

shaped, 50-65 x 15-25 micr., sparse. ODOR weak, somewhat like pears, agreeable."

Reported by Longyear. The description has been adapted from Ricken, who gives the characters most fully. Ricken's diagnosis agrees in microscopic details with most other authors, except that his plants are very large. Patouillard gives the same spores as Ricken, but figures a small plant. Cooke (Ill., Pl. 391) figures a plant whose spores measured 11 x 6 micr. Cooke's spore-size has been copied by Massee and Schroeter. Thus, there seem to be two species at present confused under this name. I have not seen a plant which could be referred to either.

471. *Inocybe lacera* Fr.

Syst. Myc., 1821.

Illustrations: Ricken, Die Blätterpilze, Pl. 30, Fig. 4, 1911.

Patouillard, Tab. Analyt., No. 531.

Cooke, Ill., Pl. 583.

"PILEUS 3-5 cm. broad, umbonate-expanded, at times depressed, umbo obtuse, *fawn-brown to mouse-gray*, at first almost glabrous-fibrillose, soon fibrillose-scaly, becoming ragged around the umbo; FLESH thin, whitish. GILLS rounded-adnexed, broad, ventricose, subdistant, brownish-clay color, at length concolor. STEM 3-4 cm. long, 4-5 mm. thick, subequal, *brownish*, with red-brown fibrils, *apex naked*, white-mycelioid at base, stuffed, *reddish within*. SPORES almost *cylindrical, long and narrow*, straight, 12-18 x 4-6 micr., smooth. CYSTIDIA on sides and edge of gills, narrow-lanceolate, 54-70 x 14-17 micr., rounded above. ODOR slight; *taste mild*."

Reported by Longyear.

Apparently well-marked by the long, cylindrical spores. Patouillard gives the spores of somewhat different size, 10-13 x 6-7 micr. The above description is adapted from Ricken. An unusual mark of this species is the naked apex of the stem; in most species this is pruinose or scurfy. A form occurred at New Richmond, which agreed except that the spores were the size of those of *I. infelix*.

472. *Inocybe infelix* Pk. (POISONOUS)

N. Y. State Mus. Rep. 32, 1879.

PILEUS 1-2.5 cm. broad, *rather small*, campanulate then ex-

panded-plane, *umbonate*, grayish-brown, *umbo cinnamon or umber*, fibrillose at first, becoming fibrillose-scaly or floccose-scaly, flesh thin, whitish. GILLS adnexed, rather broad, ventricose, close, whitish becoming cinnamon. STEM 2-5 cm. long, 2-3 mm. thick, equal, stuffed, silky-fibrillose, whitish or faintly violaceous at apex, becoming dingy brown below, white within. SPORES *elongated-oblong*, smooth, 10-14 x 4-6 micr. CYSTIDIA flask-shaped, 50-70 x 15-20 micr., apex crystallate. ODOR slight.

Solitary or gregarious. On low, wet ground. Ann Arbor, Bay View. May-July. Frequent.

Scarcely differs from preceding except in size. In those plants which grow in wet places the stem is hollow. Peck says the cuticle of the pileus is more lacerated in wet weather than in dry weather.

473. *Inocybe flocculosa* Berk.

Eng. Flora.

Illustration: Cooke, Ill., Pl. 393.

PILEUS 1-2 cm. broad, subcampanulate, expanded-umbonate, *tawny-brown with tinge of fuscous*, fibrillose-scaly, not rimose. GILLS rounded-adnate, broad, *ventricose*, almost subdistant, brownish-ashy then concolor, edge fimbriate-crenulate. STEM 1-2 cm. long, 1-2 mm. thick, equal, hollow, pruinose-hoary, scurfy at apex, *tinged brown*. SPORES 8-9 x 4-6, elliptical-ovate, *smooth*. CYSTIDIA on sides and edge of gills, flask-shaped, apex crystallate, about 60 micr. long.

Among spruce needles and on the ground in swamps. Bay View. New Richmond. August.

This little species is usually found in low, wet places. The stem is tinged rufous-brown in most cases.

***Spores angular*.

474. *Inocybe decipientoides* Pk.

Torr. Bot. Club Bull. 34, p. 100, 1907.

PILEUS 1-4 cm. broad, campanulate-convex, expanded-umbonate, umbo subconic, *silky-floccose*, then scaly-diffracted, dry, brownish-ochraceous; flesh thin, pallid. GILLS adnate, broad, close, whitish

at first then *lurid-cinnamon*, edge white-fimbriate. STEM 4-5 cm. long, 2-5 mm. thick, equal, usually slender, glabrous to subfibrillose, slightly striate, whitish or pallid, apex white-pruinose, base bulbil-late, stuffed. SPORES irregularly wedge-shape, subrectangular, etc., *tuberculate*, 9-13 x 5-7 micr. CYSTIDIA on sides and edge of gills, ventricose-elliptical, slender pediceled, 50-60 x 12-18 micr. ODOR and TASTE slight.

Gregarious. On the ground, grassy places in low frondose woods. Detroit. June. Rare.

This is a species very clearly marked by the peculiar spores.

Section III. Rimosae. Pileus radiately fibrous, soon *rimose*, sometimes subscaly or adpressed-scaly.

**Spores smooth.*

475. *Inocybe frumentacea* Bres.

Fung. Trid., Vol. II, 1892.

Illustrations: Ibid, Pl. 200.

Bres., Fung. Trid., Vol. I, Pl. 87 (as *I. rhodiola* Bres.).

Patouillard, Tab. Analyt., No. 551 (as *I. jurana* Pat.).

Plate XCII of this Report.

PILEUS large, 3-8 cm. broad, rigid-firm, campanulate at first, then expanded and broadly umbonate, fibrillose, becoming *rimose* or scaly, *fibrils and scales brown-purplish to reddish-chestnut with a dark vinaceous tint*, umbo darker; flesh thick, white, vinaceous under cuticle. GILLS adnexed, at length emarginate-uncinate, close, not broad, thickish, white at first, then grayish-brown, edge white-flocculose, becoming rufescent-spotted. STEM 3-8 cm. long, rather stout, 6-12 mm. thick, equal, terete or compressed, sometimes twisted, fibrillose, apex glabrous or sub-floccose, whitish, *rufous-vinaceous below*, becoming spotted with the same color where handled, solid. SPORES broadly elliptic-subreniform, *smooth*, epispore strongly colored, 10-13 x 6-7 micr. CYSTIDIA none. *Sterile cells* on edge of gills obclavate, or subcylindrical, rounded-inflated above, 45-60 x 9-12 micr. ODOR and TASTE slight, of meal.

Gregarious. On the ground in low places under frondose trees in Belle Isle Park, Detroit and near Ann Arbor. August and July.

This large, wine-colored *Inocybe* was found in abundance in the above localities during two seasons. It corresponded accurately to the figures of Bresadola, Plate 200, in shape and stoutness. In age or after lying for a day, the characteristic dark vinaceous color becomes more marked. The umbo is broad and in half-expanded caps a gibbous condition is not unusual. It has the appearance of a *Tricholoma*.

I. jurana Pat. seems to be a distinct plant, although referred to by Bresadola as a synonym of *I. frumentacea*. Our photograph shows the shape and habit well. The pileus is at first conic-elliptical, then campanulate. The stem is more slender than that of *I. frumentacea*, and the spores are smaller, 9-10 x 5-6 micr. There are no cystidia, and the sterile cells on the edge of the gills are of the same size. The other characters are very similar.

Gregarious. On the ground, in low frondose woods. Ann Arbor. August.

476. *Inocybe rimosa* Pk. (SENSE OF RICKEN)

Syst. Myc., 1821.

Illustrations: Gillet, Champignons de France, No. 371.

Cooke, Ill., Plate 384.

Ricken, Die Blätterpilze, Pl. 30, Fig. 8.

Murrill, Mycologia, Vol. 4, Pl. 56, Fig. 7.

PILEUS 3-6 cm. broad, oval-campanulate then expanded and obtuse or subumbonate, silky-fibrillose, *at length rimose* and virgate, often split on the margin, *brown*, tinged yellowish in age, margin at length recurved; FLESH pallid, fragile. GILLS almost free, *narrow*, scarcely ventricose, crowded, cinereous-clay color, edge white-fimbriate. STEM 4-8 cm. long, 5-7 mm. thick, equal, straight or curved at base, whitish or pallid, solid, subglabrous, apex white-mealy, *base usually with a marked rounded or subdepressed bulb*. SPORES *short*, reniform, very obtuse at ends, *smooth*, 7-9 x 5-6 micr. CYSTIDIA none; STERILE CELLS on edge of gills, saccate, 30-40 x 12 micr. ODOR after crushing rather strong and nauseous; TASTE disagreeable.

Gregarious. On the ground, in low frondose woods. Ann Arbor. August. Infrequent.

Dark individuals of this species have the appearance of non-scaly forms of *I. destriata* and a microscopic examination is usually necessary to distinguish them. In age the color of different caps

varies considerably in intensity. It is probably widely distributed, but I have few collections. The figure of Patouillard (Tab. Analyt., No. 114) shows the presence of cystidia and belongs elsewhere.

477. *Inocybe destricta* Fr. (MINOR)

Epicrisis, 1836-38. (As var. *I. rimosa*.)

Illustrations: Fries, Icones, Pl. 108.

Cooke's Ill., Pl. 387.

Ricken, Die Blätterpilze, Pl. 29, Fig. 9.

PILEUS 2-4 cm. broad, conic-campanulate, then expanded-umbonate, at length depressed around the darker abrupt umbo, dark brown, rufous-brown or ochraceous-brown, *umbo persistently dark chestnut* or umber, fibrillose at first, *at length lacerate-scaly or rimose, or both*; FLESH thin, whitish. GILLS sinuate-adnexed or deeply emarginate, uncinata, *ventricose*, medium broad, close to subdistant, whitish then *pale brownish-ashy*, edge white-fimbriate. STEM 2.5-5 cm. long, 2.5-5 mm. thick, equal, scarcely bulbillate, *pallid, tinged with rufous*, varying flocculose-fibrillose to glabrous, apex pruinata, solid, white within. SPORES subreniform, inequilateral, *smooth*, 8-10 x 5-5.5 micr. CYSTIDIA abundant on sides and edge of gills, ventricose, stout above, apex crystallate, 50-65 x 15-18 micr. ODOR at first slight then somewhat nauseous.

Gregarious. On the ground in coniferous forests of pine and hemlock. Bay View, New Richmond. August-September. Frequent.

This is a variable plant, and when developed under moist weather conditions the cap becomes lacerate-scaly and often excoriate in part, and is then non-rimose; in dry weather it becomes markedly rimose and less scaly. When young or freshly expanded the pileus is usually densely fibrillose and its edge minutely appendiculate by the remains of the rather copious, white cortina. At first the pileus is dark brown, but in age it becomes somewhat ochraceous-brown beyond the umbo. The faint tinge of rufous on the older stems is a well-marked character, duly noted by Fries. The spores are markedly subreniform in one view, short fusiform-ovate in the other view. Our collections contain mostly plants with a rather longer stem and narrower cap than shown by the figures of Cooke and Fries. It is easily confused in some of its forms with *I. rimosa*, but differs in possessing abundant cystidia. Occasionally a troop

of dwarf forms occurs, which, however, scarcely differ except in the shorter stem.

478. *Inocybe fastigiata* Bres.

Fung. Trid., Vol. I, 1881.

Illustrations: Ibid, Pl. 57.

Cooke, Ill., Pl. 383.

Patouillard, Tab. Analyt., No. 343.

Fries, Icones, Pl. 108.

Ricken, Die Blätterpilze, Pl. 31, Fig. 1.

Plate XCIII of this Report.

PILEUS 2-7 cm. broad, *typically very conical or conico-campanulate*, sometimes oval-campanulate, at length subexpanded, *usually with a prominent umbo*, radially fibrillose, *rimose*, virgate, *rich yellowish-fuscous*, ochraceous-tan or straw-color, margin at length split or lobed; FLESH white. GILLS adnexed, becoming sinuate-free, and narrower behind, not broad, ventricose, close, whitish at first, soon tinged *olive or gray*, darker in age. STEM 4-8 cm. long, 4-10 mm. thick, equal or tapering upwards, solid, more or less fibrillose or scurfy, white or slightly fuscous, sometimes twisted or obscurely striate. SPORES elliptic-subreniform, *smooth* (not angular), obtuse at ends, 9-12 x 5-6 micr. CYSTIDIA none. STERILE CELLS on edge of gills saccate. ODOR strong and disagreeable or entirely lacking.

Gregarious. On the ground, in low, moist places in frondose or conifer woods. Throughout the State. July-September. Frequent.

This is a striking species, and quite variable. The stem may be dull whitish to pale ochraceous. Small forms occur with cap less campanulate and at length papillate. The odor may be very strong or altogether absent. All these forms agree in having the same size spores, gills of the same color and no cystidia. The color of the pileus is sometimes a rich pheasant-yellow, sometimes fulvous-ochraceous, at other times much paler. The English authors, Masee and Berkley, were in error when they assigned rough, nodulose spores to this species. (British Fungus Flora and Outlines.)

479. *Inocybe curreyi* Berk.

Outlines of Brit. Fung., 1860.

Illustration: Cooke, Ill., Pl. 398.

PILEUS 2-4 cm. broad, irregularly convex-campanulate, obtuse, not umbonate, gibbous at times, appressed-fibrillose, at length rimose, *pale tawny-yellowish*, edge undulate; FLESH white. GILLS slightly adnexed, rather broad, close, *becoming smoky-olivaceous*, edge white-fimbriate. STEM 2-4 cm. long, variously curved, *tapering upward from a subclavate base*, not bulbous, solid, slightly fibrillose, glabrescent, whitish at first, furfuraceous-scaly at apex. SPORES elliptic-subreniform, obtuse at ends, 7-9.5 x 5-5.5 micr., *smooth*, fuscous-cinnamon in mass. CYSTIDIA none. STERILE CELLS on edge of gills saccate. ODOR strongly earthy when crushed.

Gregarious. On the ground among grass in frondose woods. Ann Arbor. July-August. Not infrequent.

This plant is referred to this form with some hesitation as published details of Berkley's species, especially as to the microscopic characters, are insufficient. The color of the pileus approaches *I. fastigiata* rather closely, but it is not conical nor truly umbonate, and the spores are constantly smaller. From the following it is distinguishable by the very different form of the stem and by the color of the pileus. Patouillard gives the spores 6 x 4 micr., in which he is quite at variance with the British authors.

480. *Inocybe cookei* Bres.

Fung. Trid., Vol. 2, 1892.

Illustration: Ibid, Pl. 121.

PILEUS 1.5-4 cm. broad, subconic-campanulate, expanded-umbonate, silky-fibrillose, at length rimose, glabrous on center, *straw-yellow, becoming sordid lutescent*, margin at length wavy or split; FLESH whitish. GILLS sinuate-adnexed or almost free, scarcely ventricose, narrow, close, whitish at first, soon tinged ashy-ochraceous-cinnamon, edge white-fimbriate. STEM 2.5-5 cm. long, 3-5 mm. thick, equal, solid, silky-fibrillose, pruinose at apex, *with a marginate distinct bulb*, whitish at first, *lutescent*. SPORES 8-9.5 x 4.5-5.5 micr., elliptic-subreniform, obtuse at ends, *smooth*.

CYSTIDIA none. STERILE CELLS on edge of gills, inflated-obclavate, 30 x 12-15 micr.

Gregarious. On moist ground in frondose and coniferous woods. Ann Arbor, Bay View, New Richmond. August-September. Infrequent.

The uniform pale yellow color of the pileus which becomes deeper in age, the lutescent stem and margined bulb are characters which separate this from the two preceding species. The odor is scarcely noticeable at times but occasionally it is rather strong of rancid meal.

481. *Inocybe lanotodisca* sp. nov.

PILEUS 2-4 cm. broad, rarely broader, convex-campanulate, obtuse or broadly umbonate, ground-color pale ochraceous-brownish or pale tawny, *at first covered by a white, mouldy-like silkiness on the center, when expanded subzonate by the subconcentric arrangement of the downy-silky fibrils*, at length rimose; FLESH white, rather thick on disk. GILLS adnexed-emarginate, moderately broad, close, at length cinereous-alutaceous, edge white-fimbriate. STEM 3-5 cm. long, 4-6 mm. thick, equal or subequal, solid, glabrescent, apex pruinose-scaly, white, becoming pale sordid yellowish in age. SPORES elliptic-subreniform, *smooth*, obtuse at ends, 9-10.5 x 5-6 micr. CYSTIDIA none. STERILE CELLS on edge of gills, obclavate, attenuated downward. BASIDIA clavate, 33 x 9 micr., 4-spored. ODOR nauseous on crushing the plant.

Gregarious to subcaespitose. On the ground in low frondose woods. Ann Arbor. August-September. Infrequent.

A well-marked species; to be known by the hoary-silkiness on the central portion of the pileus and by the lack of cystidia. It approaches *I. sindonia* in appearance, but that species has abundant cystidia, the cap is not rimose, and the covering of the pileus is differently disposed. The habit varies from rather slender forms to those quite stout. As the pileus expands the white fibrils are disposed over a larger area.

482. *Inocybe eutheloides* Pk.

N. Y. State Mus. Rep. 32, 1879.

PILEUS 1-2.5 cm. broad, conico-campanulate, then expanded-umbonate, *fawn-color to grayish-fawn*, darker to chestnut when

young or on the *distinct umbo*, silky-fibrillose, at length rimose, sometimes appressed-scaly. GILLS adnexed, rather broad, ventricose, close, whitish then brownish-cinnamon, white-fimbriate on edge. STEM 2-5 cm. long, 2-4 mm. thick, equal, subbulbillate at base, solid, densely white-fibrillose when young, subglabrescent, apex scurfy-pruinose. SPORES 8-10 (rarely longer) x 4.5-5.5 micr., variable in shape, subreniform-fusoid, ends somewhat narrowed, smooth. CYSTIDIA rather abundant on sides and edge of gills, narrowly flask-shaped, apex crystallate, 50-70 x 12-16 micr. BASIDIA 30 x 9 micr., 4-spored. ODOR slight.

Gregarious. Common in southern Michigan; on the ground in low frondose woods. June-September.

This is closely allied to *I. dstricta*, form *minor*, in its microscopic characters. The colors are, however, constantly distinct, and *I. dstricta* seems limited to coniferous regions. *I. eutheoides* also approaches *I. eutheles* as interpreted by some authors, e. g., Massee. But according to Patouillard that species is devoid of cystidia. The stem is usually markedly silky-fibrillose, and the umbo is dark chestnut in young and fresh specimens. In young specimens the margin of the pileus is often crenately fringed by the white cortina.

**Spores angular-tuberculate.

483. *Inocybe radiata* Pk. (POISONOUS)

Torr. Bot. Club Bull. 22, p. 488, 1895.

PILEUS 1.5-5 cm. broad, campanulate, fuscous-brown to ochraceous-brown, very umbonate by an obtuse, dark amber umbo, which remains glabrous, elsewhere appressed-fibrillose with brown fibrils, not at all viscid, becoming rimose; FLESH white, thickish on disk. GILLS adnate, broad, at length sinuate-uncinate, close, becoming ochraceous-cinnamon to subferruginous, edge white, flocculose. STEM 3-6 cm. long, 2-4 mm. thick, equal, stuffed, silky-fibrillose, becoming amber-fuscous-brown, apex paler, subbulbillate and white-mycelioid at base. SPORES irregularly oblong-rectangular to sub-wedge shape in outline, angular and with few scattered tubercles, 7-9 x 5-6 micr. CYSTIDIA few or scattered, on sides and edge of gills, 55-65 x 12-18 micr., broadly ventricose, apex somewhat pointed and crystallate, on slender pedicel. ODOR earthy. TASTE mild.

Gregarious. On the ground, in frondose woods. August. Ann Arbor.

This seems to be intermediate between *I. carpta* Bres. and *I. umbrina* Bres. in its microscopic characters. The umbo does not become warty nor scaly and is not subviscid as in the latter species. The same species has been received from Massachusetts; it was sent by Simon Davis, who reports it poisonous.

484. *Inocybe fibrosa* Bres. (POISONOUS)

Fung. Trid., Vol. I, 1881.

Illustrations: Ibid, Pl. 56.

Cooke, Ill., Pl. 454.

Ricken, Die Blätterpilze, Pl. 29, Fig. 8.

Plate XCIV of this Report.

PILEUS 4-8 cm. broad, large, obtusely campanulate, then broadly umbonate and expanded, dry, creamy-white or tinged straw-color, sometimes ochraceous-stained, silky, at length rimose and margin lobed, split or recurved; FLESH white, thick, thin on margin. GILLS free, rounded behind, ventricose, broader toward front, close, whitish at first, then ashy-cinnamon, edge white-fimbriate. STEM 4-8 cm. long, 6-15 mm. thick, fibrous, splitting longitudinally, subequal, striatulate to subsulcate, glabrescent, apex pruinose, white then sordid, base often subbulbous. SPORES angular-oblong, with obscure, scattered tubercles, 9-13 x 5-7 micr., epispore reddish under the microscope. CYSTIDIA fusoid, crystallate at apex, abundant on sides and edge of gills, 60-75 x 10-15 micr. ODOR earthy. TASTE mild.

Gregarious. On the ground, in low, moist, frondose woods. June-August. Ann Arbor. Infrequent.

Apparently our largest species. The spores are inclined to be more or less sinuate-tuberculate, but the angularity is not as marked as in many others. The character of the surface of the pileus is much like *I. fastigitata* except in color. It appears earlier than most *Inocybes*, and is said to be poisonous. (See Bresadola, Fung. Trid.)

485. *Inocybe albodisca* Pk.

N. Y. State Mus. Rep. 51, 1898.

PILEUS 1.5-3.5 cm. broad, conical at first, soon campanulate-umbonate or expanded, *umbo lubricus-glabrous, obtuse and whitish*, elsewhere silky, at first pale lilac-flesh color, at length *grayish-drab* and rimose; FLESH whitish, not changing color. GILLS rather narrow, close, narrowly adnate, whitish at first, then subferruginous, edge minutely white-flocculose. STEM 3-5 cm. long, 3-5 mm. thick, equal, subbulbulate to somewhat marginate-bulbous, solid, *glabrous* or upper part pruinose, at first tinged by color of pileus, fading, even. SPORES *sinuate-angular*, subrectangular to subglobose in outline, shape variable, 7-8 x 5-6 micr., nucleate. CYSTIDIA very abundant on sides and edge of gills, crystallate at apex, fusoid-ventricose, about 50 x 15 micr. Basidia 33 x 9 micr., 4-spored. ODOR slight, subnauseous.

Gregarious-scattered. On the ground, clay soil of hemlock and beech woods. New Richmond. September. Infrequent.

Known by its glabrous, whitish, obtuse umbo, submarginate bulb, and the peculiar shade of pale lilac-incarnate color when young. This color disappears in older specimens where the cap takes on a grayish shade and becomes rimose. The spores distinguish it sharply from *I. lanatodisca*, and the smaller size of the plant and spores separate it from *I. fibrosa*. It is closely related to *I. umbratica* Bres. and *I. fallax* Pk.

486. *Inocybe asterospora* Quel.

Bull. Soc. Bot. France, Vol. 26, p. 50, 1879.

Illustrations: Ricken, Die Blätterpilze, Pl. 29, Fig. 1.

Cooke, III., Pl. 385.

Patouillard, Tab. Analyt., No. 546.

PILEUS 2-5 cm. broad, conic-campanulate to convex-umbonate, brown or rufous-brown, *very rimose*, fibrillose-scaly; FLESH pallid, rather thin. GILLS narrowly adnate, emarginate, ventricose, close, at length olivaceous-cinnamon or grayish-brown. STEM 4-6 cm. long, 2.5-6 mm. thick, equal above the submarginate or rounded bulb, *rufescent*, innately striatulate, *mealy-pubescent*, fibrous, solid. SPORES subspheroid, slightly longer than broad, covered with

blunt, subcylindrical tubercles which are broader toward base, 9-11 micr. CYSTIDIA abundant on sides and edge of gills, 50-75 x 15-24 micr., ventricose, apex crystallate. ODOR slight or subnauseous.

Gregarious. In low, sandy, frondose woods. Ann Arbor. June-August.

It is rather difficult to keep *I. asterospora* and *I. calospora* distinct. The rimose and scaly characters by which they are set apart may vary under certain weather conditions so as to be obliterated. The spores are very similar, but those of *I. asterospora* are not as truly spherical as in *I. calospora*. With us this species tends to be smaller than the figures show it. It is at once separable from the other red-brown species by the spiny-tuberculate spores.

Section IV. Velutinae. Pileus not rimose, cuticle of interwoven fibrils, glabrescent or appressed-scaly.

**Spores angular-tuberculate.*

487. *Inocybe repanda* Bres.

Fung. Trid., Vol. II, 1892.

Illustrations: Ibid, Pl. 119.

Plate XCV of this Report.

PILEUS 3-5 cm. broad, obtusely conic-campanulate, then expanded and broadly umbonate, umbo fulvous and glabrous, *elsewhere covered with orange-fulvous fibrils on a whitish foundation*, sublubricous, margin at length split or subrimose, sometimes scaly-cracked. FLESH white, rather fragile, thick on disk. GILLS adnexed or almost free, broad, subventricose, close, at first white, *rufescent*, finally argillaceous-cinnamon, edge white-fimbriate. STEM 3-6 cm. long, strict, 5-6 mm. thick, equal above the abrupt or rounded bulb, stuffed, terete, even, slightly silky fibrillose, *the fibrils fulvous-tinged toward base*, apex white-pruinose. SPORES angular, 7-9.5 x 6-7 micr., longer than wide, sometimes rectangular in outline, *with minute papillate tubercles*. CYSTIDIA moderately abundant on edge and sides of gills, ventricose-fusiform, apex crystallate, 60-75 x 12-18 micr. ODOR and TASTE mild.

Gregarious. On the ground, in low frondose woods. Ann Arbor. July-August. Infrequent.

This is one of our larger *Inocybes* and is well-marked. The flesh

does not readily become rufescent in our plants, yet there is little doubt that the plant is the one described by Bresadola.

***Spores smooth.*

488. *Inocybe sindonia* Fr.

Epicrisis, 1836-38.

Illustrations: Cooke, Ill., Pl. 400.

Ricken, Die Blätterpilze, Pl. 30, Fig. 7.

PILEUS 2-6 cm. broad, at first obtusely conic-oval, then campanulate-expanded and *broadly umbonate, cortinate, at first woolly-fibrillose from dense white fibrils*, later subglabrescent, not rimose, *whitish* becoming straw-yellow to dingy ochraceous in age. FLESH compact, thick on disk, white. GILLS emarginate-adnexed or almost free, moderately broad, ventricose, close, at first pale grayish-white then grayish-clay color. STEM 3-6 cm. long, 4-9 mm. thick, equal above the submarginate bulb, *white*, stuffed, often striate, silky shining, at first fibrillose, flesh satiny-shining. SPORES subreniform, *smooth*, relatively broad, 8-10 x 5-6 micr. CYSTIDIA abundant on sides and edge of gills, ventricose-lanceolate to subcylindrical, apex crystallate, 60-75 x 15-20 micr. ODOR rather strong, somewhat nauseous.

Gregarious. On the ground, in low, rich, frondose woods. Ann Arbor. August-September. Infrequent.

Without an examination of the microscopic characters, this species might easily be confused with *I. lanatodisca*. In the young stage the white woolly-fibrillose cortina is continuous with the fibrils on the margin of the cap. At maturity the pileus becomes glabrous, especially on the disk, while in *I. lanatodisca* the disk is marked at last by the white fibrils. It is probable that Hard's Fig. 218, p. 269, Mushroom Book, of *I. subochracea* var. *burtii* Pk. is referable to this species.

489. *Inocybe subochracea* Pk.

N. Y. State Mus. Rep. 23, 1872 (as Hebeloma).

Illustration: N. Y. State Mus. Rep. 54, Pl. H. (as var. *burtii*).

PILEUS 2-3.5 cm. broad, *conical at first*, then convex-campanulate, umbonate, *ochraceous or ochraceous-yellow*, appressed fibril-

lose subscaly, darker and more scaly on disk, *not rimose*. FLESH *white, thin*. GILLS sinuate-adnexed, scarcely close, moderately broad, whitish then pale ochraceous-brown to rusty-brown. STEM 2.5-5 cm. long, 2-4 mm. thick, *equal*, solid, subglabrous, whitish, pallid ochraceous in age. SPORES broadly elliptic-subreniform, 7-9 x 4.5-5 micr., *smooth*. CYSTIDIA scattered on sides and edge of gills, apex crystallate, lanceolate, stipitate, *yellowish*, 70-90 x 12-20 micr. ODOR and TASTE mild.

Gregarious. On the ground, frondose woods. August-September. Ann Arbor.

This species has a smaller and more yellowish pileus than *I. sindonia*; the spores and cystidia are similar. A variety has been described by Peck with a distinct, webby cortina and more fibrillose stem, as var. *burtii*.

490. *Inocybe geophylla* Fr.

Syst. Myc., 1821.

Illustrations: Cooke, Ill., Pl. 401.

Gillet, Champignons de France, No. 364.

Patouillard, Tab. Analyt., No. 228.

PILEUS 1.5-2.5 cm. broad, conical at first, then expanded-umbonate, *very silky and glossy, white or whitish*, not rimose; FLESH white, thin. GILLS adnexed, close, rather broad, ventricose, whitish then pale grayish-clay color. STEM 2-5 cm. long, 2-3 mm. thick, slender, equal, firm, stuffed, *white*, silky, apex pruinose. SPORES elliptic-subreniform, *smooth*, 8-9 x 5 micr. CYSTIDIA fusiform, 40-55 x 12-15 micr. ODOR "slightly nauseous."

Gregarious or scattered. On the ground in frondose and conifer woods. Throughout the State. July-October. Common.

One of our commonest *Inocybes*, although not often found in abundance at one place. The clear, white, glossy cap and stem are characteristic. Other white species which have been described are: *I. comatella* Pk., a smaller plant, which has a hairy pileus and at times a reddish-brown stem, but the spores and cystidia are the same, usually grows on rotten wood; *I. fallax* Pk., with angular or nodulose spores; *I. infida* Pk., also with nodulose spores and a subscaly, reddish-brown umbo. Both the latter species have cystidia.

491. *Inocybe lilacina* (variety of preceding by authors)

Illustrations: Patouillard, Tab. Analyt., No. 545.

Ricken, Die Blätterpilze, Pl. 30, Fig. 2.

Hard, Mushrooms, Fig. 219, p. 270, 1908.

PILEUS lilaceous-violet, the umbo darker, almost smoky-purple at first. STEM pale lilac-violaceous to whitish. Otherwise like *I. geophylla*.

Gregarious. On the ground, in frondose and conifer woods. Throughout the State. August-October. Less frequent than *I. geophylla* Fr.

This is a pretty little plant, and is usually combined with *I. geophylla*. It is usually found in gregarious groups of several individuals and not mixed with *I. geophylla*. This fact and its constantly independent color, leads me to believe that it does not arise from the same mycelium as *I. geophylla*. The general appearance during development and the character of the surface of the cap, although not easily differentiated in words, seem sufficiently different from the white species.

492. *Inocybe scabella* Fr.

Syst. Myc., 1821.

Illustrations: Fries, Icones, Pl. 110, Fig. 1.

Bresadola, Fung. Trid., Vol. I, Pl. 86, Fig. 1.

Patouillard, Tab. Analyt., No. 229.

PILEUS 1.5-2.5 cm. broad, conico-campanulate, then expanded and with a naked, glabrous, obtuse, rather small umbo, silky elsewhere, dry, cinnamon-brown to sordid alutaceous, at length minutely appressed-fibrillose-scaly. FLESH thin, pallid. GILLS sinuate-adnexed, subdistant, ventricose, pale grayish-white, then sordid cinnamon, edge white-fimbriate. STEM 2.5-3.5 cm. long, 2-4 mm. thick, equal, stuffed, subfibrillose, soon glabrescent, pallid or slightly fuscous, slightly rufous upwards. SPORES almond-shaped, almost golden-yellow in microscope, smooth, 10-13 x 5-6 micr. CYSTIDIA fusoid-ventricose, on sides and edge of gills, apex crystallate, 60-70 x 13-14 micr. ODOR slightly rancid-subfarinaceous. TASTE sweetish.

Var. *rufa*: Whole plant pale rufous to sordid brick color. STEM more slender, 5-6 cm. long, 1-2 mm. thick. SPORES inequilateral,

elongated-elliptic, subacute at ends, smooth. CYSTIDIA abundant, ventricose flask shaped.

Gregarious. The variety is common in swampy or mossy wet places on rich soil, of cedar and hemlock woods. It scarcely differs except in color from the typical form as described by Bresadola. The wet habitat easily accounts for the more slender stem. The color, however, is constant in young and old plants, or may become brownish on the cap. The typical form is less easily distinguished, and approaches *I. trechispora*, an angular-spored species. In fact, Bresadola has pointed out that Patouillard's figure No. 547, and Cooke's Plate 402 are illustrations of *I. trechispora*. June-September. In coniferous regions. Houghton, Bay View, New Richmond.

