

MERULIUS IN NORTH AMERICA¹

EDWARD ANGUS BURT

*Mycologist and Librarian to the Missouri Botanical Garden
Associate Professor in the Henry Shaw School of Botany of
Washington University*

MERULIUS

Merulius Haller, Hist. Stirp. Helvetiae 3 : 150. 1768, emend. Fries, Syst. Myc. 1 : 326. 1821; Elenchus Fung. 1 : 56. 1828; Epicr. 499. 1838; Hym. Eur. 591. 1874; Sacc. Syll. Fung. 6 : 411. 1888; Engl. & Prantl, Nat. Pflanzenfam. I. 1** : 152. 1898.—*Serpula* as a section of *Merulius* Persoon, Syn. Fung. 496. 1801.—*Xylomyzon* Persoon, Myc. Eur. 2 : 26. 1825.

Fructification formed from a woven, mucedinous mycelium, covered with the continuous hymenium which is usually waxy-soft, reticulated on the surface with obtuse folds, incompletely porose, at length gyrose and obsolete toothed.

The fructifications grow on wood usually, although some species occur on the ground, are soft and mucedinous, and dimidiate, reflexed or resupinate. Many reflexed species may be found resupinate also. The spores are distinctly ochraceous or white in most species, but have only the slightest tinge of color in several intermediate species; the basidia are simple; cystidia are present in a few species.

Merulius is closely connected on one side with *Coniophora*, *Corticium*, *Peniophora*, and *Stereum* of the *Thelephoraceae* and on the other side with *Poria*. If one has an immature specimen only, it may be difficult to decide whether it is a *Merulius*, but fully mature specimens have the hymenial surface distinctly reticulate with obtuse folds imperfectly porose

¹ Issued December 8, 1917.

Note.—The technical color terms used in this work are those of Ridgway, Color Standards and Nomenclature, Washington, D. C., 1912. With regard to the citation of specimens, all except those of "Exsiccati" are in Burt Herbarium, which are cited without explicit reference to place in other herbaria. For example, the specimen of *Merulius americanus* cited "Louisiana, St. Martinville, A. B. Langlois, 1590," is in Burt Herbarium. The data given is that received with the specimens and may identify duplicates in another herbarium. The location of all specimens in other herbaria than my own is designated by giving in parenthesis the name of the herbarium preceded by "in." For example, the specimen of the same species cited "Wyoming, Medicine Bow Mts., A. Nelson, 9673 (in Mo. Bot. Gard. Herb., 43754)," is in Missouri Botanical Garden Herbarium, but not in Burt Herbarium.

(305)

or gyrose, while the departure from the even hymenial surface in the genera of the *Thelephoraceae* just named is at the most only undulate-tubercular or granular. Greater difficulty may be experienced in deciding from poor or scanty material whether a given collection belongs in *Merulius* or in *Poria*. The development of the hymenium is, however, fundamentally different in these two genera. In *Merulius*, the hymenium is at first plane, and in this young stage sections show basidia and spores; by further growth this plane surface is thrown into folds and becomes porose, but it remains continuous over this irregular surface and will show in sections basidia on the edges of the folds as well as lining the pores. In *Poria* the formation of pores precedes the formation of the hymenium, hence sections of a young *Poria* having distinct pores may have no basidia as yet; at length a hymenium develops for each pore, as in the genus *Porotheium*, but these hymenia are not continuous over the edges of the dissepiments from pore to pore, so far as I have observed; hence while a porose *Merulius* and a *Poria* may resemble each other, sections of the *Merulius* should show a continuous hymenium, while those of the *Poria* might have the hymenium not yet differentiated if the *Poria* is very young, or lacking the hymenium on the edges of the dissepiments if mature.

The species of *Merulius* are of great economic importance on account of the dry rot of timber, caused by the species which grow on wood. There is an extended literature on the dry rot caused in Europe by *Merulius lacrymans*, a species which is rather rare in North America; but very little has been published in the United States concerning decay caused by our numerous other species.

