVELLACEAE.**Helvella atra** Koenig.

Tenderfoot Lake, September 1905 (Neuman):

Helvella crispa (Scop.) Fr.

Good figures of these plants are given in Diet., Deutsch. Crypt., pl. 31; Barla, Champ. Prov. Nice, pl. 43, fig. 1—5. Common, Dead Lake, September 1901; Eagle Heights, September 1903 (R. A. and A. M. Harper); Milwaukee, September 1903; Blue Mounds, September 1903; Devil's Lake, July 1905; Baraboo, October 1907 (Mrs. English); Madi-

son, October 1900, 1907; Ladysmith, August 1905; Bangor, September 1905 (Neuman); Tenderfoot Lake, September 1905; Blueberry, September 1907; Alton, September 1909; Danek's woods, Algoma, September 1904—1909 (Dodge).

***Helvella elastica* Bull.**

Milwaukee, November 1903 (Thal); Lake Waubesa, July 1904; Cemetery woods, Madison, July 1904; Vilas' woods, June 1905; campus, July 1907; Blahnik's woods, Algoma, September 1904 (Dodge); Devil's Lake, June 1906, July 1907; Blue Mounds, July 1907—1909; Sturgeon Bay, August 1907 (R. Allen); Mile Bluff, Mauston, June 1909 (J. Dodge).

***Helvella Ehippium* Lev.**

The spores are 8—10x15—16 mic. Boudier, *Icones, Myc., pl. 236, no. 572*, gives the spore measurements as 22—25x9—10 for *Leptodia Cookeiana* Boud., which he considers the same species as figured by Cooke, *Mycog., pl. 43, fig. 169*. Rehm, *Disc., p. 1181*, cites Cook's figure as excellent for *H. Ehippium*. Milwaukee, September 1903.

***Helvella fusca* Gill. var. *bresadolae* Boud.**

A species with broad spores well figured by Bresadola, *Fungi Trid., pl. 212*. Locality and date of collection not stated.

***Helvella inflata* Cum.**

Although neither Underwood, *Dis. N. A. Helvellales*, nor Hone, *Minn. Helvellineae*, mentions this species, it seems to be quite distinct from *H. infula*. *H. inflata*, commonly grows on the ground, is much larger, more bladdery or inflated. Krom, *Schwamme, pl. 1, fig. 14 17*, gives good figures for the species. Star Lake, August 1901, August 1904, (no. 250, 292, Harper); Muscallonge Lake, August 1904 (no. 310, Harper); Sturgeon Bay, August 1910 (R. Allen); Blueberry, September 1907; Superior, September 1907, (Gilbert).

***Helvella infula* Schaeff.**

The margin of the pileus is attached to the stem, which is flattened and tapers downward as figured by Schaeffer, *Icones Fung., pl. 159, fig. 2*; and by Cooke, *Mycog., pl. 2, fig. 334*. On dry, exposed root of coniferous stump, Schmeiling's swamp, Algoma, June 1905 (Dodge).

***Helvella lacunosa* Afz.**

Blue Mounds, August 1903; Homewood, August 1903; Burlington, July 1903 (Denniston); Algoma, September 1904—1909 (Dodge); Eagle Heights, October 1906; Madison, July 1907 (no. 1251, E. T. Harper); Sturgeon Bay, August 1907 (R. Allen); Milwaukee, October 1908;

Helvella pallescens Schaeff.

These plants correspond well with the figures by Schaeffer, *Icones*, pl. 322, and Bresadola, *Fung. Trid.* pl. 146, in having a long, deeply sulcate stipe. On the ground among needles, Blahnik's woods, Algoma, September 1904–1909 (Dodge). Rehm *vid.*

Gyromitra curtipes Fr.

On the ground, Danek's woods, May 1906. (Dodge).

Gyromitra gigas (Krombh.) Cke.

Barron, May 1906 (no. 1., Cheney).

Verpa digitaliformis Pers.

Woods, near coal shed, Madison, May 1903; on ground in lawn, Wodsedalek's, Algoma, May 1905 (G. Andregg).

Verpa perpusilla Rehm. (*Ann. Myc.*, 7: 526, 1909).

Apothecia gregarious, arising from a subterranean white mycelium, erect, stipitate, obtusely campanulate, apex often depressed, acute, margin not inrolled nor folded, exterior subfuscous, 0.5–1 cm. high, up to 2 cm. broad, stipe central, more or less cylindrical, 3 mm. thick, up to 5 mm. thick and sub-compressed at the base, solid, smooth, 1.5–5 cm. high, yellowish or whitish. Asci cylindrical, rounded at the apex, 200x14 mic., 8-spored. Spores ellipsoid, obtuse at both ends, one-celled, one large central oil globule, 15–20x9–10 mic., monostichous. Paraphyses filiform, gradually enlarging toward the apex to 8 mic., hyaline.

"*Verpa pusilla* Quel. (*Sacc.*, 8: 72, Cooke, *Mycog.*, pl. 101, fig. 366) differs in the form of the cap, in the color of its under surface, spores without oil globules, and brown paraphyses."

Helvella elastica is often found in the same locality. Under tamarack and fir, Blahnik's woods, Algoma, August 1909 (no. 1857, Rehm *Asc. Exs.*, Dodge).

Morchella bispora Sorok.

Probably identical with *Verpa bohemica*. The Madison forms show ridges of the hymenium markedly reticulated.

Milwaukee, April 1905; Madison.

Morchella conica Pers.

This species has frequently been called a variety of *M. esculenta*. The pileus is distinctly conical and brown, clearly different from the yellowish-olive, more or less rounded pileus of *M. esculenta*. Kromholz, Schwamme, pl. 16, fig. 7, 8, 10, represents the smaller forms, and

fig. 12, for var. *ceracea*, the large forms. Under maple and pine, along edge of woods in pastures, Algoma, May-June 1905 (Dodge); Blue Mounds, May 1902; Windsor, Madison, May 1905.

***Morchella crassipes* (Vent.) Pers.**

The long, thick, brittle stipe distinguishes the species from *M. conica*. Perry's woods, Algoma, June 1905 (Dodge); Eagle Heights, May 1906; Blue Mounds, June 1906.

***Morchella esculenta* (L.) Pers.**

In lawns and pastures and in oak woods. Cemetery woods, Madison, May 1903 (Harper); I. C. R. R., near Madison May 1906 (Denniston); Windsor road, May 1905; Rock Cut, May 1905; Minequah, May 1906; Algoma, June 1905 (Dodge).

***Morchella hybrida* (Sow.) Pers. (*M. semilibero* D. C.).**

Cooke, *Mycog.*, *pl. 85, fig. 321*, shows both the low and the high forms. Madison, June 1901 (R. A. Harper); Fuller's woods, Madison, May 1908 (Arzberger); Milwaukee, May 1908 (Sherman).