Section V. *Viscidae*. Pileus viscid, more or less silky when dry.

*Spores angular-tubercular.

493. *Inocybe trechispora* Berk.

Outlines of Brit. Fung., 1860.

Illustrations: Ibid, Pl. 8, Fig. 6.

Cooke, Ill., Pl. 403 (Pl. 402 as *I. scabella*).

PILEUS 2-2.5 cm. broad, convex, expanded-umbonate, viscid, silky when dry, umbo tawny and naked, elsewhere tawny-ochraceous and paler. GILLS sinuate-adnexed, moderately broad, ventricose, close, white then grayish-brown, edge white-fimbriate. STEM 2.5-5 cm. long, 2-3 mm. thick, subequal, usually tapering upwards, marginate-bulbous at base, glabrous, apex pruinose, solid, white. SPORES tubercular-angular, slightly longer than wide, irregular in outline, 6-8 x 4-6 micr. CYSTIDIA ventricose, flask-shaped, 50 x 16-18 micr., apex crystallate and obtuse.

Gregarious. On the ground, among debris, in conifer swamps. Houghton, Bay View, New Richmond. August-September. Infrequent.

A small species, known by its viscid pileus with shining, naked and tawny umbo, by the rather abruptly marginate bulb of the stem and by the tuberculate spores. Our plant agrees with Berkeley's species in the spore character as given by Masee. Ricken has applied the name to a plant with spores 14-15 x 6-7 micr.

**Spores smooth.

494. *Inocybe glaber* sp. nov.

PILEUS 1.5-3.5 cm. broad, at first narrowly elliptic-oval, then campanulate-expanded and umbonate, *umbo glabrous-sublubricous*, sordid ochraceous-brown or livid-brown, at length darker on margin, paler on *umbo*, at first glabrous, at length subfibrillose, moist and shining, *becoming soft and fragile in moist weather*. FLESH thin. GILLS almost free, rather narrow, close, pallid then pale fuscous-brown, edge white-fimbriate. STEM 3-5 cm. long, 2.5-4 mm. thick, equal above the bulbillate base, glabrous, even, solid, white or pallid. SPORES subreniform, *smooth*, 7-9 x 4-5 micr. CYSTIDIA *none*. STERILE CELLS on edge of gills subcylindrical to rounded-enlarged at apex. ODOR nauseous to slightly radishy.

Gregarious. On the ground, in low frondose woods. Saginaw, Ann Arbor. July-September. Infrequent.

This species approaches the genus *Hebeloma* in some of the characters. The pileus becomes soft and watery at maturity and is easily crushed, and the odor is obsolete of radish. The shape of the young pileus is however distinctly *Inocybe*-like, and the plants were found growing with a number of other *Inocybes*. It seems to approach *Hebeloma discoloratum* Pk., but lacks the reddish tint on the cap, the hollow stem and the spores of that species. It is not truly viscid, even in moist weather, although the *umbo* is somewhat lubricous.

Hebeloma Fr.

(From the Greek, *hebe*, the vigor of youth, and *loma*, a fringe, referring to the presence of the *cortina* in the young plant.)

Ochre-brown-spored. Stem continuous with the pileus, *without a membranous annulus*; fleshy to fibrous; *partial veil in the form of a fibrillose cortina or lacking*; *no volva*; gills adnexed or emarginate; pileus *viscid or subviscid*, its margin at first incurved; *spores alutaceous*, never ferruginous.

Putrescent, *terrestrial*, often with a strong odor. They approach the terrestrial *Pholiotas* on the one hand, but without the membranous annulus, and *Inocybe*, *Flammula* and *Cortinarius* on the other. *Inocybe* differs in its silky or fibrillose-scaly pileus and verrucose-pointed cystidia; *Flammula*, in its non-emarginate, sub-

decurrent or broadly adnate gills, and mostly lignicolous habit; *Cortinarius*, in having a more delicately woven, spider web-like *cortina* and darker brown to ferruginous spores. *Hebeloma* corresponds to the genus *Tricholoma* of the white-spored group. Their *edibility* is not established and a number of species are under suspicion.

The PILEUS is glabrous, somewhat viscid, mostly with pale colors: whitish, tan, brownish, dingy ochraceous or rufous, often with shades of these colors variously distributed. The small amount of variation in the colors of different species makes it difficult to become rapidly acquainted with them, and often one has to rely on somewhat minute or variable characters to distinguish them. The young plants should always be examined for the fibrillose *veil or cortina* which disappears in most mature specimens and which is entirely wanting in one section. The viscosity should also be established before referring a plant to this genus since this is hardly noticeable in dry weather. The GILLS at length become emarginate, and this character, as in the genera *Tricholoma* and *Entoloma*, limits the genus. Variations sometimes occur in individual specimens, where the gills are adnate-decurrent or arcuate, and hence a single specimen is very unsatisfactory for a definite diagnosis. The edge of the gills is sometimes minutely fimbriate on account of the long sterile cells or cystidia and in a few species the edge distills drops of liquid which give it a beaded appearance under a lens; in many cases the edge remains white or whitish after the spores have colored the rest of the gills. The STEM often has a distinct outer, fleshy or fibrous rind which varies in thickness, while the interior, which is of varying diameter in different species, is stuffed by a white pith. While the stem is developing this pith breaks down leaving a hollow axis, although in some species the pith persists a long time. When no pith is present, the stem is said to be *solid* and is then composed of a fibrous texture which does not disappear. In both cases, however, grubs nearly always hollow out the stem at maturity, a condition which must be clearly distinguished from the term "hollow stem," which is not applied in that case. The SPORES are usually pale in color, ochraceous, brownish or alutaceous, coloring the mature gills a similar shade. The paler color of the gills and spores usually provides the means of separation from the genus *Cortinarius*. The shape of the spores varies but is generally elliptical-ovate, inequilateral and apiculate at one end; they are almost smooth except in a few species in which they are obscurely rough. CYSTIDIA are rather rare in this genus on the

sides of the gills, *H. albidulum* being the only one known to me with cystidia. Sterile cells, usually elongated beyond the hymenium, are found on the edge of the gills, and furnish important microscopic details for the certain identification of many of the species of this genus. Their shape and size vary, and at maturity they give to the edge of the gills a white, fimbriate or flocculose appearance. The ODOR is often like that of radish, especially when the flesh is rubbed or bruised. The TASTE also is sometimes radishy or bitter and disagreeable. McIlvaine, who studied the edibility of so many mushrooms, has given us little information on this genus. Some are probably poisonous, and as far as known, even where a species has been proved harmless, the taste when cooked is not found to be appetizing, so that the Hebelomas are hardly to be considered of much value for the table. This is a difficult genus for the amateur, and much uncertainty is prevalent, even in the minds of mycologists, as to the limits of the species.

The genus may be divided into two sections, those with a cortina when young, Indusiati; and those without a visible cortina, Denudati. It does not seem to me that Fries' section "Pusilli," which included the smaller species, is a satisfactory grouping, and the species which have been placed in "Pusilli" are distributed under Indusiati and Denudati. Even the two divisions retained run into each other imperceptibly.

Key to the Species

- (A) Stem solid, rarely becoming cavernous.
 - (a) Cortina present when young.
 - (b) Edge of gills beaded with drops in moist weather; pileus pale yellowish-tan; odor of radish. 496. *H. fastibile* Fr.
 - (bb) Edge of gills not beaded.
 - (c) Cystidia numerous on gills; spores 6-7 x 3-4.5 micr.; gills arcuate-adnate, rather narrow; pileus yellowish-tan, etc. (See 513. *Flammula lenta*.)
 - (cc) Cystidia lacking; spores larger.
 - (d) Pileus conical when young, 2-3 cm. broad, pale yellowish, clay-color, darker on disk; stem slender. 497. *H. mesophaeum* Fr.
 - (dd) Pileus soon convex, umbonate or subumbonate.
 - (e) Growing in open woods, fields, bare places, etc.; pileus 2-5 cm., brownish-clay-color, rufescent. 499. *H. pascuense* Pk.
 - (ee) In coniferous woods; pileus 5-7 cm., mature gills dark. *H. firmum* Fr.
 - (aa) Cortina not present.
 - (b) Stem stout, scaly-torn, white; pileus large, sordid grayish-brown to pale tan, odor of radish. 500. *H. sinapizans* Fr.
 - (bb) Stem flexuous, silky fibrillose, base enlarged by adhering sand; pileus alutaceous to tan. 508. *H. colvini* Pk.

- (AA) Stem stuffed by a pith, or hollow.
 - (a) Cortina present at first.
 - (b) Pileus glutinous (wet), sprinkled with superficial white scales. *H. glutinosum* Fr. (See also *Flammula lenta*.)
 - (bb) Pileus glabrous; gills whitish at first; odor of radish.
 - (c) Cortina cottony-fibrillose, somewhat persistent on stem or on margin of pileus; pileus chestnut, reddish-gray or grayish. 495. *H. velatum* Pk.
 - (cc) Cortina fugacious; pileus brick-red to reddish-ochraceous; spores 10-13 x 6-7 micr. *H. testaceum* Fr.
 - (ccc) Cortina fugacious; stem slender; pileus 2-3 cm. broad, pale ochraceous-tan. 498. *H. gregarium* Pk.
 - (aa) Cortina not present.
 - (b) Gills bright flesh-colored or pink, turning brown only in extreme age; pileus chalk-white to dingy-white. 506. *H. sarcophyllum* Pk.
 - (bb) Gills not pinkish.
 - (c) Edge of gills beaded with drops in moist weather; odor strong; pileus pale tan, darker on disk. 501. *H. crustuliniforme* Fr.
 - (cc) Edge of gills not beaded.
 - (d) Stem short, 2-4 cm. in length.
 - (e) Spores 12-13 x 6-7 micr.; pileus pale tan. 502. *H. niemale* Bres.
 - (ee) Spores 6-9 x 4-5 micr.
 - (f) Pileus brick-red (moist), umbonate; spores 7-9 x 4-5 micr. 510. *H. magnimamma* Fr.
 - (ff) Pileus yellowish-white, not umbonate; in pastures, etc. *H. sociale* Pk.
 - (dd) Stem long and rather stout in normal specimens, white.
 - (e) Stem bulbous; cystidia long, slender, cylindrical; pileus whitish. 504. *H. albidulum* Pk.
 - (ee) Stem equal or attenuated downward.
 - (f) Stem fragile, partially hollow; pileus whitish to tan; odor not of radish. 503. *H. longicaudum* Fr.
 - (ff) Stem firm.
 - (g) Pileus white or whitish, tinged tan.
 - (h) Gills narrow, adnexed; pileus white; spores 12-16 x 6-8 micr. 507. *H. album* Pk.
 - (hh) Gills rather broad, adnate at first; sterile cells on edge of gills clavate-thickened at apex; stem floccose; spores 11-13 x 6-7 micr. 505. *H. simile* sp. nov.
 - (gg) Pileus darker colored.
 - (h) Gills intervenose, costate; pileus ochraceous to tawny-ochraceous; edge of gills with clavate, sterile cells. Spores 12-15 x 7-8 micr. *H. neurophyllum* Atk.
 - (hh) Gills not costate; pileus tinged reddish to ferruginous, with a viscid separable pellicle; spores 9-11 x 5-6 micr. 509. *H. syrjense* Karst.

Section I. Indusiati. Cortina present in young stage.

495. Hebeloma velatum Pk.

N. Y. State Mus. Bull. 139, 1909.

PILEUS 2-6 cm. broad, bullate-convex at first, then expanded, obtuse or umbonate, viscid (moist), glabrous, becoming appressed-

silky on drying, livid-bay, fading to tan with reddish disk, *margin decorated by the remains of cortina*, even. FLESH white, thin, hygrophanous, soft and pliant. GILLS adnexed-seceding, close, rather narrow, subventricose, whitish then alutaceous, edge minutely white-fimbriate. STEM 3-6 cm. long, 4-6 mm. thick, equal, stuffed then hollow, *white at first then dingy ochraceous*, fibrous-fleshy, flexuous, twisted at times, pruinose-floccose at apex, *floccose above middle from the subpersistent cortina*, at length fibrillose, splitting longitudinally in age. SPORES 10-12 x 5-7 micr., narrowly elliptic, acute at one end, subobtuse at distal end. CYSTIDIA none; sterile cells on edge of gills short, slender, 30-45 x 6 micr. ODOR and TASTE slight.

Gregarious. Ground, in mixed woods. New Richmond. September. Infrequent.

Peck says it is very variable in color and in the development of the cortina. Sometimes a distinct annulus adheres to the stem and is then easily mistaken for a Pholiota, other specimens show a slight development of the cortina. The odor of radish was slight in our specimens and the gills were hardly ventricose and rather narrow. It appears as a plant of small stature at times. The colors of the pileus, the rather floccose stem, and the short sterile cells of the gills distinguish it.

496. *Hebeloma fastibile* Fr. (SUSPECTED)

Syst. Myc., 1821. Epicrisis, 1836.

Illustrations: Fries, Icones, Pl. 111.

Patouillard, Tab. Analyt., No. 342.

Ricken, Blätterpilze, Pl. 32, Fig. 1.

PILEUS 3-7 cm. broad, compact, convex-plane, often wavy, obtuse, viscid (moist), glabrous, *yellowish-ochraceous to alutaceous-whitish*, margin pubescent and incurved. FLESH white. GILLS *emarginate, subdistant*, unequal, whitish then argillaceous-cinnamon, edge white-fimbriate and *beaded with aqueous drops in moist weather*. STEM 4-6 cm. long, 5-10 mm. thick, solid or slightly hollow, *firm*, bulbous, fibrillose, *white*, decorated above by the remains of the cortina which is sometimes annular. SPORES 10-12 x 5-6 micr., elliptical-ovate, smooth. CYSTIDIA clavate. ODOR *disagreeable*. TASTE *bitter*.

Gregarious. In woods. New Richmond, etc. Frequency unknown. September.

The beaded gills, color of pileus, subdistant to distant gills, odor and taste are the distinguishing features. The odor is somewhat of radish.

497. *Hebeloma mesophæum* Fr.

Epicrisis, 1836.

Illustrations: Cooke, Ill., Pl. 411.

Ricken, Blätterpilze, Pl. 32, Fig. 3.

PILEUS 1-3 cm. broad, *campanulate or subconical at first*, then convex-expanded and subumbonate, sometimes wavy on margin, slightly viscid, buff to whitish on margin, brownish to chestnut or rufous on disk, glabrous, silky-shining, even, the margin at times decorated with the delicate remnants of the dingy-white cortina. GILLS soon emarginate, adnate, close, rather broad, whitish at first then pale rusty-alutaceous, edge white-fimbriate. STEM 4-6 cm. long, 3-5 mm. thick, mostly slender, fleshy-fibrous, *equal, silky-fibrillose*, sometimes twisted, mealy at apex, whitish, becoming dingy, with a small tubule. ODOR and TASTE slight.

Gregarious to subcaespitose. On sandy ground among grass or on bare ground in woods, fields, etc. Ann Arbor. October. Sometimes frequent.

Known by its rather small, subconical pileus when young, its tough, equal stem, peculiar cast to the pileus and lack of a distinctive odor. The spores are rather larger than the size given by Masee, but otherwise it agrees well with Fries' description. The stem is at first solid but develops a slight tubule in age. It differs from *H. hiemale* in the presence of a cortina which sometimes forms a slight, fugacious ring on the stem. Dried, the cap and stem remain whitish-tan. The surface of the cap is often quite silky. Ricken says it is known by its rusty-brown flesh when old, a character I have not noticed.

498. *Hebeloma gregarium* Pk.

N. Y. State Mus. Rep. 49, 1896.

PILEUS 1.5-3 cm. broad, *convex*, obtuse, slightly viscid, isabelline to ochraceous-tan, sometimes darker on disk, glabrous, even.

FLESH rather thin, *whitish*. GILLS adnate at first, then emarginate, close, thin, rather broad, subventricose, whitish at first then rusty-cinnamon. STEM 4-10 cm. long, 2-4 mm. thick, slender, equal, *stuffed then hollow*, subcartilaginous, fibrillose below, slightly mealy at apex, pallid, at length dingy-brown. SPORES 9-12 x 5-6 micr., variable, elliptical, smooth, alutaceous-cinnamon in mass. CYSTIDIA none. ODOR strong, radishy or almost lacking. TASTE slightly disagreeable. CORTINA scanty, fibrillose, evanescent.

(Dried: Pileus rusty-tan to brown, gills cinnamon-brown, stem sordid brownish.)

Gregarious. Under shrubbery or trees, on lawns, etc. Ann Arbor, East Lansing. May, June, September, October. Infrequent.

This species is closely related to *H. mesophaeum*. Its spores are the same, and usually it has a similar stature. As far as I can see, *H. gregarium* is distinguished from *H. mesophaeum* only by its darker gills and spores, its truly convex pileus and sometimes by its odor. Specimens identified by Peck as his species were compared with the above. It has been reported by Peck and others as occurring in October and November although I have seen it also in early spring, a seasonal distribution quite frequent in the case of certain species of mushrooms. Its cortina and general appearance suggest a Cortinarius; it is clearly not distantly related to that genus and I suspect has been referred to it more often than to Hebeloma. On drying it becomes much darker than *H. mesophaeum*, as the latter is diagnosed above. It has slender sterile cells on the edge of the gills.

499. *Hebeloma pascuense* Pk.

N. Y. State Mus. Rep. 53, 1900.

Illustrations: Ibid, Pl. C, Fig. 21-27.

Hard, Mushrooms, Fig. 222, p. 274.

PILEUS 2-5 cm. broad, convex then plane, obtuse, viscid when moist, *brownish-clay color*, tinged rufous on disk, becoming pale (dry), subhygrophanous, glabrous, *innately streaked or variegated by fibrils*, margin whitish at first from the cortina. FLESH whitish. GILLS adnexed, becoming ventricose and sinuate, *rather broad*, close, pallid then pale ochraceous-cinnamon, edge white-fim-

briate at first. STEM 2-5 cm. long, 3-6 mm. thick, solid or apex hollow, sometimes with a tubule, cortex subcartilaginous, fibrillose or subfloccose, apex floccose-scurfy, often somewhat twisted or curved, pallid but soon darker or tinged umber toward base. CORTINA cobwebby, evanescent, slight remnants at apex of stem or on margin of pileus. SPORES 8-10 x 4-6 micr. (mostly 8-9 x 4-5), elliptical, smooth, pale ochraceous-cinnamon in mass. CYSTIDIA none; *sterile cells* on edge of gills are prominent, *cylindrical*. 40-50 x 4-5 micr. ODOR radishy.

Gregarious or subcaespitose. On denuded or grassy soil in open, pastured woods or similar places, often on sterile, gravelly soil. Washtenaw County. May and June (as early as May 3). Frequent locally.

This Hebeloma loves sterile or gravelly soil which has scanty grass. It is early with us, although Peck reports it for October. In its seasonal habit it corresponds, therefore, with *H. gregarium* from which it differs in size, color, and its smaller spores. Peck says it is closely related to *H. fastibile* but is smaller, with a more slender stem, differently colored pileus and more crowded gills. The margin of the pileus sometimes shows a differentiated brown zone. Small forms are easily confused with *H. hiemale*, except for the spores and the presence of a cortina.

Section II. *Denudati*. Cortina lacking.

500. *Hebeloma sinapizans* Fr.

Epicrisis, 1836.

Illustrations: Cooke, Ill., Pl. 413.

Plate XCVII of this Report.

PILEUS 6-12 cm. broad, *compact*, convex-expanded, obtuse, *viscid* (moist), glabrous, even, somewhat irregular, *ashy-brown to clay-color* or whitish-tan, sordid. FLESH thick, soft in age. GILLS adnexed to deeply emarginate, *broad*, close, dry, pallid then pale alutaceous-cinnamon, *edge entire and concolor*. STEM stout, 6-12 cm. long, 1.5-2.5 cm. thick, rigid, *equal*, even or striate above, fibrillose, upper part *becoming squarrose-scaly* from the tearing of the cuticle, stuffed but soon cavernous, *white* then dingy, apex squamulose-floccose. SPORES broadly elliptical, hyaline-apiculate at both ends, obscurely rough, 11-13 x 7-8 micr., pale-cinnamon in mass. CYSTIDIA none. ODOR and TASTE usually strongly of radish.

In troops, subcaespitose or gregarious. On the ground, wooded hillsides, oak, maple and beech woods. Washtenaw County. September. Infrequent.

This is one of our largest and most luxurious Hebelomas, appearing after heavy rains. The stout, scaly-torn white stem, lack of cortina, broad gills and large spores, distinguish it. In age and in wet weather it decays rapidly. Fries says it is solitary, but with us it grows in troops as described by Stevenson, often forming dense rows along hillsides where *Cortinarii* flourish. Cooke's figures illustrate our plant well. It approaches *H. sinuosum* Fr. (sense of Ricken).

501. *Hebeloma crustuliniforme* Fr.

Epicrisis, 1836.

Illustrations: Michael, Führer f. Pilzfreunde, Vol. II, No. 69.
Engler and Prantl. I, 1**, Fig. 117, p. 242.
Swanton, Fungi, Pl. 40, Fig. 5-6, 1909.
Cooke's Illus., Pl. 507.
Ricken, Blätterpilze, Pl. 32, Fig. 2.
Plate XCVII of this Report.

PILEUS 4-8 cm. broad, broadly convex, then plane, subrepand, slightly viscid (moist), glabrous, even, *pale whitish-tan, disk reddish* or yellowish, *zoneless*, margin at first incurved. FLESH thickish, rather firm, white. GILLS adnexed, *crowded*, narrow, rounded behind, thin, whitish then watery cinnamon-brown, *edge crenulate and beaded with drops* when young or moist. STEM 4-8 cm. long, 4-6 mm. thick, equal or subbulbous, stuffed then hollow, somewhat *floccose-squamulose*, glabrous below, white or whitish, pruinose at apex. SPORES 10-12 x 5-7 micr., apiculate, ovoid elliptical, smooth, pale brown. Sterile cells on edge of gills, cylindrical-saccate, 24-30 x 6 micr., abundant. ODOR strong of radish. TASTE disagreeable. Said to be *poisonous*.

Solitary or gregarious, sometimes forming interrupted rings. In frondose grassy woods. Washtenaw County. October. Infrequent. The description given above is that of the continental mycologists. My own notes and specimens were lost.

Form *minor*: is smaller, pileus 2-3 cm. broad. It has no cystidia on the sides of the gills, and the spores measure 8-10 x 5-7 micr. Sterile cells on the edge of the gills are clavate at the apex. The

edge of the gills exudes drops. Found in the same woods as the type.

Form *sphagnophilum*: These plants grew on dense sphagnum. PILEUS 4-7 cm. broad. STEM 7-9 cm. by 5-8 mm. There are no cystidia on the sides of the gills; the sterile cells on the edge are slender, slightly thickened below, cylindrical above. The edge of the gills distils drops. The odor, when the plants are fresh, is similar to alcohol ethers. Otherwise as the type. See Plate XCVII of this Report.

The most striking characteristic of this species and its varieties is their habit of distilling drops from the gills when fresh or moist. In this respect it imitates *H. fastibile*, but lacks the cortina and has more crowded gills. It is considered poisonous, and is said to be called "poison-pie" in England, no doubt because the color of the cap simulates a baked pie crust. In dry weather it is easily confused with other species, and the occurrence of the forms mentioned above shows that it needs further study. It does not seem to be as common here as in Europe.

502. *Hebeloma hiemale* Bres.

Fungi Tridentini, 1892.

Illustration: Ibid, Pl. 160.

"PILEUS rather fleshy, 2-4.5 cm. broad, convex-subhemispherical then plane and gibbous or depressed, viscid, glabrous, margin at first involute and white flocculose, pale alutaceous, marked by a crustuline center or broad zone. GILLS crowded, white then argillaceous-subcinnamon, edge white-floccose, sinuate-adnate or adnexed and almost free. STEM 2-3 cm. long, 5-7 mm. thick, white, becoming yellowish below, stuffed then somewhat hollow, equal, subfibrillose, apex white-furfuraceous. Spores obversely pyriform, 12-13 x 6-7 micr., golden-yellow under the microscope; basidia clavate, 30-35 x 7-8 micr. ODOR scarcely any. TASTE somewhat bitter.

"Approaching nearest to *H. crustuliniforme*, from which it differs by its constantly smaller stature and scarcely noticeable odor."

The description is that of Bresadola, as my own notes are not full enough. It is with some hesitancy included under Michigan species but is said to occur in the United States and is easily confused with the preceding. It is at least of value to make Bresadola's description accessible in English.

503. *Hebeloma longicaudum* Fr.

Syst. Mycol., 1821.

Illustrations: Cooke, Ill., Pl. 415.

Gillet, Champignons de France, No. 309.

Berkeley, Outlines, Pl. 9, Fig. 2.

Ricken, Blätterpilze, Pl. 33, Fig. 2.

PILEUS 3-6 cm. broad, convex-expanded, subumbonate, glabrous, viscid (moist), even, somewhat irregular, *pale ochraceous-tan*, becoming whitish. FLESH soft, watery, white. GILLS *arcuate-adnate* then emarginate, medium broad, narrowed behind, crowded, whitish then pale clay-color, edge minutely fimbriate. STEM 5-10 cm. long, 4-9 mm. thick, *white*, equal, subbulbous below, stuffed then somewhat hollow, *fragile*, fibrillose-striate, mealy at apex or throughout. SPORES obliquely-elliptical, inequilateral, narrow at one end, smooth, 12-15 x 6-7 micr. CYSTIDIA none. *Sterile cells* slender, slightly enlarged at base, numerous on edge of gills. ODOR scarcely noticeable or none. TASTE mild, not of radish.

Gregarious. In or near cedar and tamarack swamps, sometimes on sphagnum, sometimes on rich humus. Ann Arbor, New Richmond. September-November. Infrequent.

The white stem, medium size, lack of cortina and large spores distinguish this species. The white-stemmed species of *Hebeloma* are quite distinct from those with sordid or brownish stems, although the former may become dingy or brownish by handling. The gills are at first adnate-decurrent and often do not become emarginate until late maturity, a character found in several other species. European authors do not agree upon the size of the spores for this species and usually give smaller spores; but our plant agrees so well with descriptions and the figures referred to above that it seems best to place it here. It differs from *H. elatum*, for which Massee gives large spores, by its lack of a radish odor, and the smaller average size of the pileus. Two other related species with persistently white stems were found at New Richmond: (a) had a more slender stem up to 9 cm. long, tapering downward, flocculose at apex, elsewhere innately fibrillose-striate; its pileus was up to 7 cm. broad, yellowish ochre on disk and white on margin; gills rather broad; odor none. (b) was smaller, with a stem about 5 cm. long, hollow and torn-scaly as in *H. sinapizans*; its cap was testaceous-tan and it had a radishy odor. Both forms had spores 9-12 x 5-6 micr. in size. They need further study.

504. *Hebeloma albidulum* Pk.

N. Y. State Mus. Rep. 54, 1901.

PILEUS 3-6 cm. broad, convex-expanded, obtuse, *glabrous*, viscid (moist), dingy-white, buff, or tinged ochraceous or grayish, even. FLESH white, thick on disk. GILLS adnexed, emarginate, *narrow, crowded*, whitish then isabelline to pale rusty-brownish, minutely white-fimbriate on edge. STEM 3-9 cm. long, 4-10 mm. thick, equal or subbulbous at base, glabrous and innately *silky-shining*, stuffed then hollow, *white*, pruinose at apex. SPORES elliptical, inequilateral, 10-12.5 x 5-7 micr., pale-brownish under the microscope, smooth. CYSTIDIA rather abundant on sides and edge of gills, *cylindrical*, slender, obtuse, about 75 x 5-6 micr. Odor none; taste mild.

(Dried: Pileus rufous-brown to tan; gills rusty-brown; stem pallid to dingy white.)

Gregarious to subcaespitose. On the ground, mixed or frondose woods. Ann Arbor, New Richmond. September-October. Infrequent.

Definitely known by its peculiar cylindrical cystidia; its dingy-white or ochraceous-buff pileus, white stem and narrow gills also help to place it. It is related to *H. album* Pk. which has larger spores, measuring 12-16 x 6-8 micr., and a more persistent white pileus and stem. Both *H. albidulum* and *H. album* can be easily distinguished from *H. sarcophyllum* which is also a pure white species, by the pink gills of the latter. *H. neurophyllum* Atk. may also be confused with it. Some of our specimens had a rather abrupt, oblique and marginate bulb, in this respect approaching *Cortinarii*, but fresh young specimens lack the cortina. The gills and spores have a peculiar shade of brown, showing their relation to *H. sarcophyllum*.

505. *Hebeloma simile* sp. nov.

PILEUS 2-6 cm. broad, convex-expanded, whitish tinged ochraceous, subviscid (moist), lustre dull (dry), glabrous, even. FLESH thick on disk, white. GILLS adnate at first, becoming emarginate, *rather broad*, not crowded, ventricose, thin, whitish then alutaceous, edge minutely floccose-denticulate, not costate. STEM 3-8 cm. long, 2-5 mm. thick, *slender*, equal, *not bulbous, white, floccose to mealy throughout*, glabrescent, at length innately fibrillose-striatulate,

stuffed with a persistent pith, white within and without, texture fibrous. SPORES fusiform-elliptical, inequilateral, smooth or obscurely rough, apiculate, 11-13 x 6-7 micr. CYSTIDIA none. Sterile cells on edge of gills, clavate-thickened at apex, 55-65 micr. long. ODOR and TASTE slightly of radish.

(Dried: Pileus and stem whitish, dingy; gills cinnamon-brown.)

Gregarious. On the ground, in copses, woods, etc., among grass. Ann Arbor, Detroit. September-October. Infrequent.

Differs from *H. neurophyllum* Atk. in the lack of costate gills, the persistent pith of the stem, smaller spores and broader gills. Its sterile cells are clavate-thickened like the upper portion of many paraphyses among the Pezizaceae, a character which is said to belong to the sterile cells on the gills of *H. neurophyllum* Atk. It differs from *H. album* Pk. by the broader gills, floccose-mealy stem and smaller spores; and from *H. albidulum* by the lack of cystidia, broader gills, etc.

506. *Hebeloma sarcophyllum* Pk.

N. Y. State Cab. Rep. 23, 1872.

Illustrations: Ibid, Pl. I, Fig. 7-11.

PILEUS 3-6 cm. (or more) broad, chalk-white, becoming dingy white, convex, obtuse, glabrous, subviscid (moist), soon dry, even. FLESH white, thickish. GILLS rather narrow, adnexed, deeply emarginate, close, deep rose to flesh color, edge minutely fimbriate. STEM 3-8 cm. long, 4-8 mm. thick, equal or tapering upward, clavate-bulbous at first, white, firm, stuffed by a persistent pith, finally hollow, fibrillose, glabrescent, minutely scurfy-mealy at apex, subshining. SPORES ventricose-elliptical, subinequilateral, ovate-pointed at both ends, obscurely rough, at first deep-flesh color in mass, but changing to dark brown, 9-12 x 5-6 micr. STERILE CELLS on edge of gills, cylindrical, slender, 5-6 micr. diam. CYSTIDIA similar, rarely found. ODOR subfarinaceous, TASTE bitterish.

Solitary, scattered or gregarious. On grassy ground, in frondose or mixed woods. Ann Arbor, Huron Mountains. June-August. Infrequent.

Remarkable for the deep pinkish color of the mature gills and spores which simulate those of a *Psalliota*. There is no cortina, else the shape and structure of the spores would indicate a *Cor-*

tinarius. The spores lose their pink color in the herbarium. Luxuriant specimens, with caps 15 cm. across, have been found, whose surface was minutely silky-floccose. When fresh the plants present a beautiful appearance because of their chalky whiteness of cap and stem as contrasted with the deep flesh-colored gills. It is an aberrant species and approaches the genus *Entoloma*.

507. *Hebeloma album* Pk.

N. Y. State Mus. Rep. 54, 1901.

Illustrations: Ibid, Pl. G, Fig. 1-7.

N. Y. State Mus. Bull. 139, Pl. 117, Fig. 1-6, 1910.

"PILEUS 2.5-5 cm. broad, fleshy, firm, convex becoming nearly plane, or concave by the margin curving upward, glabrous, subviscid, white or yellowish-white. FLESH white. GILLS thin, narrow, close, sinuate, adnexed, whitish becoming brownish-ferruginous. STEM 3.5-7 cm. broad, 4-6 mm. thick, equal, firm, rather long, solid or stuffed, slightly mealy at the top, white. SPORES subellipsoid, pointed at both ends, 12-16 x 6-8 micr."

Specimens sent from Detroit have been referred by Peck to this species. Its large spores, narrow gills and white or almost white cap distinguish it from related species. Compare *H. albidulum*, *H. simile* and *H. sarcophyllum*.

508. *Hebeloma colvini* Pk.