I am indebted for specimens to my correspondents whose names are mentioned in the following pages, and who have made possible this record of our species of *Merulius* and of their distribution. I am under further obligation to Dr. W. A. Murrill for the opportunity to study the unmounted specimens of *Merulius* of the New York Botanical Garden Herbarium, to Mr. C. G. Lloyd for permission to study his reference series of species of *Merulius*, to Dr. H. D. House for

permitting me to study the Peck types of species of this genus in the New York State Herbarium, and to Dr. W. G. Farlow for access to specimens in the Curtis Herbarium. Miss E. M. Wakefield has kindly studied two type specimens in Kew Herbarium which were inaccessible to me and has communicated the results. Specimens received from Abate G. Bresadola and Mr. L. Romell have been of the utmost value for comparison of American species with those of Europe. To all I make grateful acknowledgment for aid.

KEY TO THE SPECIES

- LEPTOSPORI. Spores white (perhaps colored in *M. sordidus* when mature) 1
- CONIOPHORI. Spores ferruginous, ochraceous, or only very slightly colored 12
- Color of spores unknown, probably white..... 3. *M. Wrightii*
1. Fructifications dimidiate 2
1. Fructifications effuso-reflexed when best developed but sometimes occurring resupinate 3
1. Fructifications always resupinate..... 6
2. Fructifications dimidiate, imbricated, tomentose, coral-pink when fresh; spores $4-4\frac{1}{2} \times 2-2\frac{1}{2} \mu$; rare outside of Mississippi Valley..... 1. *M. incarnatus*
2. Fructifications dimidiate, solitary, hirsute, drying pale cream-buff; spores $3 \times 2 \mu$; known from Jalapa, Mexico, only..... 2. *M. hirsutus*
2. Fructifications reniform, very small, 5×4 mm. and 3 mm. in diameter, minutely tomentose, drying Isabella-color; spores not observed; collected in Texas..... 3. *M. Wrightii*
3. Fructification fleshy-tremellose, with a broad gelatinous subhymenial layer which dries horny and requires several minutes to absorb water to soften for sectioning; large pores often transversely partitioned; spores allantoid, $3-3\frac{1}{2} \times \frac{1}{2}-1 \mu$ 4. *M. tremellosus*
3. Fructification with subhymenial layer having walls of its hyphae gelatinously modified, but thin and somewhat pliant when dry; no cystidia; spores $4-5 \times 2-2\frac{1}{2} \mu$; on conifers..... 5. *M. ambiguus*
3. Fructification neither fleshy-tremellose nor with walls of hyphae of the subhymenial layer gelatinously modified..... 4
4. Hyphae of the subhymenial layer incrustated; fructification coriaceous, soft, somewhat tomentose, concentrically sulcate when broadly reflexed, white to pallid neutral gray; spores $4\frac{1}{2}-5 \times 2\frac{1}{2} \mu$ 6. *M. confluens*
4. Like *M. confluens* except that the hymenial and subhymenial zones are brownish in sections stained with cosin, and KHO solution often turns the sections vinaceous..... 7. *M. pallens*
4. Hyphae not incrustated 5
5. Reflexed portion white, villose, soft, thin; hymenium reticulately porose, drying pinkish buff to cinnamon; pores about 3 to a mm.; spores of American collections $4\frac{1}{2}-5 \times 1\frac{1}{2}-2\frac{1}{2} \mu$ 8. *M. corium*
5. Reflexed portion drying cinnamon-buff, tomentose; hymenium drying between vinaceous-brown and Hay's brown; pores about 2-3 to a mm.; sections change to vinaceous by action of KHO solution; spores hyaline, $3 \times 1\frac{1}{2} \mu$ as seen attached to basidia, published by Cooke as dilute fuscous, $7 \times 5 \mu$; described from Venezuela, but may range further north 9. *M. sordidus*