N. Y. State Mus. Rep. 28, 1876.

"PILEUS 2-7.5 cm. broad, convex or nearly plane, sometimes gibbous or broadly umbonate, rarely centrally depressed, glabrous, grayish or alutaceous with an ochraceous tint. GILLS close, broad, sinuate, adnexed, whitish, becoming brownish-ochraceous. STEM 2-8 cm. long, 2-6 mm. thick, equal, flexuous, silky-fibrillose, stuffed or hollow above, solid toward the base, whitish. SPORES ellipsoid, 10-12 x 5-6 micr. Sandy soil in open places. The mycelium binds the sand into a globose mass which adheres to the base of the stem."

The description is that of Peck. One collection at New Richmond is closely related. The plants grew in sand which adhered to the cap and stem. Our plants varied from the type in having narrow gills and a solid stem which becomes cavernous.

509. *Hebeloma syrjense* Karst.

PILEUS 2-5.5 cm. broad, convex-expanded, firm, glabrous, *viscid*, provided with a gelatinous, separable pellicle, even, *rufous or brick-red*, fading to ochraceous-brown, margin at first incurved. FLESH toughish, pallid or tinged rufous-brown. GILLS adnate at first, then emarginate, close, moderately broad, whitish then rufous-brown to cinnamon-brown, edge obscurely flocculose. STEM 4-6 cm. long, 3-5 mm. thick, subequal or attenuated downward, *floccose-scaly above*, glabrescent below, *toughish*, elastic, stuffed then hollow, whitish, becoming sordid brownish below, even. SPORES elliptical, inequilateral, apiculate, smooth, 8-10.5 x 5-6 micr., pale rusty-cinnamon in mass. CYSTIDIA none. *Sterile cells* short, slender, cylindrical, on edge of gills. ODOR slight. TASTE slightly astringent. Gregarious or caespitose. On the ground in frondose woods. Ann Arbor. September-October. Infrequent.

This species has the appearance of a *Cortinarius*, but no cortina is present in the young stage; on this account it is also to be distinguished from *H. testaceum*. The brick-red color, caespitose stems and separable pellicle are characteristic features. The somewhat tough texture is also a marked character. When young, the pileus is often bay-brown and in age may become irregular or repand.

510. *Hebeloma magnimamma* Fr.

Hymen. Europaei, 1874.

Illustration: Cooke, Ill., Pl. 508.

PILEUS 1-2 cm. broad, *umbonate*, convex, *brick-red* (moist), paler on margin, fading, glabrous, *viscid* (moist), even. GILLS adnate, close, thin, narrow, width uniform, ochraceous-isabelline, edge white-fimbriate. STEM 3-4 cm. long, 1-2 mm. thick, equal, even, *glabrous*, narrowly fistulose, pallid-ochraceous, apex pruinose. SPORES elliptical, smooth, mostly with a large nucleus, 7-9 x 4-5 micr. *Sterile cells* on edge of gills numerous, narrow-cylindrical, about 6.5 x 4-5 micr.

Gregarious. Ground in cedar swamp. New Richmond. September. Rare.

Flammula Fr.

(From the Latin, *flamma*, a flame.)

Ochre-brown to rusty-spored. Stem central, continuous with the pileus, without an annulus, *fleshy or fibrous*; partial veil in the form of a fibrillose or subarachnoid cortina, evanescent. Gills *adnate or subdecurrent at first*. Spores *dark brown, rusty-brown or rusty-yellow*. Pileus *viscid or dry*. Mostly on wood.

Fleshy, putrescent, lignicolous, rarely terrestrial fungi, characterized by the habitat and the spore-color. To be separated from *Pholiota* by the non-membranous inner veil; from *Hebeloma* by the darker brown or rusty-yellow gills and spores; from *Naucoria* by the fleshy-fibrous stem; from *Continarius* by the habitat on wood. It corresponds to *Hypholoma* of the purple-spored group in habit. By reason of the bitter taste or odor, the *Flammulas* are not attractive for food, and although no definite information is available to prove that they are not edible, they are usually considered unpalatable and looked upon with suspicion. The genus is difficult and the species appear to run into one another. They occur mostly in the northern forests.

The PILEUS is often very viscid, with a separable pellicle, or, in the section *Sapineae*, with a dry adnate cuticle; it is usually tinged with yellowish, olivaceous or fuscous hues. The margin or surface is sometimes dotted with thin, fibrillose scales but becomes denuded in age or after rains; it is therefore important to obtain fresh plants for study. The fibrillose *cortina* is more copious in some species than in others and this fact must be kept in mind. The GILLS are referred to by authors as adnate-decurrent and some emphasize the decurrent character as a means of recognizing the genus; there is, however, considerable variation in this respect, and more often the gills are adnate or slightly rounded behind and in age may become emarginate as in related genera. The color of the gills at maturity is conditioned by the spores and is markedly different in the first and last section. *F. polychroa* is unique by the gray and purplish hues which cloud them. *F. carbonaria* has dark dirty-brown gills. In the last section they are bright rusty-ochre or yellow. The STEM is fleshy or fibrous, usually more or less fibrillose, glabrescent, mostly naked at the apex and with a tendency to become darker, sordid, brown or rusty in age, especially at or toward the base. The SPORES are usually elliptical or oval, smooth or slightly rough under high magnification. A spore-print is very

important for the diagnosis of species, because of the considerable difference in the color. CYSTIDIA are present and rather abundant on the sides and edge of the gills. The ODOR is an important character and was frequently employed by Fries, especially in the Monographia, to separate the species. The TASTE is often bitter, sometimes strong, and tends to turn away the searcher who is after edible mushrooms.

The species are not yet well understood, especially in this country. Peck has described some twenty-five species but most of these are poorly known. Only about half of my different collections have been included here since the rest are still doubtfully determined. Few species seem to be common at least in the southern part of the State but it is likely that more species occur in the north during favorable seasons.

Key to the Species

- (A) Pileus dry, golden-tawny, minutely floccose-scaly; gills chrome-yellow. 519. *F. sapinea* Fr.
- (AA) Pileus glutinous, viscid, subviscid or moist.
 - (a) Gills grayish to olive-purplish-fuscous; pileus glutinous, with superficial scales. 511. *F. polychroa* Berk.
 - (aa) Gills without gray or purple tints.
 - (b) Pileus 6-12 cm. or more broad, viscid, flesh white. 512. *F. lubrica* Fr.
 - (bb) Pileus 3-8 cm. broad, glutinous; flesh white. 513. *F. lenta* Fr.
 - (bbb) Pileus 2-7 cm. broad; flesh yellowish.
 - (c) Gills smoky-brown to fuscous-brown; pileus not truly yellow. 514. *F. carbonaria* Fr. var.
 - (cc) Gills yellow or pallid-ochraceous.
 - (d) Pileus with viscid or glutinous separable pellicle.
 - (e) Pileus sulphur-yellow, with fulvous center; stem slender; flesh thin. 515. *F. spumosa* Fr.
 - (ee) Pileus pale ochraceous-olivaceous-buff; flesh thick. 517. *F. gummosa* Fr.
 - (dd) Pileus without a viscid pellicle.
 - (e) Odor strong, bitter; pileus pale, cadmium-yellow, lubricous; stem elongated. 518. *F. alnicola* Fr.
 - (ee) Odor slight or none; pileus bright yellow, glabrous, margin cortinate. 516. *F. flavida* Fr.

Section I. *Phacotae*. Spore mass sordid brown. Pileus with a more or less viscid or glutinous, separable pellicle.

511. *Flammula polychroa* Berk.

Lea's Catalog, Plants, Cinn. 1844.

Illustrations: Atkinson, Mushrooms, Fig. 147, p. 156, 1900.
Moffatt, Chicago, Nat. Hist. Surv., Bull. No. VII, Part I, Pl. 10, Figs. 1-2, 1909.

PILEUS 3-7 cm. broad, broadly convex, then expanded, obtusely depressed, sometimes broadly umbonate, very viscid, *varying dull orange to yellowish on disk, paler yellowish toward the olive or greenish margin*, in age variegated yellowish-olivaceous-brown, at first *decorated toward margin by wedge-shaped, creamy to vinaceous, fibrillose, deterrent, delicate scales*, concentrically arranged, the outermost forming an interrupted fringe at the edge of the pileus, glabrescent in age, margin even, at first incurved. FLESH soft, moist, thick on disk, thin on margin, yellowish-white. GILLS adnate, rounded behind or sinuate, often seceding or subdecurrent in age, rather broad behind, tapering anteriorly, close to crowded, at the very first creamy-buff, soon grayish-fuscous, *finally dark olive purplish-gray*, edge white-flocculose. STEM 3-6 cm. long, 3-5 mm. thick, *slender*, rigid-tough, subequal, curved, solid-fibrous within, in age hollow, fibrillose and *dotted with small, recurved scales up to the evanescent annulus*, yellowish above, becoming dull reddish-brown below. VEIL rather well-developed at the first, varying white to vinaceous, lilac or purplish-tinged, floccose-fibrillose. SPORES oval or short oblong, 6-7.5 x 3.5-4.5 micr., smooth, dark, fuscous-brown *with a slight purplish tinge in mass*. CYSTIDIA numerous on sides and edge of gills, subventricose below, lanceolate above, about 55 micr. long.

Solitary to subcaespitose. On logs, sticks, dead branches, etc., frondose and mixed coniferous woods.

Marquette, New Richmond, Ann Arbor, etc. Throughout the State. July-October. Rather frequent.

This species is distinguished from all the other *Flammulas* by the peculiar color of the gills and spores; the tint of gray and purple which these possess may easily lead the student into placing it among the purple-spored genera. The other characters, however, ally it to the genus *Flammula*. The colors of the pileus are, furthermore, quite variable, but there is nearly always an olivaceous tint present, especially on the margin when young. The pelliculose cap is usually glutinous and when fresh dotted with the triangular, hairy, appressed scales. It is apparently indigenous to America.

512. *Flammula lubrica* Fr.

Syst. Myc., 1821.

Illustrations: Fries, Icones, Pl. 116, Fig. 1.
Ricken, Blätterpilze, Pl. 57, Fig. 4.

PILEUS 6-12 cm. broad, tough, broadly convex, then expanded, obtuse or depressed, *tawny-orange or fulvous on disk*, yellowish on margin, sometimes paler, with a separable, *viscid* pellicle, loosely *scaly-dotted*, glabrescent, even. FLESH whitish, moist, rather thick, tinged yellow under pellicle. GILLS adnate, then emarginate or seceding, sometimes subdecurrent or unciniate, medium broad, close to crowded, sulphur-yellow to greenish-yellow, *then dingy-ochre to olive-brown*, edge minutely fimbriate. STEM 4-6 cm. long, 8-15 mm. thick, equal or slightly tapering downwards, curved or straight, subbulbous at base, spongy-solid or hollowed by grubs, at first *whitish within and without*, tinged yellowish or at base rusty-brown in age, fibrillose. SPORES minute, elliptical, 5-6 x 3-3.5 micr., smooth, pale rusty-brown in mass. CYSTIDIA very abundant on sides and edge of gills, ventricose, obtuse, 45 x 12-15 micr., rarely longer. ODOR and TASTE mild or very slightly of radish.

Gregarious or subcaespitose. On decaying logs in mixed or frondose, low woods. Bay View, New Richmond. September. Infrequent or local.

Our plant departs slightly from the accepted characters for the species. It is known by its large size, viscid or glutinous, scaly-dotted, yellow-tawny cap and whitish stem when fresh. The colors of the pileus are shown in the figures of Fries, although a form, such as is shown in Ricken's figure, has been found in the same locality with the Friesian plant. The flesh of both forms is white in the fresh plant. The color of the spore-mass indicates the next section; but it must not be confused with *F. spumosa* which is a smaller plant, whose cap is not dotted with scales, and whose flesh is greenish-yellow. *F. lubrica* appears to be limited to the coniferous regions of the State.

513. *Flammula lenta* Fr.

Syst. Myc., 1821.

Illustrations: Cooke, Ill., Pl. 439 and 440.

Gillet, Champignons de France, No. 284.

Ricken, Blätterpilze, Pl. 57, Fig. 3.

PILEUS 3-7 cm. broad, firm, convex-expanded, obtuse, *glutinous*, dotted toward margin with scattered, concentric, superficial, fibrillose scales, or glabrous and white-silky on the incurved margin, *dingy white to buff*, brownish-tan on disk, even. FLESH pallid, slightly thick. GILLS adnate-subdecurrent, rather narrow, close, white at first then pale alutaceous, buff-color, edge minutely white-flocculose. STEM 4-7 cm. long, 8-11 mm. thick, varying equal, tapering down or subbulbous, stuffed then narrowly tubular, firm, floccose-pruinose at apex, floccose-scaly up to the obsolete annulus, white, becoming brownish toward base in age. SPORES elliptical, slightly curved, smooth, pale, 5-7 x 3.5-4 micr., grayish-brown in mass. CYSTIDIA abundant on sides and edge of gills, lanceolate, ventricose, obtuse at apex, 50-55 x 12 micr., deep in the subhymenium. ODOR and TASTE slight.

On decaying logs or on the ground among debris in conifer woods. New Richmond. September. Infrequent.

Known by its pale color, glutinous cap and the remnants of the whitish cortina on the margin of the cap or on the stem. It differs from *F. lubrica* mainly in color, especially in the color of the gills. It is seldom reported in this country, although very abundant in Europe. The flesh is white. *Hebeloma glutinosum* also has a glutinous, scaly-dotted pileus, but the gills are said to be emarginate, and the flesh of the stem to become blackish toward the base. (Ricken, Blätterpilze.) In drier weather the pileus is less viscid and may appear to be entirely naked. It is easily mistaken for a *Hebeloma* because of its pale gills and its frequent development on the ground. *Hebeloma parvifructum* Pk. may be a form of this species, although Peck does not report any cystidia.

514. *Flammula carbonaria* Fr. var.

Syst. Myc., 1821.

Illustration: Cooke, Ill., Pl. 442.

PILEUS 2-6 cm. broad, pliant, convex, *then plane*, usually depressed in age, more or less viscid or subviscid, pellicle somewhat separable, dull crustuline to fulvous-yellowish, *dull dingy-rufous-brown in age*, disk rusty-yellow, glabrous, even, at first with remnants of cortina on edge. FLESH pallid then tinged yellowish, rather thin. GILLS adnate-subdecurrent, sinuate in age, crowded, rather narrow, at first pallid, *finally pale smoky-brown or fuscous-brown*, edge white-fimbriate. STEM 3-5 cm. long, 3-5 mm. thick at apex, *tapering downwards*, tough, rigid-elastic, flexible, dilated and cavernous at apex, elsewhere soon *hollowed in form of tubule*, fibrillose, at length *dark sordid-brown or smoky-fuscous*, curved or bulbillose at attached base. SPORES elliptic-oblong, smooth, 6-7.5 x 3.5-4 micr., pale ochraceous under microscope, *solid fuscous-brown in mass*. CYSTIDIA on sides and edge of gills, scattered, flask-shaped to subcylindrical, variable, 30-55 x 10-15 micr. ODOR and TASTE slight or mild.

Solitary, gregarious or caespitose, on roots, sticks, stumps, etc., in low, swampy woods or wet places. New Richmond, Ann Arbor. September-October. Infrequent.

At least two forms have been referred here: a small plant, with cap 2-3 cm. broad, growing on burnt-over ground, and a larger plant not always on charcoal remains, to which I have referred my collections. Cooke's figures illustrate our plants well except in the slightly smaller size. The principal characteristic is the color of gills and spores, in which it approaches *F. fuscus*. No critical notes of such a plant other than the description of *F. carbonarius* are at hand, and authors vary considerably in their conception of it except that they hold closely to the idea that it occurs always on charred soil or wood. Hard illustrates what appears to be the small form, and Ricken likewise emphasizes the small size in which respect they follow the Friesian tradition. Under this name Peck has described a still different form, whose spores measure 7-10 x 4-5 micr., and which also grows on charcoal beds. The species clearly needs further study in this country, as it is not likely that either Peck's or my plants represent the Friesian species. *F. highlandensis* Pk. may represent the true species.

Section II. *Caespitose*, spores rusty-brown in mass. *Caespitose* or crowded. Pileus with subviscid, subseparable pellicle.

515. *Flammula spumosa* Fr.

Syst. Myc., 1821.

Illustrations: Fries, Icones, Pl. 116, Fig. 3.

Cooke, Ill., Pl. 475.

Ricken, Blätterpilze, Pl. 57, Fig. 5.

PILEUS 2-5 cm. broad, convex-plane, with viscid, separable pellicle, *sulphur-yellow*, sometimes greenish-tinged, fulvous on center, paler on margin, glabrous, even, sometimes obscurely virgate, provided when young with a yellowish-white cortina on the margin. FLESH *yellowish or greenish-yellowish*, rather thin. GILLS adnate-emarginate or decurrent by a tooth, close, moderately broad, *sulphur-yellow or greenish-yellow at first*, finally pale ferruginous. STEM 3-7 cm. long, 3-7 mm. thick, *often slender*, equal, hollow by a narrow tubule which is at first stuffed, *fibrillose*, yellowish above, soon sordid rusty-fulvous toward base. SPORES elliptic-oval, smooth, 6-8 x 4-5 micr., contracted toward one end. CYSTIDIA on sides and edge of gills, 60-70 x 12 micr., lanceolate-ventricose. ODOR slight or of radish.

Gregarious or scattered. On the ground among forest debris or on mossy logs, etc., in coniferous regions in moist places. Marquette, Houghton, Bay View, New Richmond, Detroit. July-September. Rather frequent.

This is probably as common as any of the *Flammulas* but is to be sought in the regions once covered with hemlock or pine. The color of the pileus and flesh varies from youth to age, becoming darker or more dingy, and individual specimens vary from sulphur-yellow to greenish-yellow but are never as green on the margin of the cap as *F. polychroa*. The usual distinguishing marks are the sulphur-yellow margin of the cap, its fulvous to tawny disk, the marked viscidty, the slender, fibrillose stem and the yellowish or citron-yellow flesh. The spores have a rather characteristic shape as compared with nearly related species.

516. *Flammula flavida* Fr.

Syst. Myc., 1821.

Illustrations: Cooke, Ill., Pl. 444.

Ricken, Blätterpilze, Pl. 58, Fig. 1.

"PILEUS 4-7 cm. broad, campanulate-expanded, subumbonate, moist, *not viscid*, even, *glabrous*, rather regular, *bright yellow* (flavus), sometimes almost sulphur-yellow with pale fulvous disk, decorated *along the margin by the adherent, white or pallid remains of the cortina*. FLESH white then yellowish. GILLS adnate, close, thin, rather narrow, at first white, soon yellowish *then rusty-fulvous*, edge white-fimbriate. STEM 5-10 cm. long, 6-10 mm. thick, either narrowed or enlarged toward base, stuffed then hollow, fibrillose, flavus-yellow, rusty toward base, at length entirely rusty-brown, *sometimes with evanescent annulus*. CORTINA whitish. SPORES elliptical, 8-9 x 4-5 micr., smooth, ferruginous. CYSTIDIA clavate, 36-40 x 8-9 micr."

Reported by Lonygear from Chandlers, Michigan. The description is adopted from the Monographia of Fries, with additions from Ricken. It seems to be well-marked by the non-viscid pileus, the shreds of the cortina on its margin or on the apex of stem and the spores.

517. *Flammula gummosa* Fr.

Epicrisis, 1836-38.

Illustrations: Cooke, Ill., Pl. 441.

Fries, Icones, Pl. 116, Fig. 2.

Ricken, Blätterpilze, Pl. 57, Fig. 1.

PILEUS 3-7 cm. broad, convex-plane, at length subdepressed or subumbonate, with a *glutinous*, separable pellicle, even, *pale ochraceous mixed with buff and olivaceous hues*, glabrescent. FLESH thick on disk, concolor when moist, paler when dry. GILLS adnate-subdecurrent, broad behind, tapering in front, close, *pale ochraceous-cinnamon*, edge minutely flocculose. STEM 4-6 cm. long, 4-10 mm. thick, rather firm, subequal, *floccose-scaly above*, fibrillose below, stuffed, *pallid above*, umber downwards, dull reddish-umber when bruised at base. SPORES oblong-elliptical, 6-7 x 3-4 micr., smooth, pale rusty-brown. CYSTIDIA scattered, ventricose, tapering, 45-50 x 15 micr. ODOR and TASTE mild.

Solitary or subcaespitose and crowded. At the base of stumps in mixed woods. New Richmond. September. Rare.

Our specimens are well illustrated by Cooke's figures. The species differs from *F. lubrica* in its usually glabrous pileus and the rusty-red base of stem; the spores are slightly smaller.

518. *Flammula alnicola* Fr.

Syst. Myc., 1821.

Illustrations: Cooke, Ill., Pl. 443.

Gillet, Champignons de France, No. 282.

Grevillea, Vol. VI, Pl. 90.

Ricken, Blätterpilze, Pl. 58, Fig. 5.

"PILEUS 5-7 cm. broad, convex then expanded, obtuse, *not truly viscid*, lubricous, at first superficially fibrillose toward margin, sometimes minutely scaly, *cadmium-yellow*, becoming rusty and sometimes greenish. FLESH slightly compact, concolor. GILLS subadnate, at times decurrent or rounded behind, broad, plane, *at first dingy-pallid* or yellowish-pallid, at length ferruginous. STEM 5-10 cm. long, 6-12 mm. thick, attenuated-rooting at base, commonly curved or flexuous, *fibrillose*, at first cadmium yellow then becoming rusty. CORTINA manifest, fibrillose or arachnoid. SPORES elliptical, 9 x 4 micr. ODOR *strong and pungent, bitter*. TASTE *bitter*.

"On old stumps of frondose trees especially of alder and willow."

This has been reported from the State, but I have found no typical specimens. Ricken describes and figures a plant with smaller spores, which departs considerably from the figures of Cooke, Gillet and those in Grevillea. The description given above is adopted from that of Fries in Monographia, and the figures of Cooke, etc., fit it well. *F. alnicola* should be recognized by its long, rooting, caespitose stems, by the color and by the strong bitter odor. Peck reports it from the Catskill and Adirondack Mountains only.

Section III. Sapineae. Spore mass ochre-yellow. Gills fulvous-golden yellow. Pileus dry or nearly so.

519. *Flammula sapinea* Fr.

Syst. Myc., 1821.

Illustrations: Fries, Icones, Pl. 118, Fig. 3.

Cooke, Ill., Pl. 447.

Michael, Führer f. Pilzfreunde, Vol. III, No. 90.

Moffatt, Chicago Nat. His. Surv., Bull. 7, Part I, Pl. 9, Fig. 2,

PILEUS 2-7 cm. broad, *firm*, convex, then subexpanded, obtuse, golden-yellow to tawny, paler toward margin, velvety or *minutely floccose-scaly*, *dry*, at length fading and rimose-cracked. FLESH thick, *yellowish*. GILLS adnate, plane, rather narrow, thin, *chrome-yellow* then rusty-yellow, edge minutely fimbriate. STEM 4-7 cm. long, 6-12 mm. thick, rather stout, stuffed then hollow, *sometimes compressed and irregular*, fibrous, innately fibrillose, yellowish, brownish below when handled. CORTINA yellowish, scanty. SPORES elliptical, 6-8 x 4-5 micr., smooth, rusty-yellow. ODOR strong.

Subcaespitose, scattered or solitary. On wood of conifers in the north; on tamarack stumps and logs in the southern part of the State. Bay View, New Richmond, Ann Arbor, Detroit. August-October. Infrequent.

This is a rather variable plant, not yet sufficiently studied. The forms on tamarack are apparently the same as the species in pine and hemlock woods but often the pileus is almost glabrous. In the young state the colors are rich, in age they often fade.

Galera Fr.

(From the Latin, *Galera*, a little helmet.)

Ochre-brown or rusty-yellow spored. Stem *subcartilaginous*, tubular, slender. Partial veil none or fibrillose; volva lacking. Pileus thin, conical, campanulate or oval, *its margin at first straight and appressed on the stem*. Spores elliptical or oval, usually smooth. Cystidia lacking.

Putrescent, fragile, small mushrooms, growing on dung, mosses, grass or on the ground. They correspond to *Mycena* of the white-

spored group in the nature of the stem, the straight margin of the young pileus and in the slender habit; they also correspond to *Nolanea* of the pink-spored group. Their small size, growth on dung and scarcity in number makes them useless for food.

The PILEUS is thin and membranous, either conical, oval or elliptical when very young, becoming campanulate, or, in a few species, expanded. It is hygrophaneous and in many species is striatulate on the margin when moist. The color varies within narrow limits, mostly rusty, ochraceous, brownish, yellowish or whitish; when dry they usually fade to a much paler shade. Many develop an atomate or delicate silky surface after losing their moisture, such "atoms" being due to microscopic erect cells.

The GILLS are never decurrent, but are either narrowly adnate or adnexed to the stem within the cone of the pileus. They are more generally narrow and linear, although some species possess ventricose, rather broad gills. *Galera ovalis*, described in European works, has very broad gills, and seems to be a rarity with us, if it is not entirely lacking. It has been reported from the United States but may have been confused with others. Ricken omits it from the list of German *Galeras*. The mature gills of this genus are usually a pale rusty-yellow which is a convenient mark of recognition; sometimes this color shades into cinnamon. The edge of the gills is provided with microscopic sterile cells. In the first section they have the shape of nine-pins or Indian clubs, with a rounded knob at the apex, i. e., capitate, but with a more narrowed base. These can scarcely be seen, unless a portion of a gill is mounted sideways under the microscope. In the other groups, these cells vary in shape from lanceolate to filiform, and are never capitate. True cystidia are wanting. The *trama* of the gills is usually composed of large-celled hyphae, and a careful comparative study may bring out good specific characters here. The STEM is always slender, hollow, and usually fragile. In some species, however, it is toughish or flaccid as in certain *Mycenas*. In texture it is somewhat cartilaginous. It is usually equal throughout but species are known where a marked thickening occurs at the base in the form of a bulb; others may develop a slight bulblet or even a long root-like prolongation as in *G. antipus*. The CORTINA is lacking in most or all of the section *Conocephalae*. In the second group there is a delicate, fibrillose cortina which disappears early. Another section, of which no examples are included below, includes species which have a more highly developed superficial veil whose delicate remnants are visible after the pileus has expanded. Some of

these, e. g., *G. pellucida* Fr., *G. stagnina* Fr. and *G. paludosa* Fr., are now placed in the genus *Tubaria*, because of their decurrent or broadly adnate gills. *G. rufipes* Pk. seems at present the only species of this third section likely to be found within our limits.

About 24 species of *Galera* have been reported or newly described for the United States east of the Rocky Mountains. Some of these will probably be found to be synonyms. Several unnamed species are included below whose identity is not established and which as yet seem to be distinct from the others. This genus needs considerably more microscopic study in order to obtain material throughout the basis. Special pains were taken to obtain material throughout the course of this study but a comparatively small number of the described American species came to hand. See Plate XCVII for habit.

Key to the Species

- (A) Edge of gills provided with microscopic, capitate, sterile cells. (Growing on dung, or on the soil among grass of manured lawns, gardens, fields and pastures.)
 - (a) Stem long, rooting below the enlarged base; primarily on dung-hills. 520. *G. antipus* Lasch.
 - (aa) Stem without root-like prolongation.
 - (b) Stem bulbous-enlarged at base; gills narrow; on dung-hills. 522. *G. bulbifera* sp. nov.
 - (bb) Stem equal.
 - (c) Gills very broad, almost free, ferruginous; plants large, very fragile; rare. *G. ovalis* Fr.
 - (cc) Gills narrow to medium broad.
 - (d) Stem striatulate and pubescent; spores 10-12 x 6-7 micr. 523. *G. pubescens* Gill.
 - (dd) Stem not markedly striatulate.
 - (e) Spores small, 7-8.5 x 4-5 micr., pileus soft and very fragile, finally expanded. 527. *G. teneroides* Pk.
 - (ee) Spores 10 micr. or more in length.
 - (f) Pileus markedly cylindrical-conical, longer than wide, pale isabelline. 521. *G. lateritia* Fr.
 - (ff) Pileus not narrowed-conical.
 - (g) On cow-dung; spores 15-18 x 9-10 micr.; pileus not striatulate when moist. 524. *G. sp.*
 - (gg) In grassy places, lawns, etc.
 - (h) Stem tough, filiform; spores 9-12 x 6-7 micr. 528. *G. capillaripes* Pk.
 - (hh) Stem fragile.
 - (i) Gills crisped and interveined. 526. *G. crispa* Longyear.
 - (ii) Gills not crisped; very common on lawns. 525. *G. tenera* Fr.
- (AA) Edge of gills with sterile cells of a different form. (Growing attached to mosses, grass, sedges, etc., in moist places.)
 - (a) Stem bluish to greenish-gray; on mosses in swamps. 529. *G. cyanopes* sp. nov.
 - (aa) Stem whitish or pallid.
 - (b) Pileus sulcate, convex; gills narrow; on grass. 530. *G. plicatella* Pk.
 - (bb) Pileus even or striatulate when moist; gills broad.

- (c) Spores 8-10 x 5-6 micr., pileus conic-campanulate; very common on mosses; small. 531. *G. hypnorum* Fr.
- (cc) Spores 10-12 x 6 micr., pileus hemispherical-convex; on grass. *G. sp.*

Section I. Conocephalae. Pileus conico-campanulate at first; gills ascending and on the edge with microscopic differentiated, capitate cells; cortina none. Habitat on dung or manured ground.

520. *Galera antipus* Lasch.

Illustrations: Fries, *Icones*, Pl. 128, Fig. 2.
 Gillet, *Champignons de France*, No. 293.
 Ricken, *Die Blätterpilze*, Pl. 60, Fig. 9.

PILEUS 1.5-2.5 cm. broad (rarely up to 5 cm.), broadly campanulate, dingy ferruginous-cinnamon (moist), hygrophanous, yellowish-isabelline (dry), glabrous or subpruinose, not striatulate, atomate when dry, subflaccid. FLESH submembranous, slightly fleshy on disk. GILLS narrowly adnate, ascending, crowded, narrow, sublinear, pale cinnamon-ochraceous, finally dark ferruginous. STEM 3-5 cm. long and 2-4 mm. thick above substratum, subfusiform-enlarged at base, and with a very long, subhorizontal, thickish, flexuous, whitish root-like prolongation, pruinose or scurfy, striate or twisted, concolor or paler than pileus. SPORES lemon-shaped, obscurely 6-angled, otherwise smooth, 8-9 x 6 micr. BASIDIA 18-25 x 7-8 micr.; sterile cells on edge of gills, small, capitate. ODOR none.

Gregarious on dung-hills in beech and pine woods. New Richmond. September. Locally abundant.

This is often a large-capped species, known by its long root-like prolongation, which may extend 5-8 cm. below the point of entrance. Dung-hills on which the plants are plentiful, are often penetrated by a thick mass of these "roots" which interweave in a horizontal position. The stem appears clavate or fusiform where it enters the substratum, and easily separates at this point, so that the "root" is easily overlooked. All stages of development were observed; the very young pileus is oval and whitish, and is scarcely broader than the stout young stem; it becomes campanulate and finally is broadly expanded. No cortina is present at any stage. The spores are very characteristic and agree entirely with Ricken's description. Cooke gives the spores entirely too large in connection with Plate 463 of the Illustrations.

521. *Galera lateritia* Fr.

Syst. Myc., 1821.

Illustrations: Fries, Icones, Pl. 127.

Michael, Führer f. Pilzfrennde, Vol. III, No. 94.

Ricken, Die Blätterpilze, Plate 60, Fig. 11.

Cooke, Ill. Plate 460.

PILEUS 2.5-3 cm. high, 2-2.5 cm. wide, almost *cylindrical-conical*, later subcampanulate, *pale isabelline*, hygrophanous, glabrous, finely striate on margin. FLESH membranous. GILLS nearly free, *narrow*, linear, ascending, crowded, fulvous-rusty-ochraceous. STEM 5-10 cm. long, 2-3 mm. thick, rigid, equal, hollow, *fragile*, *pure white*, mealy-frosted. SPORES elliptical, ferruginous, 12-15 x 8-9 micr., smooth. STERILE CELLS on edge of gills capitate.

On dung or rich grassy places. Reported by Longyear as abundant; rarely seen by the writer. June-September.

The color of the cap is not as dark as in some of the Friesian figures; a fact noted by European as well as American observers. The narrow, elongated pileus is unique among the Galeras.

522. *Galera bulbifera* sp. nov.

PILEUS .5-2.5 cm. broad, oval-campanulate, obtuse, *ferruginous-cinnamon* when moist, hygrophanous, ochraceous and atomate when dry, rivulose-reticulate. GILLS ascending-adnate, *narrow*, *sub-linear*, close to crowded, ferruginous-cinnamon, sprinkled by ferruginous spores. STEM 6-15 cm. long, 1.5-3 mm. thick, strict when moist, equal above the bulbous base, pale ferruginous, hollow, glabrous-shining when dry, sometimes faintly striatulate. SPORES elliptical, obtuse at ends, smooth, ferruginous in mass, 12-15 x 8-9 micr. CYSTIDIA none. STERILE CELLS on edge of gills small, capitate. ODOR none.

On horse dung; dung-hills in mixed woods. New Richmond. September.

Variable in size; solitary specimens attain the large size, while a patch of them is apt to be composed of smaller sizes. It has the appearance, in the large condition, of *G. ovalis*, but differs by the narrow gills, etc. It is well marked by the gills, the bulblet at base of stem, and the spores. The whole plant is ferruginous-cinnamon when moist, and in large plants the pileus is finely rugose-reticulate.

523. *Galera pubescens* Gill.

Champignons de France, 1874.

Illustrations: Ibid, No. 296.

PILEUS 1-4 cm. broad, *oval-campanulate* or obtusely conical-campanulate, *ferruginous-cinnamon* to rufous-brown when moist, hygrophanous, buff to ochraceous-tan when dry, sometimes reticulate-rivulose or obscurely rugulose, atomate when dry. FLESH submembranous. GILLS ascending-adnate, *rather narrow*, *close*, subventricose, cinnamon-ochraceous. STEM 3-10 cm. long, 1-3 mm. thick, *equal*, often *striatulate*, *minutely pubescent or glabrous*, hollow, brownish-ochraceous, becoming pallid and shining. SPORES elliptical, smooth, obtuse, 10-12 x 5.5-7 micr. CYSTIDIA none. STERILE CELLS capitate, on edge of gills.

Common locally on cow-dung, cultivated fields, etc. Ann Arbor, New Richmond. June-September.

This differs from *G. bulbifera* in the size of the spores and of the stem which is of equal size to the base. The stem is usually pubescent as is also the surface of the pileus; but not too much stress must be laid on this character since it is not unusual for other species of *Galera* to develop pubescence on cap and stem when growing on dung in shaded, moist situations. The stem also varies considerably as to the striations; these are normally well-marked but may be entirely lacking.

524. *Galera* sp.

Plate XCVII of this Report.

PILEUS 12-16 mm. broad, campanulate, *not striatulate*, watery-cinnamon-brown when moist, hygrophanous, pale whitish-ochraceous and atomate when dry; FLESH submembranous, concolor. GILLS adnate-seceding, ascending, *rather broad*, *ventricose*, close to subdistant, ferruginous at maturity. STEM about 5 cm. long, 1-1.5 mm. thick, *equal*, not bulbillate, fibrous-rigid, hollow, even, glabrous or pruinose, white at first, then pallid or pale ochraceous. SPORES large, broadly elliptical, obtuse, smooth, ferruginous in mass, 15-18 x 9-10 micr. CYSTIDIA none. STERILE CELLS on edge of gills, capitate.

On cow-dung in pine woods. New Richmond. September.

Differing from the preceding two, in the large spores, broad and

ventricose gills and paler colors. It was distinguished only once and no name is as yet applied to it. It is included merely for comparison. It may prove to be a form of *G. pygmaea-affinis* Fr.

525. *Galera tenera* Fr.

Syst. Myc., 1821.

Illustrations: Cooke, Ill., Pl. 461.

Hard, Mushrooms, Fig. 223, p. 276, 1908.

Murrill, Mycologia, Vol. 3, Pl. 40, Fig. 6.

PILEUS 8-16 mm. broad, *obtusely conic-campanulate*, hygrophanous, pale ferruginous and striatulate when moist, *whitish to creamy-white and even when dry*, glabrous, atomate when dry; FLESH submembranous. GILLS ascending-adnate, close to subdistant, rather narrow, uniform in width, cinnamon when mature. STEM 3-7 cm. long, 1-1.5 mm. thick, equal or subequal, straight, slender, *fragile*, subshining, hollow, concolor (moist and dry), pruinose at apex, even or faintly striatulate. SPORES variable in size, 11-16 x 6-9 micr., elliptical, smooth, obtuse. CYSTIDIA none. STERILE CELLS on edge of gills capitate.

Gregarious or scattered. Especially on lawns in our cities everywhere; also among grass by road-sides, in fields, pastures, etc., sometimes on dung-hills. May to September. Throughout the State. Very common.

This must not be confused with *Bolbitius tener* Berk., which is much more delicate and collapses quickly at maturity. When growing in the same place the two are easily distinguished. *Bolbitius tener* is rather rare, but may appear in similar situations. There seem to be some discrepancies in the spore-measurements of *G. tenera* as given by different authors, a fact easily explained by their variability. The gills, too, are usually said to be "broad," while in most individuals they are relatively somewhat narrow.

526. *Galera crispa* Longyear

Bot. Gazette, 1899, p. 272.

Illustration: Hard, Mushrooms, Fig. 226, p. 278, 1908.

PILEUS 1.5-3 cm. broad, *persistently conic-campanulate*, subacute, rivulose-striate, sometimes rugulose, *brownish-ochraceous at*

apex when moist, whitish-buff elsewhere, glabrous, atomate when dry; FLESH membranous. GILLS adnexed, close to subdistant, rather narrow, *crisped and interveined*, at first white then ferruginous-brown. STEM 5-9 cm. long, 1-2 mm. thick, slender, base slightly bulbous, hollow, *fragile, pure white or tinged ochraceous*, sometimes faintly striatulate. SPORES *very variable in size and shape*, elliptical, ovate or elliptic oval in some individuals, varying 15 x 13 or 12 x 8, etc., (11-16 x 8-14 micr.), smooth. CYSTIDIA none. STERILE CELLS on edge of gills, capitate.

On lawns, pastures, etc., among grass. June-July. Ann Arbor, Lansing, etc. Infrequent.

This species was described by Longyear from our State. The peculiar, crisped appearance of the gills, and the slight development of the hygrophanous character in the pileus distinguishes it from *G. tenera*. Hard gives an excellent photograph of it.

527. *Galera teneroides* Pk.

N. Y. State Mus. Rep. 29, p. 39, 1878.

PILEUS 5-20 mm. broad, conic-ovate at the very first, then *campanulate-expanded*, soft, *very fragile*, sublubricous, hygrophanous, *brownish-cinnamon* and striatulate when moist, paler when dry, glabrous. FLESH membranous. GILLS narrowly-adnate, *narrow*, close, pale brown then ochraceous-cinnamon or watery-brown. STEM slender, 3-6 cm. long, 1-1.5 mm. thick, elastic, straight then flexuous, equal, *slightly toughish*, subpubescent, glabrescent and shining, often striatulate. SPORES elliptical, small, 7-8.5 x 5 micr., smooth, obtuse, pale ochraceous-brown. BASIDIA 18 x 8 micr., inflated above, narrowed-stipitate, 4-spored. STERILE CELLS on edge of gills capitate.

On horse-dung and ground or decayed debris in woods. Ann Arbor, New Richmond. August-September.

Remarkable for the soft, fragile pileus and somewhat toughish, persistent stem; the latter separates from the rather watery flesh of the pileus and is found in good condition after the pileus has collapsed. It has affinities with *Bolbitius* but the gills are Galera-like. The small spores separate it from related species on dung. It seems close to *G. spartea* Fr., but that species is said to prefer mossy or burned-over places in woods. Furthermore, Massee says the gills of *G. spartea* are broadly adnate, while Ricken says they are narrowly-attached, so that a clear idea of that species is hard to obtain.

528. *Galera capillaripes* Pk.

Torr. Bot. Club. Bull, No. 26, p. 66, 1899.

PILEUS 8-12 mm. broad, obtusely campanulate, hygrophanous, *pale ferruginous* and faintly striatulate when moist, paler and atomate when dry. FLESH membranous. GILLS ascending adnate, *rather broad, subdistant*, pale, ferruginous. STEM filiform, 2-5 cm. long, *flexuous, tough*, glabrous, concolor, persistently rufous-shining, apex pruinose. SPORES 9-11.5 x 5-6.5 micr., elliptical, smooth, obtuse, epispore ferruginous under microscope. CYSTIDIA none. STERILE CELLS on edge of gills capitate, about 20 x 7-8 micr. ODOR none.

Among grass, near woods. Ann Arbor. September. Infrequent.

Similar to *G. tenera*, but with different spores, smaller size and tough stem. It was originally described by Peck from specimens growing on lawns and grassy places in Ohio.

Section II. Bryogeni. Pileus campanulate-convex, always striatulate; gills scarcely ascending, provided on the edge with filiform, awl-shaped or lanceolate sterile cells. Habitat on mosses, sedges, etc.

529. *Galera cyanopes* sp. nov.

PILEUS 8-12 mm. broad, convex-campanulate, hygrophanous, pale watery cinnamon and striatulate when moist, whitish-buff and almost even when dry, atomate; FLESH membranous. GILLS adnate, narrow, sublinear, close to subdistant, pale cinnamon-ochraceous, edge minutely flocculose. STEM 5-7 cm. long, 1-1.5 mm. thick, filiform, *pale greenish-gray to bluish*, equal or minutely bulb-illate at base, elastic, hollow, pruinose at apex, glabrous elsewhere, concolor within. SPORES broadly elliptical, smooth, 8-9.5 x 6.5-7 micr., ochraceous. CYSTIDIA none. STERILE CELLS on edge of gills. ODOR and TASTE none.

On Polytrichum, a species of moss, in a poplar swamp. Ann Arbor. July. Rare.

A beautiful little Galera, well-marked by the blue-gray stem, habit on Polytrichum and its striatulate pileus when moist. In the light from a kerosene lamp the greenish-blue color is intensified. *G. mniophila* Lasch. is said to grow on moss and has an olive-yellow stem, but the spores are larger, according to Ricken 10-12 x 5-6 micr., and according to Masee, 14 x 6 micr.

530. *Galera plicatella* Pk.

N. Y. State Mus. Rep. 26, p. 59, 1874 (as *Galera coprinoides* Pk.).

PILEUS 10-12 mm. broad, convex-expanded, *plicate-sulcate* to the small even disk, often split on margin, yellowish or ochraceous when moist, straw-whitish when dry, glabrous. FLESH membranaceous. GILLS adnexed, moderately broad, ventricose, close to subdistant, distinct, pale rusty-ochraceous. STEM 2-3 cm. long, 1 mm. thick, slender, equal, flexuous or straight, hollow, minutely pruinose, *white* to pallid. SPORES elliptical, smooth, 6-7.5 x 5 micr., rusty-ochraceous. BASIDIA 15 x 6-7 micr., 4-spored.

On the grass, lawns, roadsides. August-October. Ann Arbor. Rare.

The pileus imitates small species of Coprinus in its plicate margin. The trama of the gills is composed of large, vesicular subhymenial cells, between which runs a narrow layer of axillary, slender parallel hyphae.

531. *Galera hypnorum* Fr.

Sys. Myc., 1821.

Illustrations: Patouillard, Tab. Analyt., No. 230.

Cooke, Ill., Plate 465.

Gillet, Champignons de France, No. 295 (var. *bryorum*).

Ricken, Die Blätterpilze, Plate 60, Fig. 8.

PILEUS 4-12 mm. broad, campanulate, *cinnamon-yellowish* or yellowish-ochraceous and *striate when moist*, glabrous, yellowish-white or buff and even when dry. FLESH membranaceous; GILLS adnate, *broad, not ascending*, subdistant, fulvous-cinnamon, edge minutely flocculose. STEM short, 3-4 cm. long, 1-2 mm. thick, equal, slender, hollow, flexuous, glabrous, apex pruinose, concolor, often darker toward base. SPORES elliptic-ovate, subinequilateral, 8-10 x 5-6 micr., smooth, ochraceous. CYSTIDIA none. STERILE CELLS on edge of gills *fusiform-lanceolate*.

Gregarious on mosses. Throughout the State. May-October. Common.

This is our commonest little Galera with a moss habitat. Doubtless closely related species are confused with it and a microscopic study may be necessary to distinguish them. A number of varieties have been described, but an account of them here would only con-

fuse the student. Sometimes the pileus is provided with a little umbo, sometimes the plants attain a larger size than that given. A form growing on sphagnum is especially large.

Bolbitius Fr.

(From the Greek, *bolbiton*, cow's-dung.)

Ochre-brown to rusty-ochraceous-spored. Gills *dissolving somewhat* in wet weather, narrowly attached. Margin of pileus at first straight; flesh very thin. Stem fragile and slender. Partial veil very evanescent or none.

Putrescent, delicate, dung-inhabiting fungi, with hollow, elongated stems, with gills which dissolve more or less into a soft mass in age and very thin caps which usually split on the margin. They approach the genus *Coprinus* in habit and in the structure of the hymenium, differing in the rusty-ochraceous spores. They have something of the appearance of *Galera*, but their gills are clearly different. Only three species are included below. Some consider *Pluteolus reticulatus* to be a better species of *Bolbitius*. The genus *Pluteolus*, in fact, differs only in degree from *Bolbitius*. Species with free gills and the stem separable from the pileus are referable to *Pluteolus*; species with gills more or less narrowly attached and with a tendency of the gills to become soft, belonging to *Bolbitius*. But apparently these characters vary or intermediate forms may occur. The gills of *Pluteolus reticulatus* are sometimes narrowly adnate and those of some species of *Bolbitius* are free in occasional specimens. The texture of the stem in both genera is different from that of the pileus and the stem is more or less separable. The pileus is viscid or slightly so in nearly all species of both genera. In spite of these facts, the nature of the gills of *Bolbitius* remains a real distinguishing character and the genus *Pluteolus* will be retained in its proper place.

Key to the Species
(See *Pluteolus*)

532. Bolbitius tener Berk.

Outlines, 1860.

Illustrations, *Ibid*, Pl. 12, Fig. 2.

Cooke, Ill., Pl. 691.

Fries, *Icones*, Pl. 139, Fig. 4.

Gillet, *Champignons de France*, No. 46.

PILEUS conical, 1-1.5 cm. high, finally expanded, obtuse, *dull white*, apex creamy-yellow, sometimes slightly subviscid, *even or scarcely striatulate*, glabrous, atomate when dry. FLESH very thin, delicate. GILLS free or nearly so, narrow, close, *dissolving quickly* and becoming brownish-ochraceous. STEM *slender*, 6-12 cm. or more in length, 1-2 mm. thick, equal, *flaccid*, glabrous, hollow, *bulbillate at base, pure white*. SPORES broadly elliptical, smooth, 13-16 x 9-10 micr., rounded-obtuse, ochraceous.

Gregarious or scattered. Among grass on lawns, parks, golf-links.

Marquette, Ann Arbor, Ypsilanti, etc. July-August. After heavy rains. Rare.

This plant must not be confused with *Galera lateritia* which has a larger pileus, a rigid-fragile stem and slightly smaller spores and gills which do not dissolve. This little *Bolbitius* seldom appears, according to my experience, and only during sultry, rainy weather. It develops overnight and in early morning stands up on its slender stem without difficulty, but soon after the sun strikes it the stems bend over, the gills dissolve and the cap collapses into soft masses which cling to the apex of the flaccid stem. On cloudy days the cap may expand and persist longer but usually it is seen as shown in Cooke's figure. It is described with salmon-colored gills, but in our plants the gills were brownish-ochraceous.

533. Bolbitius fragilis Fr.

Epicrisis, 1836-38.

Illustrations: Cooke, Ill., Pl. 720, A.

Swanton, *Fungi*, Pl. 40, Fig. 2.

PILEUS 2-5 cm. broad, conical-expanded, subumbonate, more or less viscid, light yellow, fading, umbo slightly deeper yellow, thin, almost pellucid, glabrous, *striate on the margin*. FLESH mem-

branaceous. GILLS narrowly adnate, attenuate behind, sometimes free, *yellow*, then sordid pale cinnamon, moist and *somewhat dissolving*. STEM 7-9 cm. long, 2-3 mm. thick, fragile, hollow, slightly attenuated upwards, *glabrous*, naked at apex, *yellow*. SPORES elliptical, smooth, 11-13 x 6-7 micr., rusty-ochraceous.

Solitary or gregarious. In cultivated fields. Ann Arbor. May-July. Infrequent.

This is rather difficult of separation from *B. vitellinus*. It differs apparently in its less plicate pileus and the naked, more yellow stem; but these characters are variable in this genus and intermediate forms seem to be quite frequent.

534. *Bolbitius vitellinus* Fr.

Syst. Myc., 1821.

Illustrations: Cooke, Ill., Pl. 923.

Gillet, Champignons de France, No. 47.

Ricken, Blätterpilze, Pl. 23, Fig. 9.

PILEUS 2-5 cm. broad, at first oval, obtuse and *egg-yellow*, at length campanulate-expanded, cinereous toward margin, *sulcate-striate or plicate up to the egg-yellow obtuse umbo*, viscid, glabrous, margin at first straight. FLESH very thin. GILLS narrowly adnate, close, subdistant at full expansion of pileus, narrow, soft, *ochraceous-clay-color and with white edge when young*, rusty-ochraceous in age, *scarcely dissolving in wet weather*, crisped in dry weather. STEM 6-12 cm. long, 2-4 mm. thick, equal or slightly tapering upward, slender, fragile, *pruinose-scaly at apex* or throughout, *white* or slightly sulphur-yellow-tinged, often pellucid-shining, even or innately fibrillose. SPORES elliptical, smooth, 10-12.5 x 6-7.5 micr., rusty-ochraceous. *Hymenium* with large, inflated, sterile cells intermingled with basidia and of the same length as the basidia but much broader. ODOR and TASTE none.

On dung, especially cow dung, in fields, woods, etc., where cows are pastured. Ann Arbor, New Richmond, probably throughout the State. May-July. Rather frequent.

To be looked for in early June. It is a rather variable plant, changing in color as it develops, and again as it ages. Some specimens have white stems, others have stems tinged with sulphur-yellow. The distinctive character is the egg-yellow umbo on the center of the pileus, and before expansion the whole pileus is

yellow. In the very young unexpanded stage, the surface of the pileus is provided with a delicate, thin, viscid pellicle, composed of glistening particles; this membrane disappears as the pileus expands. The species is not uncommon in Sweden, where I was able to verify the identity of our plant. The flesh of the stem is sometimes pale yellow. It should be carefully compared with *Pluteolus expansus*.

Pluteolus Fr.

(Diminutive of *Pluteus*.)

Ochre-brown to rusty-ochraceous spored. Gills *free*, not dissolving in wet weather. Stem *distinct from the pileus*, subcartilaginous. Pileus *viscid*, margin at first straight. Veil none.

Putrescent, thin-capped, slender-stemmed fungi, whose distinguishing characters are the spore-color, free gills, separable stem and viscid pileus. *Bolbitius* differs by the greater or less degree of the softness of the gills which tend to dissolve in wet weather. In Galera the gills are attached, the stem not truly separable and the cap not viscid. In Naucoria the margin of the pileus is at first incurved. *Pluteolus* corresponds to *Pluteus* of the pink-spored group in its free gills. The gills are, however, not always free, but may be attached slightly by the upper corner; this is true in *P. expansus* and *P. reticulatus*, which are somewhat intermediate between *Pluteolus* and *Bolbitius*. Ricken has discarded this genus, referring the European species to *Bolbitius*. A consideration of the extremes as shown by *Bolbitius tener* and *Pluteolus coprophilus* will make it evident that a real basis exists for these two genera. For purposes of identification, however, it seems helpful to include the species of both genera in one key.

Key to the Species

- (a) On decaying wood; pileus deep violet-gray, fading. 538. *P. reticulatus* Fr.
- (aa) On dung, straw piles, grassy places or ground in woods.
- (b) Gills dissolving quickly; pileus conical, 1-1.5 cm., dull white. (See 532. *Bolbitius tener* Berk.)
- (bb) Gills dissolving slowly or not at all.
- (c) Spores large, 12-16 micr. long, pileus rose-gray, striatulate. 535. *P. coprophilus* Pk.
- (cc) Spores 9-13 micr. long.
- (d) Pileus drab-color to grayish-brown; on the ground in woods. 536. *P. aleuriatus gracilis* Pk.
- (dd) Pileus yellow when young.
- (e) Pileus umbonate, umbo yellow.
- (f) Stem yellow, glabrous; pileus striate on margin. (See 533. *Bolbitius fragile* Fr.)

- (ff) Stem white, rarely tinged yellow; pruinose-scaly at apex; pileus sulcate-plicate. (See 534. *Bolbitius vitellinus* Fr.)
 (ee) Pileus sulcate-plicate, not umbonate; stem citron-yellow. 537. *P. expansus* Pk.

535. *Pluteolus coprophilus* Pk.

N. Y. State Mus. Rep. 46, 1893.

PILEUS 2-4 cm. broad, fragile, conical-campanulate then expanded, depressed on disk, *viscid* when moist, striatulate on margin, whitish at first, soon *rosy-gray* or *pinkish-cinnamon*. FLESH thin, submembranaceous. GILLS *free*, narrow, crowded or close, pale rusty-cinnamon, dotted by the spores. STEM 6-11 cm. long, 2-4 mm. thick, straight or flexuous, *slender*, hollow, *pure white*, rarely tinged with pink, glabrous or obscurely squamulose, equal or attenuated at base. SPORES oval-elliptical, smooth, variable in size, 12-16 x 7-10 micr., bright-cinnamon in mass.

Caespitose or gregarious. On decaying straw piles, on compost heaps or on dung, especially on lawns, fields, around trees, etc., where coarse manure was used. Ann Arbor. Probably throughout the State. May-June. Infrequent.

During continued wet and sultry weather it is often very abundant on manure mixed with straw. In June of one year specimens appeared around every tree on the campus of the University of Michigan where such manure had been deposited. Some think *Bolbitius radians* Morg. is identical with it.

536. *Pluteolus aleuriatus gracilis* Pk.

Syst. Myc., 1821 (as *P. aleuriatus* Fr.).

N. Y. State Mus. Rep. 54, 1901.

PILEUS 1-2 cm. broad, fragile, soon expanded-plane, *viscid*, striate-sulcate on margin, hygrophanous, *drab color to grayish-brown*, paler on depressed disk, glabrous. FLESH thin. GILLS *free* or nearly so, narrow, close, whitish at first then pale rusty-cinnamon. STEM 2.5-3.5 cm. long, 1.5-3 mm. thick, equal or narrowed upwards, glabrous or minutely pulverulent, hollow, white, or pallid. SPORES elliptical, smooth, 9-12 x 4-6 micr., pale ferruginous.

On the ground among decaying leaves in mixed woods. Houghton, Bay View. July. Rare.

This species does not seem to be very well known. Only a few specimens were found which are here considered to be identical with Peck's variety.

537. *Pluteolus expansus* Pk.

N. Y. State Rep. 26, 1874 (as *Galera expansus*).

Illustration: Plate XCVIII of this Report.

PILEUS 3-6 cm. broad, *fragile*, oval at first, then expanded-plane, *not umbonate*, slightly depressed in centre, *viscid* when moist, *cinereous-ochraceous* tinged with brownish or greenish hues, margin at first sulphur-yellow, *striate-sulcate* or *plicatulate*. FLESH thin, submembranaceous. GILLS *free* or slightly and narrowly adnexed, narrow, close to crowded, at first white, soon ochraceous-cinnamon, edge minutely flocculose. STEM 5-10 cm. long, 2-6 mm. thick, fragile, equal or slightly tapering upward, hollow, sometimes compressed, splitting longitudinally, pruinose or floccose, *citron-yellow*, yellow within except the evanescent pith. SPORES elliptical, smooth, 10-12 x 7.5 micr., ochraceous-cinnamon under microscope. *Hymenium* composed of large, inflated subglobose sterile cells intermingled with basidia which are narrow below, inflated above and 4-spored.

Gregarious or solitary. On rich manured lawns, fields, etc., sometimes on dung; sometimes in woods. Ann Arbor, Houghton, etc. Throughout the State. May-July. Infrequent.

This species seems to differ from *Bolbitius vitellinus* mainly in the absence of the yellow umbo or a yellow centre in the expanded pileus, in the constant yellow stem and the somewhat different distribution of color on the cap. It was first described by Peck from specimens on decaying wood, but later he reported it from "rich ground." The microscopic structure is very similar to that of *Bolbitius vitellinus*. The gills, although rather soft, do not dissolve as in a typical *Bolbitius*, but are fairly persistent. Var. *terrestris* Pk. is here made an integral part of the species.

538. *Pluteolus reticulatus* Fr.

Syst. Myc., 1821.

Illustrations: Cooke, Ill., Pl. 495.

Gillet, Champignons de France, No. 546.

Berkeley, Outlines, Pl. 9, Fig. 5.

Ricken, Blätterpilze, Pl. 23, Fig. 10.

Plate CXIX of this Report.

PILEUS 2.5 cm. broad, campanulate-expanded, obtuse, sometimes slightly depressed, *glutinous when fresh*, the gluten drying so as to form *reticulate veins*, radiately-rugose on disk, *violaceous-gray* when fresh, livid to blackish on disk, margin obscurely striate, very pale in age. FLESH rather thin. GILLS almost free or narrowly adnate, rounded behind, *seceding*, crowded, ventricose, moderately broad, whitish at first, then rusty-cinnamon, edge white-fimbriate. STEM 3-6 cm. long, 2-6 mm. thick, equal or slightly tapering upwards, elastic, toughish, *white*, minutely floccose-scaly, fibrillose-striatulate, hollow, straight or curved. SPORES elliptical, smooth, 9-11 x 5-6 micr., rusty-brownish. ODOR none.

Caespitose or subcaespitose. Around the base of stumps and standing trees, on decayed wood. Ann Arbor. October. Rare.

When fresh the plants are markedly tricolored; pileus deep gray with violet tinge, gills rusty-cinnamon and stem white. Later the color of the pileus fades somewhat as in the plates referred to above, all of which show the cap much decolorized. The gills of our specimens depart somewhat from the character of the genus in being narrowly adnate; on this account it was at first referred by the writer to *Naucoria*. Ricken places it under *Bolbitius* because of the structure of the gills. In our plants the gills showed no sign of dissolving or becoming soft under the weather conditions in which they were collected.

Naucoria Fr.

(From the Latin, *Naucum*, a nut-shell, referring to the shape of the pileus.)

Ochre-brown or rusty-brown-spored. Stem *subcartilaginous*, hollow or stuffed. Partial veil none or fugacious. Pileus slightly fleshy, convex, *its margin at first incurved*. Spores smooth.

Putrescent, terrestrial or lignicolous, usually small, sometimes

minute, growing on grassy ground, mosses, sticks, decayed wood, or on the ground in various places. They correspond to the genus *Collybia* of the white-spored group in the nature of the stem, the incurved margin of the young pileus and in habit and habitat. They differ from *Pholiota* in lacking an annulus; from *Flammula* in the subcartilaginous stem, and from *Galera* in the more convex pileus and darker spore-mass. They are usually devoid of any special odor, but may have a slightly disagreeable taste. Their edibility is mostly uninvestigated, and their small size gives them no special value as edible mushrooms.

The PILEUS is slightly more fleshy in many species than in *Galera*; others have very thin flesh. It may be hemispherical and convex, even conical in a few species, but then it tends to expand and become plane or depressed. It is often somewhat viscid, sometimes hygrophanous, frequently dry. It is rarely striate on the margin. The color is usually ochraceous or of dark shades of fuscous, brown, etc. The surface is glabrous in two sections, (*Gymnolae* and *Phaeotae*), flocculose, scaly or silky in the other (*Lepidotae*). The GILLS are adnate or adnexed, never decurrent, often broad or ventricose. Most of them have differentiated sterile cells on the edge, which gives a paler or white distinctness. A more careful study of the color in the young stage may make it possible to separate species with greater ease. The STEM is often toughish, when dry somewhat cartilaginous. It is short as compared with the species of *Galera*, except in a few forms growing on sphagnum or dung. The CORTINA is entirely lacking in the first section, slightly developed in the second and third. It is probable that a universal veil is present in some of the species of the third group.

The species of *Naucoria* are rather numerous and seem to occur over the whole world. Only a comparatively small number are here described, and a careful study needs to be made of many others found in the State. Fries includes 48 species from Europe in his *Hymen. Europ.* Peck has described 19 from this country. These species all need microscopic study.

Key to the Species

- (A) Growing in grassy places or pastures.
 (a) Pileus dark watery brown when moist; hygrophanous. 548. *N. tabacina* Fr.
 (aa) Pileus yellowish or ochraceous.
 (b) Pileus dry, slightly tomentose or silky on margin. 547. *N. pediades* Fr.
 (bb) Pileus more or less viscid.

- (c) Stem compressed; gills yellowish at first, some spores angular. 546. *N. platysperma* Pk.
- (cc) Stem terete; gills pallid at first; spores never angular. 545. *N. semiorbicularis* Fr.
- (AA) Growing in the woods and thickets, on ground, mosses, decayed wood, etc.
- (a) Pileus scaly, dark reddish-brown. 549. *N. siparia* Fr.
- (aa) Pileus glabrous; on wood.
- (b) Pileus 2-4 cm. broad, dark-fuscous, with a separable pellicle. 539. *N. nimbose* Fr. var.
- (bb) Pileus not over 2.5 cm., without a pellicle.
- (c) Pileus with marked olivaceous tints. 540. *N. centuncula* Fr.
- (cc) Pileus without olivaceous tints.
- (d) Pileus with a conical umbo, minute.
- (e) Pileus hygrophanous, watery-cinnamon (moist); gills narrow. 543. *N. lignicola* Pk.
- (ee) Pileus dark reddish-brown; gills ventricose. 542. *N. triscopoda* Fr.
- (dd) Pileus hemispherical or convex.
- (e) Pileus cinnamon-brown; gills broad; stem short. 541. *N. horizontalis* Fr.
- (ee) Pileus and stem reddish-fulvous or darker, gills yellow; spores minute. 544. *N. bellula* Pk.

Section I. Gymnotae. Pileus; veil none. Spores rusty in mass. (The following species grow on decayed wood.)

**Pileus with a separable pellicle.*

539. *Naucoria nimbose* Fr. var.

Hymen. Europ., 1885.

PILEUS 2-4 cm. broad, *convex*, firm, obtuse or subumbonate, even, *dark-fuscous with a rufescent center*, almost blackish-fuscous, wood-brown when dry, *with a subgelatinous separable pellicle*, not viscid, glabrous, subpruinose when dry, veil none. FLESH concolor, pallid when dry, rather thin but compact. GILLS rounded behind, narrowly adnate, medium broad, *crowded*, thickish, fuscous-brown, edge white-fimbriate. STEM 2-4 cm. long, 3-4 mm. thick, stuffed then hollow, equal, straight or curved, *densely white-flocculose above*, fibrillose or fibrillose scaly below, striate, *pallid to fuscous-brown*, dark brown within, *rigid-elastic*, white-mycelioid at base. SPORES 6-7 x 3.5-4.5 micr., elliptical, smooth, rusty-brown. CYSTIDIA scattered on sides of gills, abundant on edge, 35-45 x 10-12 micr., obtuse, ventricose, stout. ODOR none. TASTE sometimes unpleasant, astringent.

On decaying logs or debris in hemlock woods; gregarious. Bay View, New Richmond. September. Infrequent.

This species seems to be intermediate between *N. nimbose* and *N. cidaris* Fr. It differs from the latter in its flocculose stem and from both in its habitat. The plant is quite well marked by its dark colors, the separable pellicle, firm texture and flocculose stem. The pellicle is composed of erect, clavate cells with fuscous-brown content, and gives to the surface of the cap a gelatinous feel, but is scarcely at all viscid in wet weather. The spores are not genuinely rusty as in the other forms of this section.

***Pileus without a separable pellicle.*

540. *Naucoria centuncula* Fr.

Syst. Myc., 1821.

Illustration: Cooke, Ill., Pl. 601.

"PILEUS 1.5-2.5 cm. broad, convex-expanded, then plane, obtuse, subundulate, hygrophanous, *sooty-olive to brown-olive and delicately striate when moist*, fading to yellowish, dull, silky under lens, margin at first with sulphur-yellow dust. FLESH submembranaceous, concolor. GILLS rounded behind, adnate, *thickish, broad, crowded*, yellow-gray to olive-brown, *edge crenulate with yellowish-green flecks*. Stem 2-3 cm. long, 2-3 mm. thick, often eccentric, equal, *curved*, hollow, sometimes compressed, paler olive, white-mealy above, white-mycelioid at base. SPORES almost kidney-shaped, 6-7 x 4 micr., smooth, rusty-brown. CYSTIDIA 30-36 x 4-6 micr. ODOR mild."

On decayed wood, in frondose woods. Ann Arbor, New Richmond. July-September.

Usually small and known from all others by the olivaceous coloring of the pileus and gills. The description is adapted from Ricken.

541. *Naucoria horizontalis* Fr.

Epicrisis, 1836-38.

Illustration: Cooke, Ill., Pl. 601.

"PILEUS .5-1 cm. broad, *hemispherical*, at length depressed, dry, *cinnamon-brown*, even or wrinkled. FLESH relatively thick. GILLS adnexed, *thickish, broad*, close to subdistant, cinnamon-brown, edge white-fimbriate. STEM short and curved, 1 cm. long,

1 mm. thick, brown, naked, base white-mycelioid. Spores somewhat almond-shaped, 14-18 x 6-7 micr., smooth. CYSTIDIA on edge of gills, fusiform, 50-60 x 8-10 mm.