5. Reflexed portion drying Sayal-brown, radially fibrillose, somewhat zonate and shining; hymenium between light seal-brown and Hay's brown; pores 4 to a mm.; spores $3\frac{1}{2} \times 2 \mu$; in Venezuela.....10. *M. deglubens*
5. Reflexed portion drying whitish to wax-yellow, pubescent, concentrically sulcate; sinuous folds about 4 to a mm., sometimes growing out into projections; spores allantoid, $3 \times \frac{1}{2} \mu$; in Cuba.....11. *M. cubensis*
5. Narrowly reflexed, often wholly resupinate; hymenium becoming fissured, drying cream-color to ochraceous tawny, the folds narrow, rugaeform, interrupted, not forming pores; spores $4\frac{1}{2} \times \frac{1}{2} - 1 \mu$; on alder.....12. *M. niveus*
6. Fructifications separable from the substratum (*M. fugaw* is not included here, although its spores are sometimes colorless under the microscope) 7
6. Fructification adnate 10
7. Hymenium not becoming porose, gyrose-plicate, drying Capucine-buff; hyphae incrustated, nodose-septate; spores often slightly curved, $4\frac{1}{2} - 5 \times 2 \mu$; known from Michigan.....13. *M. gyrosus*
7. Hymenium not becoming porose, gyrose-plicate with slightly elevated folds, drying cartridge-buff, waxy; hyphae not incrustated, only rarely nodose-septate; spores $3 - 4 \times 2 \mu$14. *M. sororius*
7. Hymenium becoming imperfectly porose, with the folds colonial buff on a whitish, cobwebby, supporting membrane; spores subglobose, $2\frac{1}{2} \mu$ in diameter; on the lichen *Stereocaulon* in Adirondack Mountains.....15. *M. vichenicola*
7. Hymenium becoming porose. (Examine sections to guard against including species of *Poria*) 8
8. Spores subglobose, $3\frac{1}{2} - 4 \mu$ in diameter; fructification translucent when fresh, drying pinkish buff to pale ecru-drab.....16. *M. dubius*
8. Spores not subglobose 9
9. Hyphae incrustated toward the hymenium; hymenium drying pale olive-buff to warm buff and ochraceous buff; pores 2-4 to a mm.; spores $3 - 4\frac{1}{2} \times 1\frac{1}{2} - 2 \mu$17. *M. bellus*
9. Hyphae not incrustated; hymenium drying Hay's brown to dark vinaceous-brown; pores about 3 to a mm.; spores allantoid, $3\frac{1}{2} - 4 \times \frac{1}{2} - 1\frac{1}{2} \mu$18. *M. Ravenelii*
9. Hyphae not incrustated; fructification everywhere drying between primrose-yellow and naphthalene-yellow; pores 2-3 to a mm.; spores $4\frac{1}{2} - 6 \times 2\frac{1}{2} - 3\frac{1}{2} \mu$; in Florida.....19. *M. sulphureus*
9. Hyphae not incrustated; fructification drying white, becoming somewhat cartridge-buff in the herbarium; pores 1 or 2 to a mm.; spores $6 - 7\frac{1}{2} \times 3 - 3\frac{1}{2} \mu$; in Alabama.....20. *M. albus*
10. Hymenium tomentose, drying between warm buff and cream-buff; pores about 3 to a mm.; hyphae incrustated; spores $6 \times 2\frac{1}{2} - 3 \mu$; in British Columbia.....21. *M. tomentosus*
10. Hymenium not tomentose, having hair-like cystidia on the folds, drying light buff to pinkish buff with vinaceous-gray margin; pores about 2 to a mm.; hyphae incrustated; spores $3 - 3\frac{1}{2} \times 1\frac{1}{2} - 2 \mu$; in Massachusetts.....22. *M. hirtellus*
10. Hymenium not tomentose, having hair-like cystidia on the folds, drying between drab-gray and ecru-drab; pores about 3-4 to a mm.; hyphae not incrustated; spores $3 \times 1\frac{1}{2} \mu$; in New Hampshire.....23. *M. Parlouii*
10. Hymenium not tomentose, not having hair-like cystidia on the folds, but with clavate gloeocystidia in the subhymenial region, drying cream-buff and ochraceous salmon to tawny olive; spores $7 - 8\frac{1}{2} \times 4 - 4\frac{1}{2} \mu$; in Cuba and Jamaica.....24. *M. rugulosus*
10. Hymenium not tomentose, not having cystidia nor gloeocystidia... 11
11. Fructification drying fawn-color to carob-brown and Natal-brown; pores about 2 to a mm.; spores slightly curved, $4\frac{1}{2} \times 1\frac{1}{2} - 2\frac{1}{2} \mu$25. *M. rufus*