On bark of standing trees (like *Mycena corticola*). Not found with certainty in the State. The description is adapted from Ricken.

542. *Naucoria triscopoda* Fr.

Monographia, 1863.

Illustrations: Fries, Icones, Pl. 124, Fig. 3. -
Cooke, Ill., Pl. 458.

PILEUS 3-10 mm. broad, small, at first conical, then campanulate with a marked acute umbo, striatulate to the umbo, chestnut-brown to rufous-brown, glabrous. FLESH submembranaceous. GILLS adnate, ascending, thickish, ventricose, close, ochraceous-cinnamon then darker, edge white-fimbriate. STEM 2-3 cm. long, 1 mm. thick, slender, reddish-brown, darker below, glabrous, hollow, apex pruinose, innately silky. SPORES minute, 6-7 x 3-4 micr., rusty-brown, smooth. CYSTIDIA none. STERILE CELLS on edge of gills, slender, subcylindrical, about 35 micr. long.

On much decayed wood in mixed forests of beech and hemlock. Bay View, New Richmond. September. Infrequent.

A dainty little plant, well-marked by its shape and color. The descriptions omit the striations of the pileus, but they are well shown in Fries' excellent figures. Ricken has referred it to the genus *Galera* but without explanation. This is the plant referred to in the list of the 8th Rep. Mich. Acad. Sci., p. 35, under *N. cuspidata* Pk. (in ed.) which Peck never published. It is clearly Fries' species.

543. *Naucoria lignicola* Pk.

N. Y. State Mus. Rep. 23, 1872.

PILEUS 5-20 mm. broad, convex-campanulate, markedly umbonate when young, at length expanded and depressed around the small umbo, hygrophanous, watery-cinnamon and striatulate when moist, dull ochraceous when dry, glabrous. FLESH thin. GILLS adnate, seceding, plane, close to subdistant, narrow, cinnamon-brown, edge concolor. STEM 2-4 cm. long, 1 mm. thick, slender, toughish, equal, subfistulose, curved, glabrous or obscurely pruinose-fibrillose.

SPORES elliptic-ovate, inequilateral, 7-8 x 3-4 micr., smooth, rusty-brown. ODOR none. TASTE slightly farinaceous.

On decayed wood. Ann Arbor. July.

Differs from *N. triscopoda* by its hygrophanous, paler pileus and slightly longer spores.

544. *Naucoria bellula* Pk.

N. Y. State Mus. Rep. 26, 1874.

PILEUS 1-2.5 cm. broad, firm, moist, convex, obtuse, minutely flocculose or glabrous, even, bright watery-cinnamon to rusty-fulvous, pliant. FLESH rather thin, yellowish. GILLS adnate-seceding, sometimes emarginate with tooth, rather narrow, close to crowded, yellow then rusty-yellow and spotted. STEM 2-2.5 cm. long, 1-2 mm. thick, slender, equal, short, toughish-elastic, straight or curved, reddish-brown to rusty-bay, darker below, stuffed then hollow, fibrillose-scurfy at apex, sometimes scurfy throughout. SPORES minute, oval, 5-5.5 x 3 micr., smooth, ferruginous, staining the gills. CYSTIDIA none. TASTE bitter. VEIL none.

On decayed coniferous wood in hemlock and pine woods, subcaespitose or gregarious. September. Bay View, New Richmond.

A distinct plant of the conifer regions of the State. The whole plant has a tendency towards a fulvous-rusty more or less red color. The stem and gills become darker colored with age. The identification was made by Peck. It must not be confused with *Flammula limulata* Fr.

Section II. *Phacotae*. Pileus glabrous. Spores and gills dull-colored, fuscous, cinnamon or ochraceous. Veil scarcely noticeable. (The following species grow on cultivated ground.)

545. *Naucoria semiorbicularis* Fr.

Epicrisis, 1836-38.

Illustrations: Cooke, Ill., Pl. 493.

Gillet, Champignons de France, No. 489.

Berkeley, Outlines, Pl. 9, Fig. 4.

Plate XCIX of this Report.

PILEUS 1-3 cm. broad, hemispherical-convex, obtuse, somewhat viscid when moist, fulvous-yellow, darker on disk, ochraceous in

age, *glabrous*, sometimes rimose, even, veil none. FLESH thin or thickish on disk, pallid. GILLS adnate, often seceding, *broad*, close, *pallid or alutaceous at first*, then rusty-brown, edge white-fimbriate. STEM 4-6 cm. long, 1-3 mm. thick, equal or slightly thickened toward base or apex, subrigid, toughish, *terete*, somewhat silky-shining, stuffed by a white pith, *ochraceous*, darker in age. SPORES elliptical-oval, 12-15 x 8-9 micr., smooth, rusty-brown in mass. CYSTIDIA on edge of gills ventricose flask-shaped, sometimes capitate, 25-35 x 9 micr. ODOR none. TASTE slightly disagreeable.

Gregarious or scattered. On lawns, roadsides and grassy pastures. Throughout the State. May-September. Common.

This species occurs on lawns with *Psilocybe foenisecii* and *Pholiota praecox*, during the warm and rainy weather in May and June, although it may be found throughout the season. Its hemispherical cap and rusty-brown spores distinguish it from similar species of the purple-brown-spored group. Its spores and size separate it from nearby species of *Naucoria*. *N. verracti* Fr. has been reported from Ohio. According to Ricken, this has spores measuring 12-17 x 8-12 micr. Its stem is said to be rough-fibrillose.

546. *Naucoria platysperma* Pk.

Torr. Bot. Club, Bull. 25, p. 324, 1898.

PILEUS 2-4.5 cm. broad, *convex* then subexpanded, slightly viscid when moist, *ochraceous*, somewhat darker when young, *glabrous*, fading, even, veil slight. FLESH white, thick on disk. GILLS adnate, broader behind, close, thin, *yellowish-ochre at first* then fuscous-cinnamon, edge pallid-fimbriate. STEM 3-5 cm. long, 2-4 mm. thick, tough, *hollow and usually compressed*, equal or tapering below, *ochraceous*, often striate above, slightly flocculose with whitish floccules. SPORES 13-15 x 7-10, elliptical, or *sometimes of various shapes, triangular, heart-shaped, lobed, etc.*, fuscous-brown in mass. STERILE CELLS on edge of gills fusiform.

Gregarious. On dung-hills, pastured woods and grassy places. Bay View, Ann Arbor, New Richmond. May, June and September. Frequent during some seasons.

Characterized by the flattened or irregular spores which are present in each mount, although in small numbers. The size of the plant and its compressed stem are often good marks for its identification. Peck gives a greater width for the spores, but this is rare in our plants, which were referred to him and verified. The original description was made from California specimens.

547. *Naucoria pediades* Fr.

Syst. Myc., 1821.

Illustrations: Cooke, Ill., Pl. 492.

Gillet, Champignons de France, No. 488.

Patouillard, Tab. Analyt., No. 346.

Hard, Mushrooms, Fig. 228, p. 282, 1908.

"PILEUS 2.5-6 cm. broad, campanulate-hemispherical, at length plane, obtuse, *dry, not shining*, fulvous-ochraceous then isabelline-yellow, *delicately tomentulose toward margin*, margin silky-floccose. FLESH pallid, slightly fleshy. GILLS broadly adnate, rounded behind, rather broad, close to subdistant, ventricose, *brownish-pallid at first*, at length sordid-brown. STEM 4-7 (or more) cm. long, 2-3 (or more) mm. thick, often twisted, unequal, *stuffed*, silky-fulvous, concolor or yellowish, *granular-flocculose*. SPORES oval, 10-12 x 6-7 micr., argillaceous-brown in mass. CYSTIDIA (on edge) ventricose-fusiform, 45-50 x 8-10 micr. ODOR subfarinaceous. TASTE sometimes nauseous."

Reported as common on lawns and roadsides by Longyear. Description adapted from Ricken.

548. *Naucoria tabacina* Fr.

Epicrisis, 1836-38.

Illustration: Cooke, Ill., Pl. 493.

PILEUS 6-18 mm. broad, convex, obtuse, *then almost plane*, *glabrous, hygrophanous*, even, *watery bay-fuscous* (moist), dull ochraceous-cinnamon (dry). FLESH concolor, thin. GILLS adnate-seceding, narrowed in front, rather broad behind, close, at length horizontal, alutaceous-brownish, edge white-flocculose. STEM 2-3 cm. long, 1-3 mm. thick, *tapering downward*, straight or curved, stuffed then hollow, toughish, *brownish-umber, fibrillose-floccose*. SPORES elliptic-ovate, 6-8 x 4-4.5 micr., smooth, fuscous-brown in mass. ODOR none. TASTE bitterish.

Caespitose or subcaespitose, on the ground in a cornfield, etc. Ann Arbor. June. Infrequent. Known by its dark colors and small spores. The gills often run down the stem by a line.

Section II. Lepidotae. Pileus flocculose or scaly. Veil manifest (universal). Spores rust-colored.

549. *Naucoria siparia* Fr.

Syst. Myc., 1821.

Illustrations: Cooke, Ill., Pl. 480.

Patouillard, Tab. Analyt., No. 642.

PILEUS 5-15 mm. broad, broadly convex to plane, obtuse, moist, at first densely tomentose, *breaking up into thick scales of fasciated tufts*, especially on disk, *dark reddish-brown*. FLESH soft, brownish-ochraceous, thin. GILLS adnate, *broad*, close to subdistant, ventricose, brownish-clay-color, edge white-flocculose. STEM 1-2 cm. long, 1-1.5 mm. thick, short, equal, stuffed, lower two-thirds *loosely floccose-fibrillose and reddish-brown*, apex glabrous and whitish. SPORES very variable in size and shape, 9-13 (few 15) x 5-6 (few 7) micr., inequilateral-elliptical, smooth, rusty-brown in mass. CYSTIDIA none. STERILE CELLS on edge of gills numerous, subcylindrical or narrowly clavate, about 40 x 8-9 micr. BASIDIA 4-spored, 27 x 6 micr. ODOR none.

Gregarious, on soil or moss in frondose woods, among debris. Ann Arbor. August.

Although this plant is said to usually inhabit the stalks of ferns, our specimens agree so closely with the descriptions that scarcely a doubt can be raised concerning their identity.

Crepidotus Fr.

(From the Greek, *krepis*, a slipper and *ous*, an ear.)

Ochre-brown to rusty-spored. Stem lateral, eccentric or none. Pileus dimidiate, eccentric or lateral, often at first resupinate. Veil lacking. SPORES spheroid or elliptical.

Putrescent, shelving or resupinate mushrooms, from 1 to 5 cm. broad, growing on decaying wood. They correspond to those Pleuroti of the white-spored group which have no veil.

The PILEUS is usually of a soft consistency and soon collapses; in some species it is firmer or tougher and a few have a gelatinous surface layer. The surface of some forms is tomentose or hairy, of others glabrous: when hygrophanous, they often become pruinose when dry. The hygrophanous species are usually striatulate on the margin of the pileus when moist, but become even when dry. The color of most species is white, dingy-white or yellowish, but *C. cinnabarinus* has a deep scarlet-red color. The GILLS radiate

from the point of attachment of the pileus, where they either run down to a point or are abruptly rounded behind. They are often broad and soft and collapse when mature, but sometimes are very narrow and crowded; in age they become stained or spotted by the copious spores. The short STEM or tubercle-like point of attachment is usually somewhat tomentose or villose even in otherwise glabrous plants. The SPORES are an important means of diagnosis of the species of this genus, since a number of species have a very similar general appearance. Peck points out that European mycologists have neglected to give us careful measurements for the spores of their species. I have used the spore character in the keys, since it is the only reliable method of studying the group, and as the species are not as a rule used for food, the mycophagist will not need much attention. The spores in different species vary from brown to ferruginous and often stain the pilei when the latter grow in an imbricate fashion.

Fifteen species are reported from Michigan; all but two I have collected.

Key to the Species

- (A) Spores elliptical or oval.
 - (a) Pileus scarlet-red, substipitate. 555. *C. cinnabarinus* Pk.
 - (aa) Pileus not red.
 - (b) Pileus viscid, hygrophanous, sessile, white when dry. 550. *C. haerens* Pk.
 - (bb) Pileus not viscid.
 - (c) Pileus with a subgelatinous surface, sessile, glabrous. 551. *C. mollis* Fr.
 - (cc) Pileus not gelatinous.
 - (d) Pileus distinctly stipitate, minutely scaly, 4-8 mm. broad, tawny, tinged gray. 556. *C. sepiarius* Pk.
 - (dd) Pileus sessile.
 - (e) Pileus glabrous, whitish, resupinate. 552. *C. albidus* E. & E.
 - (ee) Pileus not glabrous.
 - (f) Pileus covered by a white villosity or tomentum.
 - (g) Pileus 4-10 mm. broad; spores 7.5 micr. long. 553. *C. herbarum* Pk.
 - (gg) Pileus 8-20 mm. broad; spores 9-10 micr. long. 554. *C. versutus* Pk.
 - (ff) Pileus covered by a dense dark-colored tomentum when young.
 - (g) Spores 8-10 x 5-6; pileus with a thin tawny tomentum, hygrophanous. 557. *C. fulvotomentosus* Pk.
 - (gg) Spores 5-6 x 4-4.5; pileus with a rufous-brown tomentum, not hygrophanous. 558. *C. calolepis* Fr.
- (AA) Spores spherical.
 - (a) Pileus white or whitish.
 - (b) Pileus subtomentose, densely villose at base; gills broad; spores 6-7 micr. 559. *C. putrigenus* B. & C.
 - (bb) Pileus glabrous except at attachment.
 - (c) Stipitate, stem 2-4 mm. long; pileus usually marginate behind. Spores 5-5.5 micr. 562. *C. stipitatus* sp. nov.

- (cc) Not stipitate, i. e., pileus sessile.
 (d) Gills narrow and decurrent; spores 4-5.5 micr. 561. *C. appianatus* Fr.
 (dd) Gills broad, rounded behind; spores 5.5-7 micr. 560. *C. malachius* B. & C.
 (aa) Pileus not white.
 (b) Pileus flabelliform, narrowed to the base, ochraceous; gills concolor. Spores 4.5-5.5 micr., with a cavity on one side. 563. *C. crocophyllus* Berk.
 (bb) Pileus dimidiate or subreniform, reddish-yellow, tomentose-scaly; spores 6 micr. 564. *C. dorsalis* Pk.

(*C. distans* Pk. has an *eccentric* stem; pileus small, 4-8 mm., *sulcate-striate*, pubescent and *tawny*, spores elliptical, 10-12 x 6-7.5 micr.; the gills are very distant. *C. latifolius* Pk. came from Ohio; pileus is sessile, 3-6 mm. broad, *hygrophanous*, white, almost glabrous; gills *very broad*; spores globose, 5-6 micr. *C. croceotinctus* Pk. has a pileus 1.5-2.5 cm. broad, *glabrous*, sessile, yellowish; gills whitish *becoming dull saffron-yellow*; spores short elliptical, 5-6 micr. long.)

550. *Crepidotus hærens* Pk.

N. Y. State Mus. Rep. 35, 1884.

PILEUS 1-5 cm. broad, rarely broader, sessile, flattened-convex, dimidiate, reniform, broadly cuneate, etc., *hygrophanous*, *viscid* from the thin but tough, gelatinous, separable cuticle, glabrous or slightly floccose-squamulose, obscurely striatulate when moist, watery-brown or tinged gray (moist) white or whitish (dry), white-villose at the base, margin at first inrolled. FLESH thin. GILLS close, narrow, radiating, whitish then brownish. SPORES broadly ovate-elliptical, obtusely pointed at ends, smooth, 7-9 x 5-6 micr., pale rusty-cinnamon in mass.

On decaying woods of deciduous trees. In Washtenaw County it was found in several localities, but not detected elsewhere. June-September. Infrequent.

This is our only truly viscid *Crepidotus*; *C. mollis* may become slightly so in very wet weather. Our plants average larger than those described by Peck, and the spores are slightly longer.

551. *Crepidotus mollis* Fr.

Syst. Mycol., 1821.

Illustrations: Swanton, Fungi, Pl. 40, Fig. 10-12, 1909.

Gillet, Champignons de France, No. 262.

Ricken, Blätterpilze, Plate 61, Fig. 1.

Cooke's Ill., Pl. 498.

PILEUS 1-5 cm. broad, rarely broader, sessile or subsessile, *soft*, obovate to reniform, soon plane *with a gelatinous cuticle* which gives it a gelatinous feel, sometimes subviscid, flaccid, *glabrous*, substriate on the margin, livid (moist) becoming ochraceous-whitish (dry). FLESH thin. GILLS *narrow, crowded*, decurrent, radiating, whitish then cinnamon. SPORES elliptical-ovate, subacute at one end, rounded at the other, smooth, 7-8.5 x 4-5 micr. ODOR and TASTE not noticeable.

Often imbricated, on decaying logs and limbs. New Richmond. September. Rare.

C. mollis differs from *C. hærens* in that the gills are more crowded and narrow, the spores are slightly smaller and the surface is not viscid as a rule, even when moist and fresh.

552. *Crepidotus albidus* E. & E.

Proceedings Amer. Acad. of Phila., 1894.

"PILEUS sessile, *resupinate at first*, whitish, *glabrous*, dry, margin incurved. GILLS thin, rather broad, pallid then yellowish-brown, radiating from a point. SPORES unequally elliptical, yellowish-brown, 5 x 3.5 micr. On bark of tiliá, Ann Arbor."

This species has not been recognized, apparently, since it was described. It is included as a basis for further observation. It approaches *C. latifolius* but the spores are not spherical and the pileus is not *hygrophanous*. Specimens of the type material are in the University of Michigan herbarium. It is very close to the following.

553. *Crepidotus herbarum* Pk.

N. Y. State Mus. Rep. 26, 1874.

"PILEUS 3-10 mm. broad, sessile, *resupinate*, suborbicular, *clothed with a white, downy villosity*, incurved on the margin when

young, sometimes becoming reflexed. GILLS rather narrow, subdistant, radiating from a naked lateral or eccentric point, white, then subferruginous. SPORES elliptical, 6-7.5 x 3-4 micr."

On dead stems of herbs, decaying wood, etc., in woods. Throughout the State. June to November. Frequent.

This little species grades into the next, but the spores seem to be constant. The pileus is often only villose toward the base.

554. *Crepidotus versutus* Pk.

N. Y. State Mus. Rep. 30, 1878.

Illustrations: Atkinson, Mushrooms, Fig. 150, p. 160, 1900.

Hard, Mushrooms, Fig. 227, p. 280, 1908.

"PILEUS 8-20 mm. broad, at first resupinate, then reflexed, reniform or dimidiate, sessile, white, *clothed with a soft, downy or tomentose villosity*, incurved on the margin. GILLS rather broad, subdistant, rounded behind, radiating from a lateral or eccentric point, whitish then ferruginous. SPORES subelliptical, 9-10 x 6-7.5 micr."

On logs, decaying wood, etc., in woods. Throughout the State. June to October. Frequent.

The larger spores and size of pileus distinguish *C. versutus* from *C. herbarum*.

555. *Crepidotus cinnabarinus* Pk.

Torr. Bot. Club, Bull. 22, 1895.

PILEUS 5-10 mm. broad, subsessile to slightly stipitate, soon reflexed lateral, *scarlet* to cinnabar-red, villose-tomentose, glabrescent, even on the margin. GILLS rather broad, subdistant, sinuate behind, *scarlet on edge*, which is minutely fimbriate-crenulate. STEM short, 1-2 mm. long, or almost lacking, lateral, minutely reddish-tomentose, continuous with the base of the pileus on the upper side. SPORES elliptical-oval, 7-9 x 4.5-5.5 micr., smooth, pointed at one end, slightly tinged reddish. BASIDIA 20-25 micr. long by 7-9 wide, with 1, 2 or 4 sterigmata.

On decaying bass-wood log, etc., in low moist woods, southeast of Ann Arbor. September-November. Rare.

This brilliant red but small species was rediscovered by the writer years after it was first collected, when it was sent to Peck from Ann

Arbor by L. M. Johnson, then instructor in Botany in the University. All efforts to get a definite spore print failed, as my plants were collected November 12 and the spores matured slowly in the cold atmosphere. Under the microscope they had a slight tinge of red like that of the edge of the gills and pileus, and some uncertainty remains as to whether the form should not be referred to *Claudopus*. Quite a number of the spores were abnormal, and in one case one spore grew from the side of another which was the only one attached to that basidium. The *trama of the gills* is composed of narrow, parallel hyphae, 3 micr. thick, hyaline towards the pileus but filled with a red homogeneous substance toward the edge of the gills, where the hyphae terminate in inflated, *sterile*, oval or elliptical *large cells*; this coloring matter gradually breaks up into refractive red globules. The *trama of the pileus* is hyaline toward the gills, composed of interwoven narrow, long hyphae, about 6 micr. thick, which become narrower toward the surface of the pileus and are filled with the red coloring matter, finally ending in tufts or fibrils which stand out from the surface and are intensely scarlet-red.

556. *Crepidotus sepiarius* Pk.

Torr. Bot. Club, Bull. 25, 1898.

"PILEUS 4-8 mm. long, convex, subumbilicate, even, very minutely scaly, *grayish-tawny*. GILLS adnexed, minutely crenulate on edge, tawny. STEM short, 2-4 mm. long, curved, *generally eccentric*, rarely central, brownish, sometimes mealy or pulverulent. SPORES broadly elliptical, 9-10 x 6 micr., nucleate.

On oak rails. Michigan Agricultural College grounds. Leg. Prof. W. J. Beal. January.

The grayish tint of the pileus is due to the minute, grayish floccose squammules." When central-stemmed the species might be mistaken for a *Naucoria*. I have not collected it.

557. *Crepidotus fulvotomentosus* Pk.

N. Y. State Mus. Rep. 26, 1874.

PILEUS 1-5 cm. broad, scattered or gregarious, suborbicular at first then reniform or dimidiate, sessile or attached by a short, villose tubercle, *hygrophanous*, densely tawny tomentose when

young, tomentum breaking up into small, tawny scales as pileus expands, i. e., variegated, ochraceous beneath the tomentum, margin at first incurved. FLESH firm, thin. GILLS medium close, broad, subventricose, radiating from the tubercle, rusty-tan color, white-fimbriate on edge. SPORES elliptical-ovate, inequilateral or with a depression on one side, 8-10 x 5-6 micr., rusty-ochraceous.

Gregarious. On decaying wood, logs, etc., of frondose trees. Throughout the State. Recorded from June 9 to October 12. Common.

This differs from *C. calolepis*, if my opinion is correct, by its spores and the tinge of red in the color of the pileus. It is very close to *C. calolepis*, but if the spores are constant must be kept separate. Both are distinguished from other species by the dense tomentum when young, which breaks up into separate but small hairy scales. Both are rather persistent and may remain on logs in a dry condition for quite a time. Peck says the cuticle of *C. fulvotomentosus* is separable. It sometimes forms large colonies with pilei of all sizes.

558. *Crepidotus calolepis* Fr.

Vet. Ak. Förhandl., 1873 (Hymen. Europ. 1874).

Illustrations: Fries, Icones, Pl. 129, Fig. 4.

Cooke, Ill., Pl. 499.

PILEUS 1-2 cm. broad, suborbicular when young, convex, twice as wide as long, sessile or attached by a white villose tubercle, reniform or dimidiate, not hygrophanous nor gelatinous, covered by a dense reddish-brown tomentum when young, breaking up into rufous scales on expanding, margin at first incurved. FLESH firm, thin. GILLS radiating from the obsolete stem, those in the center not always reaching the inner point of the radius, medium close, broad, rusty ochraceous at length, edge minutely, white villose. SPORES oval, 5-6 x 4-5 micr., smooth, fuscous-brown in mass.

On dead branches of basswood. Houghton. July. Infrequent or rare.

Differs from the preceding in the character of the tomentum, scales and spores. It was at first considered undescribed, as no spore-measurements were found in European descriptions. The spores of this and the preceding species are certainly distinct and they must be kept separate. The plants found were smaller than is usual for *C. fulvotomentosus*.

559. *Crepidotus putrigenus* B. & C.

Annals Nat. Hist., 1859.

PILEUS 3-9 cm. broad, sessile, dimidiate or subreniform, convex to conchate or subexpanded, densely short villose-tomentose, lustre dull, whitish or yellowish-white, moist or watery, even on margin when dry, margin incurved. FLESH thickish behind, white (dry) under the somewhat separable pellicle. GILLS close, broad (width 4-5 times the thickness of the flesh), radiating from the villose basal tubercle, narrowed in front, rounded-adenate behind, becoming crisped on drying, edge entire. SPORES spherical, smooth, about 6 micr. diam., rusty-fuscous. BASIDIA 4-spored. CYSTIDIA none. ODOR rather disagreeable. TASTE tardily somewhat nauseous.

Gregarious or imbricate on decaying logs, stumps, etc., of mixed woods. South Haven and New Richmond. July to September. Infrequent.

Whether this species is a mere form of *C. malachius* is hard to determine. The spores are alike, but in our plants the pileus averaged a large size (for a *Crepidotus*) and its surface was villose throughout, the villosity becoming denser at the base; this may be the result of luxuriant development. All my collections of *C. malachius* average smaller, and the pileus is glabrous except the base. The gills are somewhat closer than in *C. malachius*, and I am not certain that the pileus is truly hygrophanous. It would seem that the villose, non-hygrophanous, large pileus with margin not striate (dry) and the closer gills separate it.

560. *Crepidotus malachius* B. & C.

Annals Nat. Hist., 1859.

Illustrations: Peck, N. Y. State Mus. Bull. 122, Report for 1907, Pl. 112, Fig. 1-4.

Conn. Survey, Bull. 3, Pl. 22, p. 43.

PILEUS 1-4 cm. broad, convex to plane, varying subreniform, cuneiform or flabelliform, often depressed behind, sessile or with a very short, white, tomentose stem, hygrophanous, watery in wet weather, glabrous except above attachment, watery-white, grayish-white or hoary, striatulate on margin (dry) as well as at first, sur-

face with a slight gelatinous feel. FLESH firm at first, becoming soft. GILLS almost close, *broad, rounded or abruptly narrowed behind* but reaching the stem-like base, ventricose, thin, whitish then tinged flesh color, finally rusty-brown. SPORES spherical, smooth, 6-7 micr. diam., rusty-brown.

Var. *plicatilis* Pk. has a deeply striate pileus. Found at Bay View.

On decaying wood of frondose trees. Throughout the State. June to November. Common.

The smaller size, presence of striations on the margin of the pileus even when dried, the glabrous surface of the pileus and its tinge of gray, for the most part distinguish this species from the preceding. From *C. applanatus* it is easily separated by the gills, which in the latter species are very narrow toward the base and run together almost in lines.

561. *Crepidotus applanatus* Fr.

Epicrisis, 1836.

PILEUS 1-3 cm. broad, variable in shape, suborbicular, reniform, cuneiform or spatulate, convex, soon plane, often depressed behind, sessile or with a short, compressed, white, tomentose base, *glabrous, hygrophonous*, watery-white and striatulate on the margin when moist, white when dry. GILLS *very narrow, decurrent, crowded*, white then cinnamon. SPORES globose, 5-6 micr. diam., smooth.

Gregarious on decayed wood, logs, stumps, etc. Ann Arbor, New Richmond. September. Infrequently found.

Known from the other species by its crowded, narrow gills which taper almost to lines where they reach the stem. The pileus becomes convolute on drying and often retains its striations on the thin margin. It has not been found in the State very often, but is probably widely distributed. Ricken interprets it differently, assigning to it elliptical spores.

562. *Crepidotus stipitatus* sp. nov.

PILEUS 1-3 cm. broad, *convex*, suborbicular to reniform, *hygrophonous, glabrous*, watery-white to white, *stipitate*, faintly striatulate on the margin when moist, silky when dry, margin decurved. FLESH white, firm, rather thick behind, thin in front. GILLS

somewhat close, rather broad, broadest behind, narrow in front, white then pale ochraceous-brown, edge entire. STEM distinct, 2-4 mm. long, *eccentric to nearly lateral*, 1-1.5 mm. thick, equal, white, pruinose, villose at base, somewhat prolonged to the gills. SPORES spherical, 5-6 micr. diam., smooth, pale ochraceous-brown. ODOR and TASTE not noticeable.

Gregarious, on very rotten wood. Low swampy woods. Ann Arbor. September. Found but once.

The texture is rather firm; the stipitate character separates it from *C. malachius*, and the globose spores from *C. sepiarius*. The pileus is marginate behind and with a minute, floccose tuft on the side of the stem. *C. tiliophila* Pk. and *C. haustellaris* Fr. are also said to have a short stem, but the pilei of these are brown or alutaceous and their spores are elliptical.

563. *Crepidotus crocophyllus* Berk.

Dec. Hooker's Jour., 1856.

PILEUS 1-3 cm. broad, reniform to flabelliform, *convex*, slightly lobed, narrowed into a stem-like base, delicately hairy or glabrous in front, *basal half covered with a dense cottony white tomentum*, watery-ochraceous when moist, *becoming pale chrome when drying*, even on margin. GILLS rather broad, close, thickish, converging at the very base, ochraceous-buff, becoming rusty-ochraceous from the spores. SPORES spherical, 4.5-5.5 micr., *with a depression or cavity on one side*, ochraceous under the microscope.

Scattered on decaying beech log. Bay View. September. Rare.

Originally collected at Waynesville, Ohio, in 1844 by Thomas G. Lea, and named by Berkeley, along with a list of other fungi sent to him by the same collector. (See Cinn. Soc. of Nat. Hist., Vol. 5, 1882, p. 199.)

Our plant was at first referred to *C. ralfsii* B. & Br., but it is much more like Lea's plant. The ground color of the pileus and gills is yellow to ochraceous, and the peculiar spores add a definite distinguishing character. It is close to *C. dorsalis*.

564. *Crepidotus dorsalis* Pk.

N. Y. State Mus. Rep. 24, 1872.

PILEUS 1-3 cm. broad, convex, sessile, at first suborbicular, then

reniform or dimidiate, reddish-yellow to tawny-yellow when fresh, fading to grayish-brown, adorned with small, tawny, fibrillose scales, scarcely striate on the margin, which is decurved. FLESH pliant, thin. GILLS close, rather broad, slightly ventricose, rounded behind, yellow at first, becoming ochraceous-fuscous then rusty, radiating from the villose point at the attachment of the pileus. SPORES spherical, 6 micr. diam., smooth, nucleate.

On decaying logs and rotten wood, in low swamps. Ann Arbor, New Richmond. July to September. Infrequent.

The color of the pileus varies from a strong tinge of red in some specimens to no red in others. At times the species may be easily taken for small forms of *Claudopus nidulans*, as the coloring is somewhat similar. The young growing specimens are entirely tomentose-squamulose, forming a variegated surface when the pileus is expanded. The perfectly globular spores as well as the absence of a white tomentum on the basal part of the pileus separate it from *C. crocophyllus*. It is probably found throughout the State.

RHODOSPOREAE

Volvaria Fr.

(From the Latin, *Volva*, a wrapper.)

Pink-spored. Stem provided at its base with a *volva* which is formed from a discrete *universal veil*; without an *annulus*; stem separable from the pileus. Gills free, ventricose, rounded behind.

Terrestrial or lignicolous. With the exception of *V. bombycina* and *V. speciosa*, the species are small and rather rare. They correspond to Amanitopsis of the white-spored group, and differ from all the pink-spored, except *Chamaeota*, in the free gills, the volva, and the separable stem. *V. bombycina* is known to be edible; the others are mostly poisonous.

The PILEUS is soft in texture, corresponding in this respect with the Amanitas. Its surface may be glabrous or beautifully silky, in a few species viscid, margin even or striate. Most of them have a whitish pileus, but a few vary to grayish or brown. The GILLS are broad, ventricose, do not reach the stem, and are soft as in Amanita. The STEM is glabrous, silky or villose, some covered with minute spreading hairs; there is no distinct cortex, but a few species are said to be partly hollow. We need more accurate information concerning the interior stem-structure of the rarer species.

The VOLVA is membranous and persists at the base of the stem; in all our species, except one, it splits apically and leaves no shreds on the pileus, showing the splitting in the form of lobes which are often quite constant for a particular species. There is never any ANNULUS. The SPORES are rounded, i. e., not angular, smooth, rose-colored, sometimes nucleate. CYSTIDIA are present in *V. volvacea* Fr., *V. pusilla* Fr., *V. murinella* Quel. and *V. speciosa* Fr. I have followed Patouillard's idea of the species of Europe.

Key to the Species

- (a) On tree trunks, large; pileus very silky, white; volva large, firm, tough; spores 6-7 x 5 micr. 565. *V. bombycina* Fr.
- (aa) On the ground, among grass, herbs, etc., in woods, on dung or manured places.
 - (b) Pileus viscid, grayish-white or smoky-gray; odor disagreeable; rather large.
 - (c) Pileus striate on margin, smoky-gray; gills flesh color, without cystidia. 567. *V. gloiocephala* D. C.
 - (cc) Pileus even on margin; gills rosy, cystidia present. 566. *V. speciosa* Fr.
 - (bb) Pileus only slightly viscid, or not at all.
 - (c) Pileus umbonate, striate; stem glabrous and solid. 568. *V. umbonata* Pk.
 - (cc) Pileus not markedly umbonate.
 - (d) Pileus 5-8 cm. broad, grayish-brown, blackish-brown on disk, streaked with black fibrils; spores small, elliptic-ovoid. *V. volvacea* Fr.
 - (dd) Pileus less than 5 cm. broad, whitish.
 - (e) Stem densely villose with minute spreading hairs; growing in woods. 569. *V. pubescentipes* Pk.; *V. plumulosus* Quel.
 - (ee) Stem glabrous, except at the very base.
 - (f) Pileus at length striate or rimulose on margin, white, dry.
 - (g) Spores subglobose, 7.5 micr. long; stem rather long, 3-4 cm., gills narrow. *V. striatula* Pk.
 - (gg) Spores truly elliptical, 6-8 x 4-5.5 micr.; stem 1-2 cm.; gills medium broad. 571. *V. pusilla* Fr.
 - (ff) Pileus not striate, 1-3 cm. broad, conico-campanulate, dry, silky, white or ashy-tinged; stem solid, pubescent; volva bilobed. 570. *V. hypopithys* Fr.

565. *Volvaria bombycina* Fr. (EDIBLE)

Syst. Mycol., 1821.

Illustrations: Atkinson, Mushrooms, Fig. 134, p. 141, 1900.

Hard, Mushrooms, Pl. 29, Fig. 191-3, 1908.

McIlvaine, American Fungi, Pl. 59, 1900.

Michael, Führer f. Pilzfreunde, Vol. III, No. 102.

Plate C of this Report.

PILEUS 5-20 cm. broad, globose-ovate at first, then campanulate

or convex-expanded, obtuse, *white, very silky*, in age somewhat squamulose, even on margin, edge floccose. FLESH rather thin, white, soft. GILLS free, *remote*, broad, very *ventricose, crowded*, flesh color, edge eroded. STEM 8-20 cm. long, 1-1.5 cm. thick, solid, glabrous, tapering upward, usually curved, white, deeply inserted at the base into the *large, thick, loose* VOLVA, which splits at apex, and persists as an ample bag-like or cup-like sheath, sometimes entire, sometimes torn. SPORES oval to broadly elliptical, 6-8 x 5.5 micr., smooth, rosy in mass.

Solitary or few together on trunks of living trees or decayed wood, of maple, beech, elm, horse-chestnut, etc.; usually from a crack or wound. Throughout the State. July-September. Infrequent.

A noble mushroom, often ensconced on a tree trunk out of reach, its perfect shape and silky dress evoking admiration from everyone. In the egg-stage it reminds one of the large Phalloids. Brought into the house at this stage, and placed in a drinking-glass with a moist cloth about its base, it will expand in all its perfection. It has not been shown as yet that it lives parasitically on the trees from which it grows. Once located, it may be looked for each succeeding year on the same spot. A maple tree on the campus of the University of Michigan is the home of one which fruits regularly every summer. It attains a considerable size. The species occurs throughout the world.

566. *Volvaria speciosa* Fr. (POISONOUS)

Syst. Mycol., 1821.

Illustrations: Patouillard, Tab. Analyt., No. 640.

Ricken, Blätterpilze, Pl. 70, Fig. 1.

Cooke, Ill., Pl. 297.

Bresadola, Fungh. mang. e. vel., Pl. 44.

Gillet, Champignons de France, No. 714.

PILEUS 5-10 cm. or more broad, globose-ovate at first, then expanded to plane, subumbonate, *very viscid, glabrous, white* or tinged gray, margin *not striate*. FLESH thin, soft, putrescent. GILLS free, crowded, rather broad, *ventricose*, deep flesh-color or rosy. STEM 10-20 cm. long, 1-2 cm. thick, equal or nearly so, *at first villose*, glabrescent, base tomentose, white. VOLVA large, splitting apically, close-fitting, flaccid, edge torn. SPORES large, broadly-elliptical, smooth, variable in size, 12-18 x 8-10 micr. CYSTIDIA

clavate, obtuse. ODOR strong and disagreeable at times, especially when old.

Solitary or gregarious. On manured ground, dung, rich leaf-mould in woods; often in rich cultivated fields. So far found in the southern half of the State only. May, June and July. Infrequent.

Atkinson says plants from Lansing, found in a potato patch, had the odor of rotting potatoes. Sometimes the *odor* is not evident, *especially when the plant is young*. Solitary specimens occur in low woods and are somewhat smaller, but in all cases the large, broad spores are characteristic and separate it from the next species. It is considered poisonous in Europe, but McClatchie, in California, reports it perfectly safe. Bresadola warns against confusing it with *Lepiota naucina* and *Palliota campestris*.

567. *Volvaria gloiocephala* Fr. (POISONOUS)

Syst. Mycol., 1821.

Illustration: Patouillard, Tab. Analyt., No. 224.

Bresadola, Fungh. mang. e. vel., Pl. 45.

Gillet, Champignons de France, No. 711.

Ricken, Blätterpilze, Pl. 70, Fig. 2.

Cooke, Ill., Pl. 298.

PILEUS 5-10 cm. broad, ovate at first then campanulate-expanded to plane, obtuse, sometimes umbonate, glabrous, viscid to glutinous when moist, *smoky-gray to pearl-gray*, with a metallic luster when dry, margin striate. FLESH thin, fragile, white. GILLS free, rather close, broad toward front, narrowed behind, subventricose, edge concolor. STEM 8-15 cm. or more long, 1-2 cm. thick, tapering upward, solid, even, glabrous above, somewhat villose toward base. VOLVA thin, splitting apically or circularly, sometimes three-lobed, sometimes regular or lacerated on edge, adherent, externally tomentose. SPORES 11-13 x 6-7.5 micr., elliptical, smooth, flesh color. CYSTIDIA none. ODOR and TASTE disagreeable, quite strong.

Solitary. On decaying vegetation, old leaves, rotten wood, in low woods. August. Ann Arbor. Rare.

Except for the darker colors, smaller spores, striations on the pileus and lack of cystidia, this seems close to the preceding, and might perhaps be considered as a variety of it. The spores and colors in these two species are very variable and no doubt intermediate forms occur. Striations are never very satisfactory characters to separate species, although they are useful. The species is con-

sidered *very poisonous*, and if so, is easily confused with *V. speciosa*. The authors note that the volva breaks in a circular manner, sometimes leaving shreds on the pileus like some *Amanitas*. Atkinson has shown that in *Amanita* the volva of the same species may undergo the two different modes of breaking, and the same holds true of this form. Our plants did not show any shreds on the pileus, and the volva was angularly lobed. The pileus was not truly umbonate. It must not be confused with the gray form of *Amanitopsis vaginata*.

568. *Volvaria umbonata* Pk.

Torr. Bot. Club, Bull. 26, 1899.

"PILEUS 2-3 cm. broad, conico-campanulate or campanulate, then expanded and furnished with a prominent umbo, white, slightly viscid when moist, *silky when dry, strongly striate*. FLESH thin. GILLS free, remote, medium close, pale flesh color. STEM 5-6 cm. long, 4 mm. thick, *solid*, glabrous, white, slightly thickened below. VOLVA white, membranous, persistent, irregularly split into segments, forming a shallow cap. SPORES variable in size, broadly elliptical, nucleate, smooth, 5-7 x 4-5 micr.

"On lawns and grassy places."

The above is taken from Peck's and Lloyd's descriptions. Lloyd finds it in Ohio. It is probably to be found in our State if careful search be made.

569. *Volvaria pubescentipes* Pk.

N. Y. State Mus. Rep. 29, 1878 (*V. pubipes* in Sylloge).

Illustrations: Ibid., Pl. I, Fig. 1-3.

PILEUS 1-2 cm. broad, *dry, white*, obtuse, covered with adpressed, silky squamules, *not striate on margin*. GILLS free, remote, close, not very broad, white then flesh color, *edge persistently white-fimbriate*. STEM 2-4 cm. long, 1-2 mm. thick, usually slender, equal or subequal, *densely minutely villose* with spreading hairs, even, *white*. VOLVA white, membranous, subadpressed, sometimes 3-lobed. SPORES suboval to broadly elliptical, smooth, 5-7 x 4-5 micr., pale flesh color.

(Dried: Buff to pale ochraceous-brown.)

Scattered. On the ground, among debris in hemlock and cedar swamps of northern Michigan, sparingly in frondose woods of the southern part. Marquette, Houghton, Bay View, New Richmond, Ann Arbor, etc. July-September. Frequent locally.

Slender, pure white, with minute hairs all over the stem. Its habitat in woods is a distinguishing character. Patouillard's figure of *V. plumulosus* Quel. of Europe (No. 333, Tab. Analyt.) is somewhat illustrative of our plant. I find the stem of *V. pubescentipes* of the woods always rather long and slender, and the cap and gills more narrow than in Patouillard's figure.

570. *Volvaria hypopithys* Fr.

Hymen. Europ., 1874.

PILEUS conico-campanulate, 6-15 mm. high, dry, *silky*, whitish, *even on margin*. FLESH thin. GILLS free, ascending, rather narrow, close, white then flesh-color, edge minutely crenulate. STEM 2-3 cm. long, 2-3 mm. thick, *solid*, equal, adpressed-silky, whitish. VOLVA vaginate, bilobed, tomentose externally, whitish. SPORES 5-7.5 x 3-4 micr., smooth, elliptical.

I have referred here a collection made by Messrs. Hill and Fischer of the Detroit Mycological Club, and given the description of their plant. It appears to lack the pubescent stem of the typical description, but its conical-shaped cap even at maturity seems to require its reference to this species or to a closely related one. The finders referred it to *V. murinella* because of the gray tinge of the pileus. Patouillard's figure, however, shows the pileus of that species expanded-plane and the plant smaller. Peck (in N. Y. State Bull. 54) reports *V. hypopithys* for New York, but without any notes. Our plant differs from *V. umbonata* Pk. in its pileus being even, not at all viscid, although the spores are the same. Further collections are necessary to determine its true place.

571. *Volvaria pusilla* Fr.

Syst. Myc., 1821.

Illustrations: Patouillard, Tab. Analyt., No. 332 (as *V. parvula*).

Ricken, Blätterpilze, Pl. 70, Fig. 3.

Gillett, Champignons de France, No. 713 (as *V. parvula*).

Hard, Mushrooms, Fig. 195, p. 243, 1900.

Clements, Minn. Mushrooms, Fig. 31, p. 57, 1910.

Plate CI of this Report.

PILEUS 5-12 mm. broad, at first ovate then campanulate-convex, finally plane, *white*, silky-fibrillose, *dry*, even then rimose or striatu-

late on margin, obtuse or slightly depressed, rarely mammillate. FLESH thickish on disk only, white. GILLS free, close to subdistant, moderately broad, white then bright flesh color. STEM 1-2 cm. long, 1-3 mm. thick, white, equal, *glabrous, solid*, even. VOLVA split into 3 or 4 nearly equal lobes, firm, loose, white becoming sordid. SPORES elliptic-ovate, 6-8.5 x 4-5.5 micr., smooth, nucleate, incarnate in mass. CYSTIDIA scattered on sides and edge of gills, ventricose, very obtuse, 35-40 x 9-18 micr. ODOR none.

Solitary or scattered, under herbs in moist ground. Detroit, Ann Arbor. July-August. Rarely found.

This species is distinguished by its small size, white color, the regular, three to four-lobed volva and by its cystidia and spores. Dr. Fischer collected the Detroit specimens, from which Hard's figure was obtained; Dr. E. B. Mains found the Ann Arbor specimens of our photograph. It seems to be the same plant described by C. G. Lloyd in Mycological Notes, Vol. I, p. 9. Whether it is the true *V. pusilla* of Persoon remains an open question. Fries, in the Systema, does not mention the striations of the pileus, and in his later works includes the form under *V. parvula*, which he always describes with a dry cap. Ricken (Blätterpilze), however, says the cap is at first viscid, soon dry. Berkeley (Outlines) also speaks of the cap of *V. pusilla* as viscid and not striate. The stem is said to be somewhat stuffed to hollow, and hence our plant departs from Berkeley's also in this respect.

From the remarks of various authors it would seem that the species referred to *V. pusilla* by some and to *V. parvula* by others is an unusually variable plant, inasmuch as the pileus may be somewhat viscid or dry, even on the margin or striatulate, umbonate or plane, and the stem is either solid or with a narrow tubule. Careful study of the caps of our plants failed to reveal more than mere rudiments of a cuticle which could scarcely become viscid in wet weather. The stem was solid and practically homogeneous. There were no signs of striations on the pileus, although the expanded margin became slightly rivulose in age. The trama of the gills was convergent, composed of large, inflated cells. It remains for those who are lucky enough to find it often, to note to what extent it may vary as to the contested points.

Chamæota Smith, W. G.

(From the Greek, *chamai*, on the ground. The old generic name *Annularia* is pre-occupied.)

Pink-spored. Stem *fleshy, separable* from the pileus, with a persistent or evanescent *annulus*. Gills free. Spores rounded. Terrestrial or lignicolous. Fleshy, putrescent, *rare* mushrooms, corresponding to *Lepiota* of the white-spored group. They differ from *Volvaria* in having an annulus but no volva. The annulus is derived from an *inner veil*, which is thin. The annulus is usually movable. About a dozen species are known throughout the world. The two following species seem to be the only ones known in the United States, and their discovery is due to the careful and acute observations of Mr. Bronson Barlow of Greenville, and Dr. O. E. Fischer of the Detroit Mycological Club.

572. *Chamæota mammillata* (Longyear) Murrill

Mich. Acad. of Sci. Rep. 3, 1902. (As *Annularia*.)

Illustration: Ibid, Pl. I, Fig. 4.

PILEUS 1-2 cm. broad, plane at maturity *with a prominent mammiform umbo at the center*, whitish, umbo lemon-yellow, surface minutely rough. FLESH very thin, soft. GILLS free, ventricose, broad, thin, close, 3 mm. broad, pale flesh color. STEM 3.5 cm. long, 1.5 mm. thick at apex, gradually enlarging toward base, glabrous above and silky below the ring. ANNULUS membranous, persistent, white. SPORES subglobose, smooth, 5-6 micr. diam., pale flesh color. CYSTIDIA fusiform, inflated in the middle, 50 x 20 micr.

Solitary. On decaying logs in woods. Greenville. July. Rare. Reported by Longyear, collected by Mr. Barlow.

The type material is in the herbarium of Michigan Agricultural College, East Lansing.

573. *Chamaeota sphærospora* (Pk.)

Torr. Bot. Club, Bull. 33, p. 216, 1906. (As *Annularia*.)

Illustrations: Plates VI, CII of this Report.

PILEUS 3-6 cm. broad, conic or subcampanulate, becoming expanded, umbonate, silky-fibrillose, yellow, fading to whitish in part, *umbo brownish*. FLESH thin. GILLS free, close, thin, whitish or cream-colored when young, flesh-color when mature, moderately broad, *edge white-fimbriate*; trama of parallel hyphae. STEM 3-8 cm. long, 4-8 mm. thick, equal or tapering upward, *solid*, fibrous, substriate, whitish. ANNULUS white, median or below the middle. SPORES globose or subglobose, 5-6 micr. diam., smooth, non-apiculate, dull flesh-color. BASIDIA 4-spored, at maturity projecting beyond the younger hymenium, about 25 x 8-9 micr. CYSTIDIA none, except on edge, which is densely covered by slender stalked long cells, enlarged at apex.

Subcaespitose. On rotten wood of elm trunk. Detroit. Collected by Dr. Fischer. August. Rare. Cotype in the University of Michigan herbarium.

Described by Dr. Peck from material collected near Detroit by O. E. Fischer. It has been suggested that it is identical with *C. fenzi* Fr., illustrated as follows:

Kalchbrenner and Schulzer, *Icones, Hymen Hung.*, Pl. 10, Fig. 1.

Gillet, *Champignons de France*, No. 30.

Engler and Prantl, I, 1** Fig. 121. B. p. 258.

In some respects it certainly has similar characters, but Gillet, who gives a full description, says the spores are "large" and his figures confirm this if we compare them with those in which he shows small spores of other species. Unfortunately neither Gillet nor any one else appears to have recorded the spore-measurements of *C. fenzi*. Furthermore, the latter species is described as smaller, the annulus and stem yellow, or yellowish, the former evanescent. Gillet says the stem of *C. fenzi* is at first solid then hollow. Further information concerning the variation of our plant is necessary before it can be reduced to synonymy. It seems to be a very rare plant and is only recorded from the one locality.

Pluteus Fr.

(From the Latin, *Pluteus*, a protective military covering.)

Pink-spored. *Without volva or annulus*. Stem *fleshy to fibrous*, not cartilaginous, separable from the pileus. Gills *free*, rounded behind, soft. Spores rounded, rarely angular. Hymenium *provided with cystidia*.

Small, soft mushrooms (except *P. cervinus* Fr. which is rather large), *lignicolous* for the most part, i. e., growing on wood, on logs, stumps, decayed wood, forest debris, or sawdust, rarely on manure. The smaller forms are found in very moist situations. *P. cervinus* is common; the others tend to be rare or infrequent.

The PILEUS may be glabrous, silky, velvety, minutely scaly or torn, fibrillose or granular; its surface is even, striate on the margin or varying to quite rugulose. The upper layer of hyphae is sometimes differentiated into a separable, somewhat viscid pellicle, or it is composed of loose, rounded cells of a different color; the shape, size and color of these surface hyphae or cells under the microscope provide a helpful means of definitely determining some of the species. The color of the pileus varies white, yellow, brown, blackish, or rarely orange to red. The GILLS are soft, not attached to the stem but rounded behind and often remote. Usually they are white, in a few cases yellowish, and all become tinged by the flesh-colored or rosy spores. They are coherent, i. e., collapsing on each other as in *Coprinus*, and often become moist and nearly deliquescent in wet weather. They are provided with large cells projecting beyond the basidia, either on their edge or sides or both, called CYSTIDIA; the shape and structure of the cystidia vary, and can be used with the spores to separate the otherwise often similar species. They are called STERILE CELLS when they occur on the edge of the gills, where they are sometimes arranged in clusters. The STEM is central, fleshy, often with a fibrous cuticle, not cartilaginous except under dry weather conditions; it is solid except in a few species, as e. g., *P. admirabilis* Pk. and *P. salicinus* Fr.; it is usually slender and fragile, equal, rarely subbulbous, glabrous or velvety, etc., like the pileus. The SPORES of the different species are very much alike, minute, subglobose or short-oblong, white and smooth, not angular in our species. They include a number of *edible* forms according to McIlvaine, although the older authors considered them with suspicion. Not all the species have been

tested, and all, except perhaps the edible *P. cervinus*, are too small to consider from a food-value standpoint.

The species can for the most part only be identified with the aid of a microscope, since the character of the cystidia must be known before certainty can prevail. Hence the following key is based on the only certain method which can be followed in this genus. Of the species not yet found in the State, *P. stercorarius* Pk. grows on manure heaps, and its spores are exceptionally large, measuring 12-15 micr. long; *P. sterilomarginatus* Pk. has angular spores. It is possible that *Pleurotus subpalmatus* Fr. which as it occurs with us is well illustrated by Cooke under *Pluteus phlebo-phorus*, Plate 422, B., has been reported as a *Pluteus*; its adnate gills, however, should prevent confusion.

Fries divided the genus into three sections, given below.

Key to the Species

- (A) Pileus white or whitish. [See also (AA) and (AAA).]
 - (a) Cystidia with 2-4 horns at apex; pileus subglabrous to fibrillose or rimose, 5-15 cm. broad. 574. *P. cervinus* Fr. var. *albus* Pk.
 - (aa) Apex of cystidia without horns; pileus villose-tomentose, 2-7 cm. broad. 578. *P. tomentosulus* Pk.
 - (aaa) Cystidia rare, not pronged; pileus glabrous, 2-3 cm. broad. 579. *P. roscoecandidus* Atk.
- (AA) Pileus yellow, orange or red.
 - (a) Pileus orange to vermillion; spores short-oblong. 582. *P. caloceps* Atk.
 - (aa) Pileus yellow, sometimes smoky tinged.
 - (b) Pileus rugose-reticulate on disk.
 - (c) Stem stuffed to hollow, yellow; pileus glabrous, umbonate. 584. *P. admirabilis* Pk.
 - (cc) Stem solid, pinkish-white; pileus 4-5 cm. broad, smoky velvety on disk. *P. flavofulgineus* Atk.
 - (bb) Pileus not rugose on disk, striate on margin; stem pellucid-white. 585. *P. leoninus* Fr.
- (AAA) Pileus brown, fuscous, umber, blackish, etc.
 - (a) Cystidia with 2-4 horns at apex; pileus not striate on margin; stem fibrillose.
 - (b) Gills with their edges smoky-brown. 575. *P. umbrosus* Fr.
 - (bb) Gills unicolorous.
 - (c) Pileus usually rather large, 3-15 cm. broad; color dingy pale brown, but variable; common. 574. *P. cervinus* Fr.
 - (cc) Pileus small to medium; pileus and base of stem tinged bluish or with a distinct olivaceous tinge; cystidia longer than in the preceding; rare. 576. *P. salicinus* Fr.
 - (aa) Cystidia without horns at apex.
 - (b) Pileus not truly striate on the margin.
 - (c) Stem glabrous, pellucid, innately striatulate.
 - (d) Stem and gills white at first. 581. *P. nanus* Fr.
 - (dd) Stem and sometimes the gills, yellowish. 581. *P. nanus* var. *lutescens* Fr.
 - (cc) Stem velvety to squamulose, brownish, etc.
 - (d) Edge of gills of same color, cystidia hyaline. 580. *P. granularis* Pk.
 - (dd) Edge of gills with yellowish cystidia. 580. *P. granularis* Pk. var. *umbrosellus* Atk.

- (ccc) Stem silky, whitish or tinged fuscous; spores oblong, 6-6.5 x 3 micr. 577. *P. ephebius* Fr. var.
- (bb) Pileus short- or long-striatulate on margin.
- (c) Pileus slightly striate on margin, glabrous, cinnamon-brown. *P. chrysophaeus* Fr.
- (cc) Pileus long-striate on margin, minutely velvety or obscurely granulose.
 - (d) Pileus 1-3 cm. broad; stem fibrous-striate, glabrous, white or brownish. (See 617. *Leptonia seticeps* Atk.)
 - (dd) Pileus 2.5-5 cm. broad; stem innately striatulate, glabrous. 583. *P. longistriatus* Pk.

Section I. Surface of the pileus at length fibrillose or floccose, by the breaking up of the horizontal layer of the fibrils of the cuticle.

574. *Pluteus cervinus* Fr. (EDIBLE)

Epicrisis, 1836.

Illustrations: Cooke, Ill., Pl. 301.

Patouillard, Tab. Analyt., No. 335.

Ricken, Blätterpilze, Pl. 71, Fig. 1.

Atkinson, Mushrooms, Fig. 132, p. 138, 1900.

Hard, Mushrooms, Fig. 188, 189, p. 235, 1908.

Marshall, Mushroom Book, op. p. 87, 1905.

N. Y. State Mus. Rep. 54, Pl. 74, 1901.

McIlvaine, American Mushrooms, Pl. LXI, p. 243.

Plate CIII of this Report.

PILEUS 5-10 cm. broad, rarely smaller, campanulate, then broadly convex to expanded, *varying glabrous to fibrillose*, fibrils darker, disk sometimes scaly, even on margin, white, dingy-tan, grayish brown or darker, provided with a somewhat separable, sometimes subviscid, pellicle; FLESH white. GILLS close, free, broad, rounded behind, white then flesh-colored from the spores. STEM equal or slightly tapering upward, 5-15 cm. long, 6-18 mm. thick, firm, solid, dingy white to brownish-tan, glabrous or somewhat fibrillose. SPORES inconstant in size and shape, *short-oblong, oval*, broadly elliptical, 5-8 x 4-5 micr., sometimes longer or broader, more rarely globular, often nucleate, smooth, flesh-colored in mass. CYSTIDIA abundant, fusoid, stout, terminating in 2-4 short, blunt horns. ODOR and TASTE somewhat disagreeable.

Solitary, scattered, or when growing on sawdust, etc., often caespitose. On stumps, logs, from underground roots or wood, on boards, sawdust, etc. Throughout the State, mostly in broad-leaved

woods. June to October (earliest record is May 28; latest, October 4). Very common. Edible.

Like *Armillaria mellea* its frequent fruiting makes it possible to find a great amount of variation, and many varieties have been named. Var. *alba*. Pk. is whitish, often caespitose and frequents sawdust piles. Var. *viscosus* Lloyd is described as very viscid on the cap, and with narrow gills. Var. *pectasatus* Fr. has the cap striate to the middle. It is probable that all of these forms intergrade with the typical plant which along with the varieties varies into many shades of color. Slender forms occur in low woods, on debris, with the stature of *P. leoninus*, but the pileus is almost white.

This species can be distinguished from *Entoloma* by its free gills and its lignicolous habitat, although of similar appearance otherwise. As *Entoloma* contains poisonous species, this is important. In Europe, *P. cervinus* has been marked as "suspected"; in this country, however, it is highly praised by mycophagists, since the disagreeable odor and taste disappear on cooking. It has a characteristic relation to the stump on which it is often found, in being so attached that it is difficult to get a piece of the wood and mushroom together, since its stem grows in the vertical cracks of the stump. With us it is found on wood, rarely on soil, although the condition of the woody substratum varies exceedingly. Small plants imitate some of the other species and can only be separated with certainty by the use of the microscope. The pronged cystidia are usually the decisive character. Patouillard says that the flesh has yellowish lactiferous hyphae scattered throughout it.

575. *Pluteus umbrosus* Fr.

Sys. Mycol., 1821.

Illustrations: Bresadola, Fung. Trid., Vol. 2, Pl. 116.

Ricken, Blätterpilze, Pl. 70, Fig. 4.

PILEUS 5-10 cm. broad, campanulate then convex-expanded, broadly umbonate, *smoky amber* or blackish brown, *rugose-reticulate and floccose-scaly on disk*, even and fibrillose on margin. FLESH white. Gills free, close, broad, ventricose, whitish then flesh-colored from the spores, *edge fimbriate and smoky brown* from the dark cystidia. STEM 3-8 cm. long, 4-8 mm. thick, solid, firm, equal or slightly tapering upward, dingy white to brownish, covered with smoky-brown fibrills. SPORES oval-elliptical, 5-7 x 3-4 micr.,

smooth, flesh color in mass. CYSTIDIA fusoid, 75-85 x 15-20 micr., apex with 2-4 horns. ODOR and TASTE slightly disagreeable.

Solitary or scattered on rotten wood, in conifer woods, usually on hemlock or pine. Huron Mountains, Houghton, New Richmond. August and September. Infrequent except locally.

Distinguished at once by the smoky-brown edge of the gills. It tends to be smaller than *P. cervinus* and darker in color. *P. granularis* var. *umbrosellus* has yellowish edged gills, and its cystidia are not horned. There seem to be a number of varieties connecting *P. cervinus* and *P. umbrosus*. McIlvaine pronounces it edible.

576. *Pluteus salicinus* Fr. var.

Sys. Mycol., 1821 (as *Leptonia salicinus*).

Illustration: Cooke, Ill., Pl. 1169.

PILEUS 2-5 cm. broad, convex to expanded, broadly umbonate, smoky-umber, pruinose-velvety, disk flocculose, margin even. GILLS free, close, not broad, reaching margin of cap, *edge concolor*, white then flesh-colored from the spores. STEM equal, 2-4 cm. long, 2-4 mm. thick, base bulbillose, curved, shining, silky-fibrillose, stuffed, whitish but covered with smoky fibrils, *base smoky-olive*. SPORES broadly elliptical, 7.5-8.5 x 5-6 micr., smooth, flesh color. CYSTIDIA 2-4 pronged at apex, 75-90 x 15-17 micr., fusoid, stout.

Solitary. On rotten wood, in willow and alder swamp. July-August. Ann Arbor. Rare.

The green tinge is not very marked on the pileus but is quite marked at the base of the stem. It agrees best with Masee's description (British Fungus Flora). The typical bluish form has not been seen by me in the State, although collected elsewhere. The horned cystidia separate it from other smoky-umber species, and the white edge of the gills distinguishes it from *P. umbrosus*.

577. *Pluteus ephebius* Fr. var.

Sys. Mycol., 1821.

Illustration: Cooke, Ill., Pl. 517.

PILEUS 2.5 cm. broad, convex-expanded, *delicately silky-fibrillose*, shining, becoming somewhat fibrillose-scaly, not at all granular, *mouse gray*, unicolorous, even on margin. GILLS free, rather

remote, not broad, pruinose, white then bright pink from spores, edge concolor. STEM about 2 cm. long, equal, curved, silky, white or tinged fuscous, *striate*. SPORES *oblong*, 6-6.5 x 3 micr., smooth, pink. CYSTIDIA about 50 micr. long, slender, sometimes curved and rounded at the apex, abundant on sides and edge of gills.

Solitary. On rotten logs, in woods. New Richmond. Rare.

The fibrillose pileus allies this form with this section. The oblong spores, characteristic of the species according to Masee, induced me to place it here although the absence of "bluish down" which Fries italicises may indicate that it is a different or undescribed species. It seems to be close to var. *drepanophyllus* Schultz, the status of which is uncertain.

578. *Pluteus tomentosulus* Pk.

N. Y. State Mus. Rep. 32, 1879.

Illustration: Atkinson, Mushrooms, Fig. 133, p. 139, 1900.

PILEUS 3-7 cm. broad, thin, soon expanded, obtuse, umbonate, *floccose-tomentose*, more densely so on disk, *white* or tinged with pink, especially on the margin, margin even. FLESH thin, white. GILLS free, rather remote, crowded, *broad*, white then rose-colored from the spores, edge fimbriate. STEM 5-10 cm. long, 4-8 mm. thick, equal, solid, fibrillose-*striate*, subbulbous at base, slightly tomentulose, bulb tomentose, white. SPORES subglobose, or broadly short elliptical, 5-7 x 4.5-5.5 micr., smooth, rose-flesh color in mass. CYSTIDIA stout, 85-95 x 22-25 micr., not horned, bottle-shaped on a rather slender stalk, scattered, more numerous on edge of gills.

Solitary or scattered. On rotten logs or prostrate trunks, especially in hemlock, tamarack or cedar swamps. Throughout the State: Marquette, Houghton, Sault Ste. Marie, New Richmond, Ann Arbor. July, August, September. Frequent in the northern part of State.

This is a beautiful species but prefers deep swamps. In Europe *P. pellitus* Fr., a more glabrous species, takes its place. According to Peck, the pileus often has a pink tinge.

579. *Pluteus roseocandidus* Atk.

Ann. Mycol., Vol. VII, p. 373, 1909.

PILEUS 2-3 cm. broad, *fragile*, convex then expanded, glabrous, dry, *pure white*, sometimes tinged rose or brownish-buff in wet weather, *striatulate on the thin margin*, with a dull lustre. FLESH thin, white. GILLS free, reaching the stem, elliptical, close, rounded behind, moderately broad, hyphae of trama converging, white at first then pink. STEM 3-4 cm. long, 2.5-4 mm. thick, equal, even, hollow, glabrous, slightly mealy at apex, *fragile*, terete or compressed, subbulbillate, innately fibrillose, *pure white*. SPORES globose, smooth, 6-8 micr., pale diam., flesh color under microscope. CYSTIDIA few or lacking on sides of gills. *Sterile cells* on edge, globose or ventricose-inflated, obtuse, 50-80 x 20-35 micr. *Basidia* 30 x 8-9 micr., 14-spored. ODOR none.

Gregarious. On grassy ground in woods near tamarack swamp. Ann Arbor. October. Rare.

This white species is said to have a two-layered trama in the pileus, the inner floccose, the outer forming a cuticle two to three cells thick of pyriform to subglobose cells. I have found it but once.

Section II. Surface of pileus granulate, pruinose or pulverulent, composed of enlarged globular pyriform or fusoid-elongated, colored cells.

580. *Pluteus granularis* Pk.

Buffalo Soc. Nat. Sci., Bull. 1, 1873.

Illustration: Hard, Mushrooms, Fig: 190, p. 237.

PILEUS 2-5 cm. broad, convex to plane, subumbonate, *rugose-wrinkled*, yellowish-brown to umber, or chestnut color, *granulose* or *villose-granulose* like plush. GILLS free, crowded, rather broad, ventricose, white then flesh-colored from spores, *edge concolor*. STEM 3-7 cm. long, 2-4 mm. thick, slender, equal, solid, pallid, *velvety pubescent* or covered with brown scales towards base. SPORES globose, 4-5 micr. diam., apiculate, nucleate, smooth, flesh color. CYSTIDIA globose-obovate, about 35-25 micr., infrequent, hyaline.