11. Fructification drying ochraceous cream-buff to pinkish buff, rarely paler, often cracking and flaking away from the substratum; pores 4-6 to a mm.; spores $4 - 4\frac{1}{2} \times 1\frac{1}{2} - 2 \mu$26. *M. cerceus*
12. Fructification effuso-reflexed when best developed, but sometimes resupinate 13
12. Fructification always resupinate..... 14
13. Fructification large, from 2 mm. up to 1 cm. and more thick when growing, spongy-fleshy; the subhymenial layer composed of densely arranged, nodose-septate hyphae, some of which are colored, 5-6 μ in diameter, and the others hyaline, 4-4 $\frac{1}{2}$ μ in diameter, and gradually predominating towards the hymenium; spores citron-yellow under the microscope, $9 - 10\frac{1}{2} \times 5\frac{1}{2} - 6 \mu$27. *M. lacrymans*
13. Fructifications small, about $\frac{1}{2}$ cm. broad and 1 cm. long; hymenium drying ochraceous orange to russet; longitudinal or radiate folds more prominent than the transverse ones; spores very pale, $3 - 4\frac{1}{2} \times 1\frac{1}{2} - 2 \mu$; on pine wood.....28. *M. aureus*
13. Fructification with reflexed portion flabelliform, tomentose, drying Sayal-brown; hymenium drying fuscous, with shallow pores about 4 to a mm.; spores $3 \times 2 \mu$; in Cuba.....29. *M. spadicus*
14. Spores large, more than $7\frac{1}{2} \times 4\frac{1}{2} \mu$ 15
14. Spores small, less than $7\frac{1}{2} \times 4\frac{1}{2} \mu$ 16
15. Hymenium drying Brussels-brown to bone-brown, gyrose-porose, with the folds growing out into raduloid teeth on an inclined surface, the pores 1-1 $\frac{1}{2}$ mm. in diameter and depth or half as deep; layer next to substratum composed of loosely interwoven, colored and hyaline hyphae intermixed; spores bone-brown in a spore collection, $9 \times 6 \mu$30. *M. americanus*
15. Hymenium drying amber-brown, forming slightly elevated, obtuse, gyrose folds between which are shallow, labyrinthiform depressions; spores aniline-yellow under the microscope, $9 \times 4\frac{1}{2} - 5 \mu$31. *M. terrestris*
15. Hymenium drying warm sepia, even towards the margin, porose-sinuate at the center by accumulation of the folds; fructification in large, sheet-like masses run through with rhizomorphic veins; spores $10 - 12 \times 6 - 8 \mu$, cream-color under the microscope.....32. *M. brassicaefolius*
15. Hymenium drying raw umber when fully mature, paler towards the margin and when young, forming thin, slightly elevated, gyrose folds which outline more or less completely shallow pores about $\frac{3}{4} - 1\frac{1}{2}$ mm. in diameter; spores honey-yellow under the microscope, $9 - 10 \times 6 \mu$33. *M. himantioides*
16. Hymenium between buffy brown and Saccardo's umber, with slightly elevated folds which become reticulately connected and form hexagonal pores about 1-2 to a mm.; spores concolorous with the hyphae, $5 - 7\frac{1}{2} \times 4\frac{1}{2} \mu$; in California.....34. *M. hexagonoides*
16. Hymenium gyrose-plicate, not forming pores, drying cream-color to pinkish buff, often with a tinge of orange; hyphae nodose-septate, coarsely granule-incrustated towards the substratum; spores hyaline or slightly yellowish under the microscope, $4 - 5 \times 3 - 3\frac{1}{2} \mu$35. *M. fugaw*
16. Hymenium with folds minute, somewhat reticulate, not outlining pores, drying between avellaneous and wood-brown, the subiculum and margin Isabella-color; hyphae pale olive-buff under the microscope; spores concolorous with the hyphae, $3 \times 1\frac{1}{2} - 2 \mu$; in Idaho.....36. *M. montanus*
16. Hymenium becoming porose..... 17
17. Fructification drying sepia to Chaetura-drab, thick, soft; hyphae 2-3 μ in diameter, hyaline; folds not grown out into teeth; spores olive-buff under the microscope, $4\frac{1}{2} - 6 \times 3 - 3\frac{1}{2} \mu$37. *M. umbrinus*
17. Fructification pinard-yellow at first, then olive-ocher, drying a little darker; folds of the pores grown out into subulate or Irpex-like teeth; spores pale ochraceous in spore collection, $5 - 6 \times 4 - 5 \mu$38. *M. pinastri*

17. Fructification drying between Saccardo's umber and Dresden-brown in all parts, flaxy; hymenium minutely rugose-porose, outlining rather imperfect, shallow pores about 2-4 to a mm.; spores deep olive-buff under the microscope, $4\frac{1}{2}$ -6 \times 3 $\frac{1}{2}$ -4 $\frac{1}{2}$ μ ; on soil in sugar-cane field, Porto Rico 39. *M. byssoides*
17. Fructification drying between dark ivy-green and dark olive-gray at the center; hymenium at length porose with angular pores about 1 $\frac{1}{2}$ -2 to a mm., 1-1 $\frac{1}{2}$ mm. deep; some incrustated hyphae near the substratum; spores citron-yellow under the microscope, $4\frac{1}{2}$ -5 \times 3-3 $\frac{1}{2}$ μ ; in North Carolina 40. *M. atrovirens*

1. *Merulius incarnatus* Schweinitz, Naturforsch. Ges. Leipzig Schrift. 1: 92. 1822; Fries, Elenchus Fung. 1: 57. 1828; Epicr. 500. 1838; Sacc. Syll. Fung. 6: 411. 1888.

Cantharellus incarnatus Schweinitz, Am. Phil. Soc. Trans. N. S. 4: 153. 1832.—*Merulius rubellus* Peck, Bot. Gaz. 7: 44. 1882; Sacc. Syll. Fung. 6: 412. 1888.

Type: in Herb. Schweinitz and a portion in Herb. Fries.

Illustrations: Hard, Mushrooms, f. 353; State Univ. of Ohio Bul. IX. 6: f. 90.

Fructifications dimidiate, sessile, mostly imbricated, soft, somewhat coriaceous, tomentose, Congo-pink to coral-pink when fresh, fading in drying to pinkish buff and light buff, the margin undulate, often inflexed; hymenium with the folds much branched, porose-anastomosing, drying flesh-ocher to salmon-buff; in structure ranging up to 3 mm. thick (1) with a very broad, spongy, upper layer composed of loosely interwoven, rigid hyphae 4-5 μ in diameter, somewhat incrustated with brownish granules, and (2) with a layer 150 μ thick, composed of densely and longitudinally arranged, hyaline hyphae 4-5 μ in diameter, occasionally nodose-septate, not incrustated, not gelatinously modified, which bear the hymenium; spores white in spore collection, even, biguttulate, 4-4 $\frac{1}{2}$ \times 2-2 $\frac{1}{2}$ μ .

Fructification 2-4 cm. broad, 4-8 cm. long.

On logs and stumps of white oak, beech, birch, and maple—often growing out under, and extending beyond, old fructifications of *Stereum fasciatum*. North Carolina to Louisiana and in the Mississippi Valley.

Fresh specimens of this species may be recognized by the beautiful coral-pink color, soft and rather dry consistency,

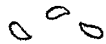


Fig. 1

M. incarnatus.
Spores \times 870.
See pl. 20, f. 1.

and dimidiate form. In determining dried specimens in the herbarium, the distinguishing positive characters are the dimidiate form, imbricate habit, immediate softening throughout of a piece of the fructification when water is applied to it preparatory to sectioning—due to absence of such a gelatinous subhymenial layer as occurs in *M. tremellosus*—, and spores slightly larger than those of the latter species and not strongly curved. Fries noted in 'Epicrisis' that *M. incarnatus* is unique in the Leptospori in not being effuso-reflexed. *M. incarnatus* is probably rare outside the Mississippi Valley and is not known to occur in the collections of Curtis and Ravenel, who mistook reddish and broadly reflexed specimens of *M. tremellosus* for *M. incarnatus*.

Specimens examined:

Exsiccati: Ell. & Ev., N. Am. Fungi, 3004.

North Carolina: *Schweinitz*, type (in Herb. Schweinitz).

Alabama: Montgomery, *R. P. Burke*, 136 (in Mo. Bot. Gard. Herb., 10464).

Louisiana: St. Martinville, *A. B. Langlois*, 2810, 2245 (the latter in Mo. Bot. Gard. Herb.).

West Virginia: *L. W. Nuttall*, in Ell. & Ev., N. Am. Fungi, 3004.

Tennessee: Elkmont, *C. H. Kauffman*, 84 (in Mo. Bot. Gard. Herb., 18643).

Ohio: Cincinnati, *A. P. Morgan*, type of *Merulius rubellus* (in Coll. N. Y. State).

Indiana: Greencastle, *L. M. Underwood*, 12 (in Mo. Bot. Gard. Herb., 4083), and an unnumbered specimen (in N. Y. Bot. Gard. Herb.).