Solitary or scattered. On rotten logs, etc., in conifer and frondose woods.

Throughout the State: Houghton, Huron Mountains, Marquette, Bay View, Ann Arbor. July-September. More frequent in mixed hemlock woods; never common.

The villosity and granulosity on the cap, when present, is due to globular or elongated-fusoid cells, filled with coloring matter. These cells correspond to the fibrils of such species as *P. umbrosus*, from which this species is separated by the spherical spores and cystidia without prongs at the apex. Peck describes the spores in the 26th report as spherical, later, in the 38th report, he says "broadly elliptical, 6-7.5 x 5-6 micr." Our plants, like Lloyd's (Mycol. Notes, 2), have spherical spores.

Var. *umbrosellus* Atk. nov. var. is distinguished by the more villose pileus and the tinge of *yellow on the edge of the gills*. The villosity is caused by long, yellowish brown cells, 200-300 micr. long, 20-30 micr. wide, often crowded into erect, pointed scales, arranged in sooty, radiating or reticulate, velvety ridges. The edges of the gills are provided with sterile cells filled with a pale yellow coloring matter. The cystidia are scattered, globose or pyriform, not pronged. The spores are 4.5 x 3.4 micr., longer than broad, subglobose, similar to those of *P. umbrosus*; the cystidia, however, separate it from the latter.

Var. *intermedius* nov. var. approaches *Leptonia seticeps* in size of spores, and white-fimbriate edge of gills; but the stem is stuffed, then hollow, and 4-5 cm. long, 4-5 mm. thick. The cap is ruglose-villose and 2.5 cm. broad.

Solitary or scattered. On rotten wood. Detroit, etc. Infrequent.

581. *Pluteus nanus* Fr.

Syst. Mycol., 1821.

Illustrations: Patouillard, Tab. Analyt., No. 334.

Ricken, Blätterpilze, Pl. 70, Fig. 6.

PILEUS 2-3 cm. broad, convex then expanded, obtuse, *radiately rugose on disk*, margin even or nearly so, *velvety-pruinose*, granulose or *pulverulent*, *brownish ashy*, umber or darker when young. GILLS free, close, ventricose, narrowed toward ends, white then flesh color from spores, edge fimbriate. STEM 2-3 cm. long, 2-3 mm. thick, *solid*, equal, rigid often curved, *glabrous*, pellucid-white,

striatulate or innately fibrillose. SPORES *subglobose*, 4-5.5 micr. diam., smooth, flesh color. CYSTIDIA fusiform bottle-shaped, sometimes tapering to a point at apex, not horned, *vacuolate*, 75-80 micr. long, on the sides and edge of the gills.

Solitary or scattered. On decaying logs, sticks, etc., in low woods and swamps. June to October. Throughout the State: Huron Mountains, New Richmond, Ann Arbor. Infrequent.

The velvety character of the pileus is only apparent since the surface under a lens is granulose or pulverulent; this is due to globular or fusoid cells which compose the surface layer and give it the brown appearance. It is separated from a number of others by the glabrous stem, small size and subglobose spores. It may appear quite early. There is sometimes a smoky tinge on the cap.

Var. *lutescens* Fr. Stem and sometimes the *gills* are *yellow*. The spores seem to be more truly spherical in the variety; stem *solid*, striate.

Habitat, etc., as in the type: New Richmond, Ann Arbor. Infrequent.

582. *Pluteus caloceps* Atk.

Ann. Mycol., 1909.

"PILEUS 2.5-4.5 cm. broad, convex, umbonate, orpiment-orange to vermilion, orange-vermilion on center, glabrous or slightly granular by separation of the cells, or somewhat rimose on margin; trama two-layered, outer layer composed of globose cells. FLESH white. GILLS free, rounded behind, broadly elliptical to subventricose, pale dull flesh color, edge flocculose, tramal hyphae converging. STEM 3-6 cm. long, 3-5 mm. thick, pallid, fibrous-striate. SPORES suboblong, 5-8 x 4-6 micr. CYSTIDIA ventricose on sides of gills, clavate to subfusoid on edge, 60-75 x 12-20 micr."

Solitary. On rotten wood and on the ground. Ann Arbor. Rare.

583. *Pluteus longistriatus* Pk.

N. Y. State Mus. Rep. 30, 1878.

Illustration: Plate CIV of this Report.

PILEUS 2-5 cm. broad, very thin, convex then expanded, pale brownish-gray to *brownish-ashy*, minutely scaly on disk and cuticle at length breaking into minute granules, *long-striate* or

subsulcate when old. GILLS free, close, rather broad, width almost uniform, rounded behind, white then pale flesh color from spores, edge pulverulent. STEM 3-5 cm. long, 2-3.5 mm. thick, equal, solid, fibrous, innately striatulate, white, pulverulent. SPORES subglobose, 6-7 x 5 micr., slightly longer than wide, granular within, smooth, pale flesh color. CYSTIDIA ventricose, cylindrical in upper part, 75-90 micr. long, not horned, apex broadly obtuse to pointed.

Solitary. On rotten wood in moist places. Ann Arbor, South Haven. June-July. Infrequent.

Peck describes the stem glabrous; our plants had a distinctly pulverulent stem when fresh. The spores also did not seem to be dented on one side as indicated by Peck. Nevertheless, the description fits closely in other respects. It differs from *P. chrysophaeus* in the long striations of the pileus and the fibrous-solid stem; the color, also, is not cinnamon. In age, the longitudinal fibres within the stem loosen, so that it appears falsely fistulose. The larger size and truly free gills separate it from *Leptonia seticeps*, which is long-striatulate on cap.

Section III. Surface of pileus glabrous; moist or hygrophaneous.

584. *Pluteus admirabilis* Pk.

N. Y. State Mus. Rep. 24, 1872.

PILEUS 1-2 cm. broad, thin, convex-campanulate then expanded, usually umbonate, glabrous, hygrophaneous, rugose-reticulate, ochre-yellow to luteous, brownish when young, striatulate on margin when moist, subeven when dry. GILLS free, rounded behind, moderately broad, ventricose, close, whitish or yellowish then rosy-flesh color from the spores. STEM 3-5 cm. long, 1-2 mm. thick, slender, equal, subrigid, glabrous, stuffed then hollow, yellow, white-myceloid at base. SPORES subglobose, 5.5-7 x 5-6 micr., smooth, rosy flesh color in mass. CYSTIDIA ventricose, cylindrical in upper part, rounded at apex, 55-65 x 18 micr., scattered, more abundant in the interspaces, more ovoid on the edge of the gills.

Scattered or subgregarious. On logs and decayed wood, in mixed conifer or frondose woods. Houghton, Munising, Marquette, New Richmond, Ann Arbor. July, August and September. More frequent in hemlock woods of the northern part of the State.

The surface of the pileus is composed of spheroid stalked cells

containing the yellow coloring matter; these are 30-35 x 20-25 micr. in diam. The hyphae of the gill-trama converge and are long and cylindrical. From *P. leoninus* this form is separated by its yellow stem and rugulose pileus; the rugosity, however, may be almost lacking at times. Variations occur approaching other species, like *P. chrysophaeus*, *P. flavofulgineus* and *P. leoninus*, and such are often difficult to place. I have never seen *P. chrysophaeus* Fr. but include it in the key, as it has been reported by Longyear.

585. *Pluteus leoninus* Fr.

Syst. Myc., 1821.

Illustrations: Patouillard, Tab. Analyt., No. 639.

Ricken, Blätterpilze, Pl. 71, Fig. 5.

Gillett, Champignons de France.

PILEUS 2-5 cm. broad, campanulate-convex, subumbonate, not rugulose, glabrous, moist, yellow, striate on margin, GILLS free, moderately broad, close, white then deep flesh color. STEM 5-7 cm. long, 2-5 mm. thick, equal or enlarged below, striatulate, glabrous, solid, pellucid-white or whitish. SPORES subglobose to oval elliptical, 6-7 x 5 micr., smooth, dull rose-colored. CYSTIDIA about 60 micr. long, fusiform, subacuminate above, not abundant, not horned.

Solitary. On rotten wood. Infrequent in the hemlock forests of the north. Negaunee, etc.

A form was found with the surface of the pileus minutely velvety. Patouillard says the surface is glabrous, composed of long slender hyphae. In this respect the form differs markedly from *P. admirabilis* Pk.

Entoloma Fr.

(From the Greek, *entos*, inside; and *loma*, the border of a robe.)

Pink-spored. Without volva or annulus. Stem fleshy or fibrous, not cartilaginous, soft, confluent with the pileus. Gills adnate or adnexed, emarginate or sinuate. Spores angular, rarely rounded. Cystidia rarely present in a few species.

Mostly large, soft, putrescent mushrooms; terrestrial, frequent in rainy weather; some of the species are poisonous. A difficult genus to study.

The PILEUS may be glabrous, pruinose, silky or fibrillose, hardly ever strongly scaly; it is either hygrophanous, viscid or dry, in the last case fibrillose or somewhat scaly. The cuticle varies in structure, the viscid species being provided with a pellicle composed of gelatinous hyphae while in many cases the surface has a gelatinous feel but is not truly differentiated and does not become viscid except in very prolonged wet weather. In one section the surface is distinctly fibrillose, the fibrils sometimes forming definite scales on the disk. In only a few species is the margin striate or striatulate. Many become water-soaked in rainy weather, and it is then often difficult to determine whether they are hygrophanous. The colors vary from white, watery-whitish, grayish, grayish-brown to dark brown; more rarely tinged violet, reddish or yellowish and always with only the soft shades of these colors. The colors are hard to describe in terms which are sufficiently clear, and this has caused considerable confusion; hence other characters must be used as much as possible. Nearly all the species are somewhat fragile, but may become tougher in dry weather.

The GILLS are adnate-sinuate as in *Tricholoma*, sometimes adnate, often seceding from the stem in age. It is important to note their color before they become pink from the spores; this is either white, yellowish or ashy. They are rather broad, even in the small species rarely narrow. In distinction from *Pluteus*, there are no cystidia except in a very few species, the edge is therefore usually entire. The STEM is central, fleshy or with the outer rind fibrous and spongy within, sometimes loosely stuffed and then hollow, not cartilaginous except under peculiar weather conditions. In the larger species the stem is stout as in *Tricholoma*. It is intimately connected with the pileus, the trama of the stem extending unaltered into that of the pileus as in all the genera with adnate gills; it is therefore not separable as in *Pluteus* and *Volvaria*.

The SPORES are irregularly-angular, the general outline varying from spherical to elliptical, often with a prominent, oblique apiculus at the angle where it was attached to the basidium; a few species have rounded spores, i. e., not angled. Their color in mass varies from pale to deep flesh color, to rosy or salmon. *Tricholoma personatum* Fr., *Tricholoma nudum* Fr. and *Tricholoma panoeolum* var. *caespitosa* Bres. have flesh-colored spores in mass and will be looked for here.

A number of the species are known to be very poisonous; *E. lividum* Fr. has been proved so by both Romell and Worthington Smith; *E. grande* Pk. is suspected by its author. The species are

difficult for the amateur and even for the expert, and hence it is necessary to proceed with extreme caution when collecting for the table. It is best not to eat *Entolomas* at all because of the danger of confusing the species. The common saying, "only the mushroom which is pink underneath the cap is sure to be safe," illustrates another error in so-called "rules to know mushrooms," since here we have a whole genus which the unsuspecting amateur who is told the above, would be likely to take for *Agaricus compestris*.

This genus corresponds, by its sinuate-adnate gills, its fleshy-fibrous stem, and lack of volva and annulus, to *Tricholoma* of the white-spored group and to *Hebeloma* of the pink-spored group. Peck reports 23 species in New York; we have been able to identify 18 species of those that have been found in Michigan. Others have been collected within our limits but need further study. Some occur seldom; others are more common, especially in showery weather. To what extent certain species are limited to the conifer regions of the State has not yet been determined.

Fries divided the genus into three sections: Genuini, Leptonidei and Nolandeii. To these Peck has added a fourth section of American species, which he calls Conoidei.

Key to the Species

- (A) Pileus scaly, scabrous, flocculose or superficially silky-fibrillose.
 - (a) Pileus white, 5-15 mm. broad, silky, spores 9-12 x 7-8 micr. 588. *E. sericellum* Fr.
 - (aa) Pileus not white, 1-5 cm. broad.
 - (b) Pileus scabrous, dark brown, 1-3 cm. broad; stem slender. 587. *E. scabrinellum* Pk.
 - (bb) Pileus not scabrous.
 - (c) Pileus and stem tinged purplish or wine color; stem solid. 589. *E. cyaneum* Pk. (cf. also *E. jubatum* Fr.)
 - (cc) Pileus and stem not tinged purplish.
 - (d) Gills ashy or smoky at first; pileus mouse-gray; stem hollow. 590. *E. jubatum* Fr.
 - (dd) Gills white at first; pileus ashy or ashy-brown. 601. *E. peckianum* Burt.
- (AA) Pileus glabrous, moist, hygrophanous or viscid.
 - (a) Pileus pelliculose or the surface viscid, gelatinous.
 - (b) Pileus 2-5 cm., gelatinous above, flesh color, coarsely reticulate; stem eccentric; rare. (See 699. *Pleurotus subpalmaris*.)
 - (bb) Pileus not reticulated.
 - (c) Stem loosely stuffed then hollow, stout; pileus livid-brownish (moist), 7-10 cm. broad. 586. *E. lividum* Fr.
 - (cc) Stem longer, solid; pileus viscid, smaller, grayish. *E. prunuloides* Fr.
 - (aa) Pileus not viscid.
 - (b) Pileus hygrophanous.
 - (c) Odor and taste farinaceous, at least when plants are fresh and crushed.
 - (d) Gills gray at first; pileus dark brown, 2-5 cm. broad, striatulate (moist). 596. *E. sericeum* Fr.
 - (dd) Gills white or pallid at first.

- (e) Pileus conic-campanulate or umbonate, streaked with darker fibrils; stem short. 591. *E. clypeatum* Fr.
- (ee) Pileus convex or finally plane, subumbonate, grayish-brown (moist).
- (f) Stem at length tinged gray; pileus scarcely fading, with a delicate, separable pellicle. 595. *E. griseum* Pk.
- (ff) Stem white; pileus fading to whitish; gills narrow. 594. *E. scricatum* Britz.
- (cc) Odor and taste not farinaceous.
- (d) Odor of fresh plant nitrous. 593. *E. nidorosum* Fr.
- (dd) Odor not nitrous.
- (e) Pileus umber, fuscous or cinnamon (moist).
- (f) Pileus conic-campanulate or umbonate; stem twisted; spores elongated-angular. 597. *E. strictius* Pk.
- (ff) Pileus at length plane; stem pure white; gills rather broad; spores globose-angular. 592. *E. rhodopolium* Fr.
- (ee) Pileus whitish or yellow-tinged (moist).
- (f) Stout and firm, pileus watery, whitish or tinged yellowish, 5-12 cm. broad; stem 10-20 mm. thick. 598. *E. grayanum* Pk.
- (ff) Rather slender and fragile, pileus whitish, 2-6 cm. broad; stem 3-8 mm. thick. 599. *E. speculum* Fr.
- (bb) Pileus neither viscid nor hygrophanus.
- (c) Pileus conic or campanulate, usually unexpanded, 1-5 cm. broad; among moss, especially sphagnum.
- (d) Color of pileus changing darker in age, from pale yellow to reddish-brown. *E. variabile* Pk.
- (dd) Pileus fading or scarcely changing.
- (e) Spores quadrate, 4-angled.
- (f) Pileus strongly cuspidate at apex, pale yellow. 602. *E. cuspidatum* Pk.
- (ff) Pileus not cuspidate.
- (g) Pileus yellow, smoky-yellow, or greenish-yellow. *E. luteum* Pk.
- (gg) Pileus salmon-colored, subacute at apex. 600. *E. salmonium* Pk.
- (ee) Spores 5-6 sided, irregular, longer than wide; pileus gray to smoky-brown, umbonate. 601. *E. peckianum* Bert.
- (cc) Pileus convex-expanded, large, yellowish-white or tinged brownish; gills broad; stem solid; spores angular-spheroid, 8-10 micr. *E. grande* Pk.

Section I. Genuini. Pileus fleshy, glabrous, moist or viscid; not hygrophanus.

586. *Entoloma lividum* Fr. (POISONOUS)

Epicrisis, 1836.

Illustrations: Cooke, Ill., Pl. 311.

Ricken, Blätterpilze, Pl. 72, Fig. 2.

Gillet, Champignons de France, No. 271.

PILEUS 7-10 cm. broad, campanulate then expanded, *glabrous*, *pelliculose*, the cuticle composed of subgelatinous hyphae about 6

micr. diam., splitting into fibrillose parts on drying, viscid in very wet weather, *pale livid-tan* faded when dry, repand, wrinkled-rugose, margin striate. GILLS *adnexed*, abruptly rounded behind, broad, subventricose, subdistant at stem, pallid then bright flesh color. Stem 6-8 cm. long, 1.5-2.5 cm. thick, stout, *white, glabrous*, apex subpruinose, even, subequal, *stuffed then hollow*. SPORES spheroid-angular, 8-10 micr. diam., *bright flesh color in mass*, apiculus prominent, 5-6 angled. CYSTIDIA none or very few, fusoid. ODOR faint. TASTE strongly farinaceous.

Gregarious. On the ground in white pine and beech woods of western Michigan. New Richmond. September. Rare. *Poisonous.*

This rare *Entoloma* is a rather stout plant. Its pileus is viscid in wet weather, although the descriptions merely call it "pelliculose," so that it is identified with difficulty when one follows the European authors. A specimen from Sweden, which was referred to *E. lividum* by Romell, agrees with our specimens in having subgelatinous thick hyphae in the cuticle, and when dried has the appearance of a surface once viscid or subviscid like that of our plant. Furthermore *E. lividum* is described with a stuffed to hollow stem, while its near relatives *E. sinuatum* and *E. prunuloides* have solid stems. If Gillet's and Cooke's figures of the latter are correct, then I have never collected such *Entolomas* with a viscid cuticle on the pileus. Romell told me he tested the edibility of *E. lividum* with serious consequences, and hence he ought to know the plant. It seems to be rare and will on that account cause little damage. The gills are often tinged yellowish and the pileus may have a livid-brown color. *E. prunuloides* Fr. is said to have an umbonate ashy cap, sometimes tinged yellowish, considerably smaller according to Cooke's, Gillet's and Patouillard's figures, and the stem is slightly striate and solid. It is said to be viscid.

Section II. Leptonidei. Pileus campanulate-expanded or convex-plane, dry, flocculose or subsquamose; not hygrophanus.

587. *Entoloma scabrinellum* Pk.

N. Y. State Mus. Rep. 33, 1880.

PILEUS 1-3 cm. broad, broadly convex, expanded and subumbonate, dry, scabrous, densely covered by minute, erect, spine-like

scales, *dark mouse-brown or smoky-brown*, the thin incurved margin slightly surpassing the gills. FLESH thin, pallid or tinged brown. GILLS adnexed, rounded behind, becoming deeply emarginate, *broad*, ventricose, at first grayish-white, becoming pink, edge white-flocculose. STEM 3-8 cm. long, 2-3 mm. thick, tapering upward, thicker at base, stuffed then hollow, fibrillose, glabrescent, scurfy-pruinose at apex, white-mycelioid at base, pallid or tinged brownish. SPORES coarsely tuberculate-angular, elliptic in outline, 7-10 x 5.5-6.5 micr., flesh-pink. CYSTIDIA none. *Sterile cells* on edge of gills, capitate, nine-pin shaped. BASIDIA 40 x 9 micr., 4-spored. ODOR none.

Gregarious. On the ground, low mossy woods of pine, beech, etc. New Richmond. September. Rare.

It seems to be nearest to *E. scabrosa* Fr., but it does not possess an umbilicate pileus, the apex of the stem is not black-punctate and the gills are not segmentoid. Our plants were somewhat larger and darker than those found by Peck.

588. *Entoloma sericellum* Fr.

Syst. Mycol., 1821.

Illustrations: Fries, Icones, Pl. 95, Fig. 3.

Ricken, Blätterpilze, Pl. 73, Fig. 4 (as *Leptonia sericellum*).
Cooke, Ill., Pl. 307.

PILEUS 5-15 mm. broad, convex then plane, small, pure *shining* white, or pellucid-white, *silky* or minutely squamulose, even on margin which is incurved at first. GILLS broadly adnate, becoming sinuate, slightly decurrent by a tooth, rather *distant and broad*, white then bright flesh color from the spores. STEM 2-5 cm. long, 1-2 mm. thick, *slender*, pellucid shining white, stuffed then hollow, equal, even, pruinose at apex, glabrous, soft, or slightly toughish and fibrous. SPORES elongated, angular-tuberculate, 9-13 x 6-8 micr., variable in size, apiculus prominent, bright flesh color in mass.

(Dried: Stem pale rufous; pileus pale brownish-buff, tinged rufous.)

Scattered. On debris or humus in low frondose woods, cedar or hemlock swamps, etc. August-September. Throughout the State, Ann Arbor, Bay View, Marquette, Houghton. Frequent.

The color sometimes varies to a creamy tint. The pileus may be obtuse or depressed. It has the stature of an *Eccilia*, and the de-

pressed pileus and subcartilaginous stem remind one of a *Leptonia*. It is smaller than *E. speculum* and has very different spores.

589. *Entoloma cyaneum* Pk.

Buffalo Soc. Nat. Sci., Bull. 1, 1873.

PILEUS 2-3.5 cm. broad, *umbonate*, convex-campanulate, dry, *fibrillose-squamulose*, dark vinaceous-murinus (Sacc.), paler at length, margin even. FLESH white, thin except disk. GILLS *adnate*, later seceding, close, rather broad, at first white-tinged vinaceous then flesh color tinged ashy, *edge white-fimbriate*. STEM 3-6 cm. long, 2-4 mm. thick, equal or subequal, *solid*, fibrillose-striate, *furfuraceous-squamulose* especially upwards, twisted at times, vinaceous above, pallid below, white and fibrous-fleshy within, cuticle subcartilaginous. SPORES angular-tuberculate, subelliptical in outline, 7-9 x 4.5-6 micr., flesh color in mass. CYSTIDIA few on sides of gills, ventricose; sterile cells numerous on the edge and nine-pin shaped.

(Dried: Pileus dark amber-brown.)

Solitary or scattered. Sandy soil and humus, in birch and hemlock swamps of our coniferous regions. August and September. Marquette, Negaunee, New Richmond. Infrequent or rare.

It has the habit of a *Leptonia*, and might be mistaken for one. Peck describes the stem as hollow; our specimens invariably had the interior filled with a solid fibrous-fleshy substance; this sometimes loosens longitudinally so as to give a false "hollow" interior. It has much the appearance of *E. jubatum* Fr. as illustrated by Cooke, and of *E. griseo-cyaneum* Fr. as figured by Fries (Icones, Plate 94, Fig. 1). It differs from both these in its solid stem and in the color of the pileus. It is said to occur sometimes on decaying wood or mossy logs.

590. *Entoloma jubatum* Fr.

Syst. Mycol., 1821.

Illustrations: Atkinson, Mushrooms, Fig. 136, 1900.

Cooke, Ill., Pl. 317.

Fries, Icones, Pl. 92, Fig. 1.

"PILEUS 2-5 cm. broad, *mouse color*, dry, campanulate then expanded umbonate, *villose-scaly or fibrillose*. GILLS *slightly ad-*

nexed, seceding, ventricose, crowded, at first dark fuliginous, then purple fuliginous. STEM 5-8 cm. long, 4-6 mm. thick, fleshy-fibrous, rigid, fragile, hollow, equal, becoming fuscous and clothed with fuliginous fibrils. SPORES extremely irregular. 9-12 x 6-7 micr. (Ricken). Inodorous."

In woods. East Lansing. Reported by Longyear.

The description is taken from Fries' Hymenomycetes Europei and Stevenson's British Fungi. Atkinson has described a form with a dull heliotrope-purple pileus and stem, with spores 7-11 x 6-7 micr., irregularly oval, coarsely angular, nucleate and 5-7 angled. This species differs from *E. cyanicum* in the hollow stem, adnexed, almost free gills and larger spores. It is rare in Michigan.

Section III. *Nolanidei*. Pileus thin, hygrophanous, somewhat silky when dry, often wavy and irregular.

591. *Entoloma clypeatum* Fr. (EDIBLE)

Epicrisis, 1836.

Illustrations; Cooke, Ill., Pl. 319.

Gillet, Champignons de France, No. 270.

Ricken, Blätterpilze, Pl. 73, Fig. 1.

Peck, N. Y. State Mus. Rep. 53, Plate D. (As *E. strictius* var. *irregularare*.)

PILEUS 3-10 cm. broad, campanulate, with an obtusely conic umbo, hygrophanous, lurid-brown (moist), brownish-ashy (dry), often virgate with darker lines, glabrous, margin even, often wavy. FLESH thin, white. GILLS adnexed, rounded behind, seceding, sometimes emarginate with decurrent tooth, moderately broad, subdistant to close, whitish then sordid rose-colored, edge serrate-eroded. STEM 4-6 cm. long, 6-12 mm. thick, often rather stout, and short, stuffed or hollow, sometimes compressed, fragile, silky-fibrillose, white or whitish, apex subpruinose, often rivulose. SPORES subglobose, angular, 7-9.5 x 6-7.5 micr., rosy in mass. Taste and odor farinaceous.

(Dried: Pileus ashy-brown, gills rose-colored.)

Gregarious to subcaespitose. On the ground in low woods, maple, elm, beech, etc., sometimes in grassy places near woods. Ann Arbor, New Richmond. July to September. Infrequent.

Usually known when dry by the grayish-brown pileus streaked

with darker fibrils, by the rosy gills at maturity and by the whitish stem. When moist the color varies considerably. Sometimes it becomes almost white on drying. *E. clypeatum* has had the reputation in Europe of being poisonous, but is eaten with impunity by some who claim it is harmless. Even if its edibility is established, the amateur may have some difficulty in being certain of the species. The pileus is often persistently campanulate with an obtuse apex which separates it from forms having grayish caps.

592. *Entoloma rhodopolium* Fr. (SUSPECTED)

Syst. Mycol., 1821.

Illustrations: Patouillard, Tab. Analyt., No. 338.

Murrill, Mycologia, Pl. 92, Fig. 4 (as *E. grayanum*).

Gillet, Champignons de France, No. 275.

Plate CV of this Report.

PILEUS 4-8 cm. broad, campanulate then expanded-plane, firm, hygrophanous, umber to fuscous (moist), pale livid-gray and silky shining (dry), glabrous, cuticle slightly differentiated with subcartilaginous hyphae, with a gelatinous feel but not viscid, undulate and even on the margin. FLESH watery then white, scissile. GILLS adnate, becoming emarginate, somewhat subdistant, sometimes veined, moderately broad, whitish then deep rose color, edge minutely eroded. STEM 4-10 cm. long, 6-12 mm. thick, pure white, subequal, tapering up or down, sometimes curved, glabrous, apex furfuraceous, white, spongy-stuffed then hollow, with a thickish, fibrous, subcartilaginous cuticle, readily splitting longitudinally on drying. SPORES subglobose, 5-6 angled, 6-9 micr. in diameter, (with a few larger ones), deep rose color in mass. CYSTIDIA none. ODOR and TASTE none.

Solitary or subcaespitose. On the ground, mixed or frondose woods. August-September. New Richmond, Ann Arbor.

The deep rosy spores, pure white stem, the toughish subcartilaginous pileus and colors are characteristic for our plants. The species may have an odor at times. Fries says it has scarcely any odor; others report a farinaceous odor. Our plants differ from the typical description in the toughish cuticle on the pileus and stem although collected in moist weather. The pileus is often dusted on top by the rosy spores as in *Clitopilus abortivus*. It differs fundamentally from *E. griseum* Pk. in the deep rose-colored gills and the glabrous and shining-white stem, but agrees with it in being firm, and in

the structure of the cuticle of pileus and stem. *E. griseum* has a farinaceous odor and taste.

593. *Entoloma nidorosum* Fr. var. (SUSPECTED)

Epicrisis, 1836.

Illustrations: Fries, Icones, Pl. 94, Fig. 3.

Swanton, Fungi, Pl. 42, Fig. 17.

PILEUS 2.5 cm. broad, convex, obtuse, grayish-brown (moist), hygrophanous, edge incurved, minutely tomentose-silky. FLESH thin, white, fragile. GILLS adnexed, broad, subdistant, flexuose, pale flesh color. STEM 4.7 cm. long, 4.8 mm. thick, equal or subequal, stuffed soon hollow, pruinose at apex, slightly fibrillose, whitish. SPORES angular, ovate, angles not definite except the very marked angle at the oblique prominent apiculus, 8-10 micr. long (with apiculus), 6-7 micr. wide; flesh color. ODOR strongly acid or alkaline.

Solitary. On mosses, in a sphagnum bog. Ann Arbor. September. Rare.

Differs from the type in the obtuse to subumbonate cap, less slender habit and by not being entirely glabrous. The European plant is said to have an umbilicate or depressed pileus and slender stem.

594. *Entoloma sericatum* Britz.

PILEUS 3-8 cm. broad, campanulate then plane, subumbonate, grayish-brown (moist), fading, paler to creamy-buff or whitish (dry), umbo darker while drying, hygrophanous, margin faintly striatulate (moist) elsewhere even, glabrous, silky-shining (dry), surface scarcely differentiated, margin at length splitting or recurved. FLESH thin, concolor, scissile. GILLS narrow, narrowed to a point in front, moderately close, thin, adnexed becoming emarginate, white at first, maturing slowly, at length pale flesh color, edge rather eroded. STEM long and somewhat slender, 5-10 cm. long, 5-10 mm. thick, pure shining white, variously curved, obscurely undulate, innately silky-striatulate but glabrous, equal or somewhat attenuated below, white-fibrous-stuffed within then somewhat hollow, splitting longitudinally (dry), apex pruinose. SPORES angular-tuberculate, slightly longer than wide, 8-10 x 6-8.5 micr., apiculus prominently oblique, flesh color in mass. CYSTIDIA none. TASTE and ODOR farinaceous.

Gregarious or subcaespitose. On the ground among leaves and debris in conifer and frondose woods. Ann Arbor, New Richmond. September. Frequent, abundant locally.

The fading colors of the pileus, the pure white, glabrous, long stem, the narrow gills and pale spores distinguish this species. Britzelmayr gives no description except the color of the pileus and the size of the spores, and hence I have used his name to avoid a new one. It has the stature and the colors of *E. rhodopolium*, but differs in its farinaceous odor, the spores, narrow gills and the striate margin of the pileus.

595. *Entoloma griseum* Pk.

N. Y. State Mus. Bull. 75, 1904.

PILEUS 3-7 cm. broad, campanulate-convex, obtuse, firm, then fragile, glabrous, margin even and often wavy at length, subhygrophanous, grayish-brown, sometimes pale amber (moist), scarcely fading, innately silky (dry), cuticle somewhat differentiated forming a thin, separable pellicle, margin decurved. FLESH hygrophanous, very scissile, moderately thin. GILLS adnexed, becoming emarginate, moderately broad, close or slightly subdistant, whitish-grayish, slowly flesh color, sometimes veined. STEM 3-8 cm. long, 4-10 mm. thick, subrigid, equal or attenuated either upwards or downwards, silky-fibrillose, whitish or tinged gray, stuffed to hollow, sometimes solid below, subshining. SPORES tuberculate-angular, 7-9 x 6.5-8 micr., spheroid, apiculus prominent, pale flesh color in mass. ODOR and TASTE farinaceous, at least when flesh is crushed, rarely lacking this odor.

Gregarious or solitary. On the ground in low woods, both coniferous and frondose. Throughout the State, Marquette, New Richmond, Ann Arbor. May-October. Frequent but scattered.

This species is similar at times to *E. sericeum* Fr.; it is a stouter plant, usually without an umbo on the pileus, and the colors are paler. The margin of the cap is not striate in typical plants, but this character is sometimes obscure. Specimens which lack the mealy odor are not infrequent in spring. The flesh is rather firm but shot through with watery lines and is scissile. The stem is often abruptly attenuated below and its interior is composed of a fibrous pith at first which disappears in places leaving cavities. The cuticle of the pileus has a slight gelatinous feel but is never viscid. The gills are not always noticeably grayish but merely

pallid. Forms which seem otherwise to belong here have a slight alkaline odor. Solitary specimens appear as early as May around Ann Arbor. I have found this species in the Adirondack Mountains, and it agrees in all respects with our plants except that the spores are slightly smaller, 6-7.5 x 6-7 micr., the size assigned to them by Peck.

596. *Entoloma sericeum* Fr.

Epicrisis, 1836-38.

Illustrations: Cooke, Ill., Pl. 320.

Gillet, Champignons de France, No. 276.

Ricken, Blätterpilze, Pl. 72, Fig. 5.

Plate CVI of this Report.