Missouri: Gaylor, *S. M. Zeller* (in Mo. Bot. Gard. Herb., 5080); Loughboro, *L. O. Overholts* (in Mo. Bot. Gard. Herb., 4082); Meramec Highlands, *S. M. Zeller* (in Mo. Bot. Gard. Herb., 43749).

Arkansas: Bigflat, *W. H. Long*, 19900 (in Mo. Bot. Gard. Herb., 9140); Cass, *W. H. Long*, 19829 (in Mo. Bot. Gard. Herb., 9137).

Mississippi: Starkville, *S. M. Tracy* (in N. Y. Bot. Gard. Herb.).

2. *M. hirsutus* Burt, n. sp.

Type: in N. Y. Bot. Gard. Herb.

Fructification pileate, dimidiate, sessile, convex, thin, hirsute, somewhat concentrically sulcate, drying pale cream-buff, the margin thin, entire; hymenium even at first, becoming porose with shallow pores about 2 to a mm., drying somewhat orange-cinnamon where pores are developed and pale pinkish cinnamon towards the margin; in structure 2-3 mm. thick towards the base, with (1) the layer forming the upper side very broad and composed of loosely interwoven, thick-walled, hyaline hyphae $4\frac{1}{2}$ -6 μ in diameter, and with (2) the layer next to the hymenium composed of densely arranged, hyaline hyphae $3-3\frac{1}{2}$ μ in diameter, with their walls somewhat gelatinously modified; spores, as seen on basidia, hyaline, even, flattened on one side, 3×2 μ , perhaps still immature.

Fructification $1\frac{1}{2}$ cm. broad, 3 cm. long, 3 mm. thick near point of attachment in the single fructification collected.

On wood. Jalapa, Mexico. December.

This species resembles *M. incarnatus* in having a dimidiate pileus, but is distinct from that species by its hirsute covering, different color, and shorter spores, and not growing imbricate in clusters. The hymenium is very similar to that of *M. confluens*.

Specimens examined:

Mexico: Jalapa, *W. A. Murrill*, 66 (in N. Y. Bot. Gard. Herb.).

3. *M. Wrightii* Berkeley, *Grevillea* 1: 69. 1872; *Sacc. Syll. Fung.* 6: 413. 1888.

Type: in Kew Herb.



Fig. 3
M. Wrightii.
Fructifications $\times 4$.

Fructification minute, pileate, sessile, reniform, attached by a point, minutely tomentose, drying pale Isabella-color, the margin free, incurved; hymenium drying snuff-brown, horny (hence probably cartilaginous when

fresh), with a few radiating, branching folds and less prominent connecting folds, forming radially elongated pores about 4 to a mm. transversely; structure and spores not known.

One fructification of the type is 5×4 mm., and the other 3 mm. in diameter; both are thick in proportion to size.

On wood. Texas. *C. Wright*, 5144, type (in Kew Herb.).

In his comment on *M. Wrightii* in connection with the original description, Berkeley states that this species is apparently intermediate between *Laschia* and *Merulius*. I could find no specimens of *C. Wrightii* in Curtis Herbarium and am indebted to Miss E. M. Wakefield for notes on the type which have made possible the above description, and also for two sketches which illustrate the species. Miss Wakefield adds that it is not possible to say from the specimens whether they were attached to wood.

4. *M. tremellosus* Schrader, *Spic. Fl. Germ.* 139. 1794; *Persoon, Obs. Myc.* 2: 92. 1799; *Syn. Fung.* 496. 1801; *Fries, Syst. Myc.* 1: 327. 1821; *Hym. Eur.* 591. 1874; *Sacc. Syll. Fung.* 6: 411. 1888.

Merulius Pruni Peck, N. Y. State Mus. Bul. 105: 25. 1906; *Sacc. Syll. Fung.* 21: 360. 1913.

Illustrations: *Fl. Dan. pl.* 1553; *Gillet, Champ. Hym.; Hard, Mushrooms, text f.* 354; *Hussey, Ill. Brit. Myc. pl.* 10.