PILEUS 2-6 cm. broad, convex expanded, *more or less* umbonate, glabrous, hygrophanous, *umber-brown (moist)*, umbo darker, fading to grayish-brown and silky-shining (dry), striatulate on margin when moist, margin at first regular then wavy. FLESH thin, concolor, moist. GILLS adnexed-emarginate or broadest behind and rounded-adnate, moderately *broad*, close to subdistant, gray or grayish-white at first, edge entire. STEM 2-6 cm. long, 3-5 mm. thick, stuffed then hollow, equal or tapering upward, sometimes compressed or twisted, *grayish-brown or tinged with gray*, innately silky-fibrillose. SPORES spheroid, tuberculate-angular, 8-9.5 (incl. apiculus) x 6-7 micr., apiculus prominent, deep flesh color in mass. ODOR and TASTE farinaceous.

Gregarious. On the ground, in open woods among grass or fallen leaves. Ann Arbor. June-July. Infrequent.

This species is characterized by its medium to small size, dark brown cap, the presence of an umbo, the grayish gills and the mealy odor. The umbo almost disappears. In Europe it is said to be abundant and to grow in grassy pastures or meadows. I have not found it in such a habitat. The surface of the cap has a sheen almost velvety as shown in our illustration. *E. griseum* differs in the truly convex cap without an umbo, and is usually larger. The spores of these two species are alike, and there is some question whether they do not run into each other.

597. *Entoloma strictius* Pk. (SUSPECTED)

N. Y. State Mus. Rep. 23, 1872.

Illustrations: Ibid, Pl. 2, Figs. 6-9.

Atkinson, Mushrooms, Fig. 138, p. 146, 1900.

Plate CVII of this Report.

PILEUS 2.5-6 cm. broad, rigid-fragile, obtusely conic-campulate to broadly campanulate, then expanded and often *strongly umbonate*, glabrous, hygrophanous, umber to watery cinnamon (moist), pearl-gray and silky-shining (dry), margin even or pelucid-striatulate when moist, somewhat wavy, thin and at length splitting. FLESH quite thin, concolor, scissile. GILLS adnexed, then emarginate or sinuate, *ventricose, broad*, narrowed in front, close to subdistant, white or pallid then rosy-incarnate, edge minutely eroded. STEM 6-10 cm. long, 3-7 mm. thick, *slender, cylindrical* or tapering slightly upward, sometimes obscurely bulbous, *strict*, stuffed then hollow, rigid-fragile, twisted, fibrillose-striate, pallid to pale grayish-white. SPORES elongated-angular, curved toward apiculus, 10-12 x 6-8 micr., nucleate, cinnamon-rose color in mass. BASIDIA about 40 x 8-9 micr., 4-spored. CYSTIDIA none. ODOR and TASTE none.

Subcaespitose. In swampy or low woods or near sphagnum swamps, near or on much-decayed stumps, etc. July-August. Ann Arbor, New Richmond, East Lansing. Infrequent.

Very distinct. The pileus is usually markedly campanulate, with a strikingly mammate umbo, very hygrophanous becoming silvery shining when dry, and the thin flesh is at length split on the margin. The stem is very straight and easily splits longitudinally. The spore-mass is peculiarly colored; when deposited thickly on white paper it has a deep rufous or cinnamon-rose color. The width of the spores are given too large by Peck. The striations on the margin of the cap soon disappear or are lacking. The smaller specimens have the appearance of a *Nolanea*.

598. *Entoloma grayanum* Pk.

N. Y. State Mus. Rep. 24, 1872.

Illustrations: Atkinson, Mushrooms, Fig. 157, p. 145, 1900.
Plate CVIII of this Report.

PILEUS 4-12 cm. broad, campanulate-convex, then expanded and obtuse or broadly umbonate, *firm, glabrous, hygrophanous*, watery-white, *whitish or yellowish-white* (moist), shining and whitish (dry), not striate, sometimes wrinkled on disk. **FLESH** *relatively thin*, whitish or tinged yellowish, *scissile*, not compact. **GILLS** adnexed, becoming emarginate, at first rounded behind, *broad, ventricose*, rather close, thickish, white then deep flesh color, edge entire or eroded-cripsed. **STEM** 5-12 cm. long, 10-20 mm. thick, equal or subequal, *firm, stout*, variously thickened, fibrous-stuffed, solid at base, straight or curved, glabrous, silky-shining, watery-white or tinged faintly with yellowish. **SPORES** spheroid, angular, 5-6 angled, 8-10 (incl. apiculus) x 7-9 micr., bright flesh color in mass. **CYSTIDIA** and **STERILE CELLS** none. **BASIDIA** clavate, 45 x 12 micr., 4-spored. **ODOR** and **TASTE** *none* or rarely subfarinaceous to slightly pungent.

(Dried: Pileus fuscous; stem sordid; gills dingy flesh-color.)

Solitary or subcaespitose-gregarious. On the ground in woods. August-October. Ann Arbor, Negaunee.

Distinguished by its whitish or yellowish-white pileus which has a watery cast, the hygrophanous hence scissile flesh, and the spores. It is often a noble plant and our forms surpass considerably the sizes given by Peck. In fact its characters are in some respects so near those of *E. grande* Pk., that only its hygrophanous flesh and thinner pileus seem to separate it. The spores are sharply angled and the apiculus usually stands out straight instead of obliquely as in many others. Atkinson (1900) describes a form with a drab-colored pileus. In dry weather the yellowish hues may be altogether lacking.

599. *Entoloma speculum* Fr.

Epicrisis, 1836.

Illustrations: Fries, Icones, Pl. 95, Fig. 2.

Cooke, Ill., Pl. 308.

Plate CIX of this Report.

PILEUS 2-6 cm. broad, convex-expanded then expanded-plane or slightly depressed around the umbo, margin somewhat wavy, *hygrophanous, pinkish-white* (moist), white and silky-shining (dry), the *umbo* obtuse and when moist whiter than *the rest of the pileus*, margin even or obscurely striatulate (moist). **FLESH** thin, fragile, white. **GILLS** emarginate, broad behind, *subdistant*, sometimes veined, *white at first* then *deep rose-colored*, edge suberoded. **STEM** 3-9 cm. long x 3-8 mm. thick, *equal*, stuffed by loose pith then hollow, sometimes compressed, *fragile, shining-white*, silky-fibrillose or striatulate, pruinose at apex. **SPORES** spheroid-angular, or slightly longer in one direction, 7-9 (including apiculus) x 6-7.5 micr., apiculus suboblique, nucleate. **CYSTIDIA** none. **ODOR** and **TASTE** *none*.

(Dried: Pileus dark rufous-brown or fuscous-brown, stem brownish.)

Solitary or subcaespitose. In grassy places in woods or on debris. Ann Arbor, New Richmond. Infrequent.

The persistently white umbo, deep color of the gills, fragile texture and the silvery shining-white pileus when dry, characterize the species. The size varies in different collections, normally rather small, but in favorable situations becoming larger than figured in the plates. The stem tends to elongate and is very fragile. The color is not retained on drying. The spores are a little large in some specimens but do not agree with the large size given by Saccardo and Masee, each of whom must have dealt with a different species. The surface of the pileus lacks any kind of differentiated cuticle. The trama of the gills is parallel and the margin of the cap is at first incurved.

Section IV. Conoidei. Pileus conic or campanulate, not expanded, moist; stem slender, long and hollow; on mosses, especially sphagnum.

600. *Entoloma salmoneum* Pk. (SUSPECTED)

N. Y. State Mus. Rep. 24, 1872.

Illustrations: N. Y. State Mus. Rep. 24, Pl. 4, 1872.

Hard, Mushrooms, Fig. 199, p. 247, 1908.

PILEUS 10-25 mm. broad, often longer than wide, thin, conical or campanulate, papillate or subacute, subhygrophanous or moist, deep salmon color or tinged with orange, margin even or nearly so. GILLS adnexed, broad, subdistant, ascending, ventricose, salmon-yellow or salmon-colored. STEM 5-12 cm. long, 2-4 mm. thick, slender, equal, glabrous, pruinose at apex, hollow, salmon-colored, innately silky-striatulate, becoming subcartilaginous. SPORES quadrate-nodulose, measuring 10-12.5 micr. diagonally, about 9 micr. wide from side to side, apiculus prominent, rosy-salmon in mass. CYSTIDIA few or none.

(Dried: Reddish-cinnamon to chestnut color.)

Gregarious or scattered. On the ground in conifer woods, in moist places, usually among mosses. August and September. In northern Michigan, Bay View, Negaunee, Detroit. Infrequent and local.

A beautiful little *Entoloma*, easily mistaken for a *Nolanea*. The spores are unique for the most part; under the microscope they appear like 4-sided crystals, but with the sides less straight. Simon Davis reports that the stem and sometimes the pileus may be tinged greenish.

601. *Entoloma peckianum* Burt. var.

N. Y. State Mus. Rep. 54, 1901.

Illustration: Ibid, Pl. F., Figs. 9-16.

PILEUS 3-5 cm. broad, campanulate or convex-expanded, brownish-ashy to grayish, streaked with brown-gray fibrils, umbonate, glabrescent, even on margin. FLESH white, thin. GILLS adnate, becoming emarginate-sinuate, rather broad, white then bright flesh color. STEM 5-7 cm. long, 4-6 mm. thick, whitish, sometimes ashy-tinged, equal or tapering downward, straight or flexuous,

stuffed then hollow, white-mycelioid at base, glabrous, sometimes fibrillose-striatulate, flocculose-pruinose at apex, subshining and subcartilaginous when dry. SPORES angular, slightly longer than wide, 5-6 angled, 8-9.5 x 6-7.5 micr., apiculus prominent, nucleate. CYSTIDIA none.

Subcaespitose or solitary. Low grounds and swamps of frondose trees. July, August and September. Ann Arbor, New Richmond, Marquette and Houghton. Infrequent.

This *Entoloma* seems to have characters of both *E. peckianum* and *E. murinum* Pk. It differs from the former in its smaller spores, color and size, as these are given in Peck's description. Our plants were referred to *E. peckianum* by Peck. This species differs from *E. murinum* in the smaller spores and size and in the even margin of the cap. From both it would seem to differ in its lack of a conical pileus and in its stouter habit, so that it may turn out to be a distinct species belonging to the section *Leptonidei*. In his remarks on *E. murinum*, Peck indicates that it is smaller than *E. peckianum*, although he gives the same size in the published descriptions. Our plants always have spores of the size given.

602. *Entoloma cuspidatum* Pk. (SUSPECTED)

N. Y. State Mus. Rep. 24, 1872.

Illustrations: Ibid, Pl. 2, Fig. 14-18.

Plate CX of this Report.

PILEUS 1.5-5 cm. broad, conical or persistently conical-campulate, 1-3 cm. high, glabrous, silky-shining, pale yellow, even or at length rimulose, bearing an elongated papilla at the apex, margin at first straight, at length irregular. FLESH thin. GILLS ascending, narrowly adnate, broad in middle, subdistant, pale yellow at first, then bright flesh color, edge uneven. Stem 4-12 cm. long, 2-3 mm. thick, equal, hollow, strict, sometimes twisted, glabrous, pale yellow, fibrous or with a subcartilaginous cuticle. SPORES subquadrate, coarsely angular, nucleate, apiculus prominent, 9-12 micr. diam., bright flesh color. CYSTIDIA none; STERILE CELLS lacking on edge of gills. Trama of gills parallel. ODOR and TASTE mild.

Gregarious. On mosses, sphagnum, leucobryum, etc., in swamps and bogs.

Eloise, near Detroit. August. Rare.

A unique plant, collected by Mrs. T. A. Cahn of the Detroit

Mycological Club near Eloise. It does not seem to have been reported outside of New York. The pileus and stem fade on losing moisture, but it is not hygrophaneous. It is a close relative of *E. salmoneum*, but with different colors and marked by the prominent cusp at the apex of the cap.

Clitopilus Fr.

(From the Greek, *klitos*, a slope, and *pilos*, a felt-cap.)

Pink-spored, without volva or annulus. Stem *fleshy or fibrous*, not cartilaginous, confluent with the pileus whose margin is at first involute. Gills *decurrent or adnate* but *not becoming sinuate nor seceding*. Pileus usually depressed or umbilicate.

Terrestrial plants, often with a farinaceous odor or taste; none are known to be poisonous. The decurrent gills ally them with the genus *Clitocybe* of the white-spored group.

The PILEUS is glabrous or pruinose in most species; in *C. abortivus* a delicate silky tomentum covers the surface; in a number it is hygrophaneous, and in *C. orcella* it is slightly viscid. The larger species are of a firm consistency; the smaller, membranous or fragile. The colors are usually dull or pale, whitish, grayish or brownish. The GILLS furnish the characteristic mark of the genus. Although usually decurrent, they are sometimes broadly adnate as in *Entoloma* and *Leptonia*, but in that case do not become sinuate-emarginate in age, nor readily separate from the stem. When decurrent, they are usually narrowed behind and end in a point on the stem as in many *Clitocybes*. When mature the gills of the different species present the same variation of color as those of *Entoloma*. Some are pale flesh-colored or deep rose; Peck grouped them into three groups with this difference in color as a basis. At first the gills are usually white or whitish, but in *C. micropus*, *C. albogriseus*, *C. abortivus* and *C. novaboracensis* they are pale gray or ashy at first. The STEM is fleshy-fibrous but may become rather rigid in the smaller forms. It is solid in all the larger forms and in this respect differs markedly from most *Entolomas*. There is no cartilaginous cuticle as in *Eccilia*. The SPORES are angular in some species like those of *Entoloma*, rounded in others as in *Clitocybe*, varying in intensity of color as shown by the mature gills or spore-prints. Ricken has moved all those with non-angular spores to other genera and omits the genus *Clitopilus* entirely. CYSTIDIA are absent as far as known. The

TASTE is often farinaceous, sometimes quite strong; that of *C. novaboracensis* is bitter; in others it is mild or insipid.

Fries divided the European species into two sections: one with deeply decurrent gills and the margin of the pileus at first flocculose; the other with adnate or subdecurrent gills and the margin of the pileus naked. Peck suggested the use of the different shades of pink of the mature gills as a basis for the sections. It seems to me that the character of the spores is more fundamental than any of these, since the angular spores simulate those of *Entoloma*, the rounded ones those of *Clitocybe*. In this sense, there would be two sections; the *Angulosporae* and the *Globosporae*. The genus is not well represented in Michigan.

Key to the Species

- (A) Spores angular.
 - (a) Pileus hygrophaneous, 1-3 cm. broad, fragile.
 - (b) Odor and taste farinaceous; pileus grayish-brown (moist). 605. *C. subvilis* Pk.
 - (bb) Not farinaceous; pileus pinkish-white (moist). Spores smaller than in the preceding. 604. *C. woodianus* Pk.
 - (aa) Pileus not hygrophaneous.
 - (b) Pileus 5-10 cm. broad, grayish-brown, often abortive. 603. *C. abortivus* B. and C.
 - (bb) Pileus less than 5 cm. broad, whitish to grayish or smoky-cinereous.
 - (c) Odor none.
 - (d) Gills white then somewhat rosy; stem stuffed to hollow. 609. *C. subplanus* Pk.
 - (dd) Gills dark ashy; stem solid or fibrous. 606. *C. undatus* Fr.
 - (cc) Odor farinaceous; gills gray at first.
 - (d) Stem slender, 3-6 cm. long, solid; pileus glabrous. 608. *C. albogriseus* Pk.
 - (dd) Stem short, 1-2 cm. long, solid; pileus silky. 607. *C. micropus* Pk.
- (AA) Spores not angular. (Slightly in *C. novaboracensis*.)
 - (a) Pileus somewhat viscid (moist), white or whitish, 3-7 cm. broad. 611. *C. orcella* Fr.
 - (aa) Pileus not viscid.
 - (b) Taste bitter; pileus concentrically-cracked, brownish-gray; gills deeply decurrent. 612. *C. novaboracensis* Pk.
 - (bb) Taste not bitter.
 - (c) Plants very caespitose, fragile, pileus 5-15 cm. broad, whitish, moist. 613. *C. caespitosus* Pk.
 - (cc) Plants gregarious, firm; pileus 3-10 cm. broad, white or tinged gray. 610. *C. prunulus* Fr.

Section I. Angulosporae. Spores angular or tuberculate.

603. *Clitopilus abortivus* B. & C. (EDIBLE)

Ann. Nat. Hist., 1859.

Illustrations: Hard, Mushrooms, Fig. 202, p. 250, 1908.

(Abortive form) Ibid, Fig. 203.

(Abortive form) Minnesota Mushrooms, Fig. 33, p. 57, 1910.
N. Y. State Mus. Bull. 54, Pl. 78, 1902.

Plate CXI of this Report.

PILEUS 5-10 cm. broad, firm, convex then plane to subdepressed, dry, at first covered with a delicate silky tomentum, glabrescent, grayish-brown, dull, becoming isabelline, margin even. FLESH white. GILLS decurrent, varying to merely adnate with a tooth, thin, close, pale gray at first, then rosy to salmon color, rather narrow. STEM 3-9 cm. long, 6-12 mm. thick, solid, fibrous, subequal, minutely flocculose, sometimes striate, pale grayish-brown to isabelline. SPORES elongated angular, irregular, 8-10 x 5-6 micr., nucleate, pale rose color or almost salmon color in mass. CYSTIDIA none. ODOR and TASTE somewhat farinaceous.

(Dried: Pileus brownish-gray, stem sordid white, gills dingy deep flesh color).

Subcaespitose, gregarious, occasionally solitary. Habitat varies: found frequently in low woods of elm, maple, etc., on wooded hill-sides, ravines, of frondose or mixed woods; sometimes on rotten wood. Late August to middle October. Common in southern Michigan.

Often some of the individuals of one patch are attacked—apparently by some other fungus—and do not develop the cap and gills, but remain as abortive, whitish masses, with the appearance of puff-balls; the interior however retains its whitish color, and does not become brown, olive or purple as in puff-balls. Their shape varies from globular to depressed, often umbilicate above. Sometimes all of the specimens are found in this condition, but careful searching of the locality usually brings to light normal individuals. McIlvaine says the abortive ones are fair eating.

604. *Clitopilus woodianus* Pk.

N. Y. State Mus. Rep. 24, 1872.

PILEUS 2-5 cm. broad, convex, then plane, obtuse or slightly depressed, sometimes umbonate, fragile, hygrophanous, brownish-

buff or watery-white (moist), white or tinged slightly yellowish or brownish and silky shining (dry), glabrous, margin striatulate (moist). FLESH thin, white. GILLS broadly adnate to subdecurrent, not sinuate, moderately close, rather broad, thickish, whitish then deep flesh-colored. STEM 4-6 cm. long, 2-5 mm. thick, equal or tapering upward, glabrous, stuffed with a firm pith, cuticle subcartilaginous, innately silky-striatulate, somewhat pellucid-white, elastic. SPORES spheroid-angular, 7 micr. diameter, nucleate, deep flesh color in mass. TASTE and ODOR none.

Solitary. On the ground or on rotten logs in frondose or cedar woods. Ann Arbor, Marquette. September. Rare.

This differs from *C. subvilis* in its small spores, whitish color, close gills and lack of odor. The stem is rather elastic for the genus and inclines to that of *Nolanea*. The pileus is depressed around the low umbo and tinged brownish there. It has a stouter stem and smaller spores than *Entoloma sericellum*, and is hygrophanous.

605. *Clitopilus subvilis* Pk. (EDIBLE)

N. Y. State Mus. Rep. 40, 1887.

PILEUS 1.5-3 cm. broad, fragile, convex-campanulate, depressed to umbilicate, hygrophanous, brown or watery grayish-brown (moist), paler and silky-shining when dry, margin decurved and somewhat wavy, slightly striatulate (moist), glabrous. FLESH thin, moist. GILLS broadly adnate or subdecurrent, subdistant, rather broad, whitish then flesh-colored, edge uneven. STEM 2-5 cm. long, 2-3 mm. thick, fleshy-fibrous, stuffed then hollow, equal or subequal, glabrous, tinged brownish, silky-shining. SPORES strongly 4-6 angled, subquadrate to subrectangular in focus, sides straight or concave, apiculus oblique, 8-10 x 7-9 micr., nucleate. CYSTIDIA none. ODOR and TASTE farinaceous.

(Dried: Dark brown to umber.)

Solitary. Ground in hemlock woods. Houghton. July-August. Infrequent.

It differs from *C. woodianus* in the color, subdistant gills and spores. From similar species in other pink-spored genera, it differs by its fleshy-fibrous stem and its adnate, not seceding gills.

606. *Clitopilus undatus* Fr.
(Sense of Patouillard.)

Epicrisis, 1836-38.

Illustrations: Fries, Icones, Pl. 96, Fig. 4.
Patouillard, Tab. Analyt., No. 428.
Cooke, Ill., Pl. 486.

PILEUS 1.5-3.5 cm. broad, *fragile*, deeply umbilicate to subinfundibuliform, *dark smoky-gray* (moist), fading, opaque, silky when dry, splitting radially in age, sometimes obscurely zonate, *margin wavy*, fleshy, concolor. GILLS *decurrent*, broad in the middle, thin, close, *dark cinereous*, at length tinged by the spores, edge entire. STEM short, 1.5-2 cm. long, 1.5-3 mm. thick, equal, terete, solid, even, tough-elastic, glabrous, *brownish-ashy to pale brown*. SPORES irregularly subglobose-oval, angular, 7-9 x 6-6.5 micr., nucleate, reddish-flesh color in mass. CYSTIDIA none. ODOR none.

On mossy ground or much decayed wood, in open frondose woods. Ann Arbor. August. Infrequent.

Known by its dark gray gills, lack of odor and angular spores. Ricken refers it to *Paxillus* and assigns to it smooth spores, in which he differs from other authors. Our plants had a solid stem while Fries describes the stem with a cavity. In all other respects it agrees well with the Friesian description. Patouillard reports the stem either solid or hollow and doubtless he had our species.

607. *Clitopilus micropus* Pk.

N. Y. State Mus. Rep. 31, 1879.

Illustration: N. Y. State Mus. Bull. 54, Pl. 78, 1902.

PILEUS small, 1-2 cm. broad, *fragile*, convex then depressed, *umbilicate*, *silky*, *gray*, usually slightly zoned on margin, margin decurved. GILLS adnato-decurrent, *narrow*, narrowed in front and behind to a point, close, gray then *salmon-colored*. STEM short, 1-2 cm. long, 2-3 mm. thick, solid or with a slight cavity, *pruinose*, gray, white-mycelioid at base. SPORES elongated angular-tuberculate, 9-10 x 5-6 micr., nucleate, pale salmon color. ODOR and TASTE *farinaceous*.

(Dried: Dark gray.)

Gregarious or subcaespitose. On the ground, grassy places, sandy fields or thin woods. July-September. Throughout the State. Ann Arbor, Detroit, New Richmond, Marquette. Frequent.

Sometimes it occurs in abundance in one place. There is a pale variety, almost white, which is widely distributed. The short stem, umbilicate and subzonate pileus distinguish it from *C. albogriseus*. It is rarely if ever found in deep woods. It differs from *C. subplanus* in its fragile cap.

608. *Clitopilus albogriseus* Pk. (EDIBLE)

N. Y. State Mus. Rep. 31, 1879.

PILEUS 1-3 cm. broad, convex, *firm*, then plane, depressed or umbilicate, glabrous, pale gray, margin even. GILLS adnato-decurrent, close, *rather broad*, grayish then flesh color. STEM 3-6 cm. long, 2-5 mm. thick, solid, subequal, glabrous, pale gray. SPORES elongated-angular, 10-12 x 6-7 micr., apiculus oblique and prominent. ODOR and TASTE *farinaceous*.

Gregarious or solitary. Ground, in conifer or frondose woods. Ann Arbor, Marquette, Houghton. July-September. Not infrequent in northern Michigan.

The large spores and longer stem separate it from *C. micropus*; the solid stem and the spores from *C. subplanus*. These three are closely related.

609. *Clitopilus subplanus* Pk.

N. Y. Mus. Bull. 122, 1908.

PILEUS 2-3 cm. broad, convex-expanded, somewhat plane, depressed or umbilicate, glabrous, innately silky, *grayish-white* or whitish. GILLS adnato-decurrent, close, moderately broad, *white then flesh color*. STEMS 2-4 cm. long, 2-4 mm. thick, *toughish*, terete or subcompressed, subsilky, cuticle subcartilaginous, even. SPORES angular, 9-11 x 6-7 micr., flesh-colored in mass; no cystidia.

Scattered. On decaying leaves, etc., in mixed woods. New Richmond, Bay View. July-September. Frequent locally.

This species differs from the two preceding in its white gills when young and its stuffed to hollow stem. The whole plant is rather tough and its taste and odor are not farinaceous.

Section II. Globosporae. Spores rounded, neither angled nor tubercular.

610. *Clitopilus prunulus* Fr. (EDIBLE)

Syst. Mycol., 1821.

Illustrations: Atkinson, Mushrooms, Fig. 135, p. 142, 1900.

Hard, Mushrooms, Fig. 200, p. 248, 1908.

N. Y. State Mus. Rep. 48, Pl. 14, 1896, Bot. ed.

Swanton, Fungi, Pl. 42, p. 131, 1909.

Ricken, Blätterpilze, Pl. 27, Fig. 5 (as *Parillus prunulus*).

Clements, Minn. Mushrooms, Fig. 34, p. 58, 1910.

Cooke, Ill., Pl. 322.

"PILEUS 5-10 cm. broad, at first obtuse, convex then nearly plane, firm, dry, pruinose, white to dark-gray, often eccentric, margin even and often wavy. FLESH white. GILLS deeply decurrent, subdistant, narrow, white then flesh-colored. STEM 3-8 cm. long, 5-15 mm. thick, solid, naked, striate, subequal or tapering, sometimes ventricose. SPORES subfusiform to subelliptical, pointed at ends, 10-12 x 5-7 micr., smooth, with three deep longitudinal furrows, tinged salmon. ODOR and TASTE farinaceous."

Ground in open woods. July-September. Ann Arbor, Lansing. Infrequent.

The general appearance is that of *C. orcella* but its cap is firm and not viscid and the stem is glabrous. Masee and Hard give the spores too small. Only Hennings, in Engler and Prantl, and Ricken mention the characteristic furrows of the spores. It has not been seen by me in abundance and is apparently rather rare in the State. Its edible qualities are highly praised. In France it is called the "Mousseron" by the peasants. An abortive form is described by McIlvaine.

611. *Clitopilus orcella* Fr. (EDIBLE)

Syst. Mycol., 1821.

Illustrations: N. Y. Mus. Rep. 48, Pl. 14, 1896, Bot. ed.

Hard, Mushrooms, Fig. 201, p. 249, 1908.

Cooke, Ill., Pl. 323.

Gillet, Champignons de France, No. 145.

Patouillard, Tab. Analyt., No. 427.

PILEUS 3-9 cm. broad, convex at first, soon expanded, plane then depressed, soft, somewhat viscid, silky, white to whitish or tinged yellowish, margin often undulate-lobed, even. FLESH white. GILLS deeply decurrent, close, narrow, edge entire, white, then pale salmon-colored from spores. STEM 3-5 cm. long, 4-10 mm. thick, rather short, solid, soft, flocculose, sometimes eccentric, subequal to subventricose. SPORES 9-11 x 4-6 micr., fusiform to oval-elongated, narrowed toward apiculus, nucleate, pale salmon color in mass, furrowed, smooth. ODOR and TASTE farinaceous.

(Dried: Pileus and stem dull-white; gills salmon-colored.)

Solitary or gregarious. On the ground or on moss, in low oak and maple woods, grassy places, etc. July-September. Ann Arbor, Detroit, Jackson. Frequent in southern Michigan.

This apparently differs from *C. prunulus* in its viscid pileus when moist, in its closer gills and the soft texture. It is more abundant than that species. Its edibility is the same and for that purpose need not be distinguished from the preceding. I have not found it in conifer regions. It is often considered identical with *C. prunulus*, but is at least a variety.

612. *Clitopilus novaboracensis* Pk.

N. Y. State Cab. Rep. 23, 1872.

Illustrations: Hard, Mushrooms, Fig. 204, p. 251, 1908.

Compare illustrations of *C. popinalis* Fr.

Fries, Icones, Pl. 96, Fig. 1.

Cooke, Ill., Pl. 485.

PILEUS 3-6 cm. broad, convex, plane or umbilicato-depressed, concentrically rivulose, glabrous, obscurely zonate toward margin, which is inrolled at first and often wavy, dingy-white, tinged ashy. FLESH thin, white, flaccid. GILLS deeply decurrent, crowded,

narrow, brownish-ashy to pallid with a slight flesh color, becoming ashy-stained, edge entire. STEM 3-6 cm. long, 2-5 mm. thick, rather slender, *flexible*, stuffed then hollow, *pruinose or tomentose*, white-mycelioid at base, subequal, concolor or paler than pileus. SPORES oval, obscurely or not at all angular, 5-6 x 4-4.5 micr., apiculate, pale flesh color in mass. ODOR farinaceous. Taste bitterish or very bitter.

(Dried: Pileus and gills brownish-gray.)

Subcaespitose or solitary. On the ground in hemlock woods. Ann Arbor, Bay View. August. Infrequent.

Var. *brevis* Pk. is reported by Longyear in frondose woods, East Lansing. This variety is pure white, with gills merely subdecurrent and stem short. The species is referred by some to *C. popinalis* Fr. The spores of the American plant appear rounded under ordinary magnification, but when magnified about 1500 diameters, it is seen that they are slightly angled. The angles are not sharply marked and the spores never appear tubercular-angled as figured by Cooke for *C. popinalis*; some appear to be altogether rounded. The dark plants may be mistaken for *Clitocybe cyathiforme*, but the pileus of the latter is not rivulose-cracked. Some *Tricholomas* have a pileus of the same color and markings. The plants often turn ashy where bruised.

613. *Clitopilus caespitosus* Pk.

N. Y. State Mus. Rep. 41, 1888.

Illustrations: Plates CXII, CXIII of this Report.

PILEUS 5-15 cm. broad, at first convex, soon expanded and plane to depressed, somewhat firm but brittle, *very fragile* when moist or water-soaked, glabrous, whitish to gray-tinged when young, watery-dingy-white (moist), *dull whitish to pale tan* and silky-shining (dry), even, margin at first inrolled, often recurved and split in age. FLESH pallid to white, thin, subhygrophanous, somewhat scissile. GILLS very *crowded*, and *narrow*, adnate-decurrent, thin, dingy *pale* flesh color, edge sometimes minutely crenulate. STEM 3-7 cm. long, 5-12 mm. thick, *equal or tapering downward*, silky-fibrillose, scurfy at apex, stuffed, fragile in age, pallid, easily splitting. SPORES short-oblong, 4.5 x 2.5-3 micr., smooth, sordid-white with a pink tinge in mass. ODOR slightly fragrant. TASTE none.

(Dried: Pileus and stem dingy-white tinged tan color; gills brownish-flesh color.)

Very caespitose, sometimes singly. On the ground in open oak and maple woods of southern Michigan; in mixed woods of maple and pine in the north. August-October. Throughout the State. Infrequent.

This is easily mistaken for a *Clitocybe*. The spores have a dingy flesh tinge in mass, like *Tricholoma personatum* and *Tricholoma panocolum* var. *caespitosum*. In rainy weather it is water-soaked and appears as if hygrophanous. Its fragile flesh and its usually large size separate it from other *Clitopilus*. It seems to be much more closely related to the genus *Clitocybe* than to *Clitopilus*.

Leptonia Fr.

(From the Greek, *lepidion*, a small scale.)

Pink-spored. Pileus at length *subexpanded and depressed in center*, umbilicus minutely squamulose, margin at first *incurved*. Stem *cartilaginous*, confluent with the pileus, stuffed, soon hollow. Gills adnexed or adnate, seceding. Spores *angular*.

Terrestrial, lignicolous or sphagnicolous. Rather small, slender-stemmed plants of low wet places in woods or swamps. They correspond to *Collybia* of the white-spored group. From *Nolanea* they are distinguished by the more expanded, subumbilicate pileus whose margin is at first incurved instead of straight on the stem.

The PILEUS is often minutely scaly or fibrillose, sometimes glabrous; hygrophanous or merely moist; even or striate on the margin. The colors are often bright, rosy, violet, yellowish, greenish or blue-black. As in *Collybia*, the pileus tends to expand rather fully, because of the position of the margin when young. The peculiar lustre is due, according to Patouillard, to the presence of air between the hyphae of the surface layer. The GILLS secede from the stem at maturity as in *Nolanea*; at first they are either adnexed or adnate. The color when young is to be noted, as it varies in different species, at first it may be gray, bluish, or whitish, at length the gills are colored by the spores. The STEM, as in *Nolanea* and *Eccilia*, is cartilaginous, hollow (sometimes stuffed), confluent with the pileus but of a different texture; it is composed of parallel hyphae, with long cells, which are regularly cylindrical. It is usually glabrous and polished, but some species are dotted with colored squamules. It is often compressed and furrowed longi-