Fructification resupinate, then free or reflexed, fleshy-tremellose, the upper surface tomentose and white; hymenium ruddy, somewhat translucent, drying cinnamon-buff and Prussian-red; the folds form rather deep pores, at first radially elongated, about $1-1\frac{1}{2} \times \frac{1}{2}$ mm., and transversely venose, finally subdivided into smaller, equal, angular pores; in structure ranging from $\frac{1}{2}$ to 2 mm. thick, with (1) a layer next to substratum of loosely interwoven, hyaline hyphae $3-3\frac{1}{2}$ μ in diameter, and with (2) a very broad, gelatinous layer 400-1000 μ broad, composed of densely arranged, par-



Fig. 4
M. tremellosus.
Basidia and cystidium $\times 510$;
spores $\times 870$.
See *pl.* 20, *f.* 3.

allel, hyaline hyphae with walls gelatinously modified, the sub-hymenial portion of the layer usually Isabella-color and granular in preparations stained with eosin; cystidia even or incrusted, sparingly present, $3\frac{1}{2}$ – $4\frac{1}{2}$ μ in diameter, emerging 15–25 μ above the basidia; spores hyaline, even, allantoid, biguttulate, 3 – $3\frac{1}{2}$ \times $\frac{1}{2}$ – 1 μ .

Fructifications 2–6 cm. in diameter, often laterally confluent, sometimes imbricate, the reflexed margin varying up to $1\frac{1}{2}$ cm. broad.

Common on decaying logs and stumps of birch, maple, and other frondose species, rarely on coniferous wood. Everywhere in North America. August to January.

Fully developed specimens of *M. tremellosus* may usually be recognized by their occurrence on frondose wood, reflexed, white, tomentose pileus, large pores often with short, transverse veins or partition at the base, thick, gelatinous-cartilaginous flesh, and small, more or less curved spores. Such specimens, when dry, usually require an interval of three to five minutes after water is applied before the dried, horny-gelatinous layer will soften for sectioning, but immature specimens soften more quickly. Wholly resupinate fructifications have the same character as the resupinate portion of reflexed specimens, with which they are usually associated. When growing on a vertical surface the folds may show a tendency to become dentate or irpiciform.

Specimens examined:

Exsiccati: Bartholomew, Fungi Col., 2844 (in copy in Mo. Bot. Gard. Herb., not *Phlebia radiata* as stated on emended label), 4437, 4941; Cavara, Fungi Longobardiae, 159; Ellis, N. Am. Fungi, 507; Ell. & Ev., Fungi Col., 213; Klotzsch, Herb. Viv. Myc., 110; Krieger, Fungi Sax., 1013, 1013b; Ravenel, Fungi Car. 2: 22, under the name *M. incarnatus*, 3: 15; Ravenel, Fungi Am., 715; Sydow, Myc. Germ., 1204; de Thümen, Myc. Univ., 2205.

Finland: Mustiala, *P. A. Karsten*, in de Thümen, Myc. Univ., 2205.

Sweden: Femsjö, *E. A. Burt*.

Germany: Forbach, *A. Ludwig*, in Sydow, Myc. Germ., 1204;

Ilmenau, *J. F. Klotzsch*, in Klotzsch, Herb. Viv. Myc., 110; Saxony, Winterberg, *W. Krieger*, in Krieger, Fungi Sax., 1013b; Dresden, *W. Krieger*, in Krieger, Fungi Sax., 1013.

Italy: Pavia, *F. Cavara*, in Cavara, Fungi Longobardiae, 159.

Canada: Belleville, *J. Macoun*, 202 (in N. Y. Bot. Gard. Herb.); Fairy Lake, *J. Macoun*, 40 (in N. Y. Bot. Gard. Herb.); Shamminth, *J. Macoun*, 207 (in N. Y. Bot. Gard. Herb.).

Ontario: Hull, *J. Macoun*, 140, 224, 464 (all in N. Y. Bot. Gard. Herb.); Ottawa, *J. Macoun*, 202 (in N. Y. Bot. Gard. Herb.).

Quebec: Hull, *J. Macoun*, 70 (in N. Y. Bot. Gard. Herb.).

Maine: Piscataquis County, *W. A. Murrill*, 1991 (in N. Y. Bot. Gard. Herb.).

New Hampshire: Chocorua, *W. G. Farlow*, 146 (in Farlow Herb. and in Mo. Bot. Gard. Herb., 54940); East Hebron, *P. Wilson* (in N. Y. Bot. Gard. Herb.).

Vermont: Middlebury, *E. A. Burt*, four collections; Ripton, *E. A. Burt*.

Massachusetts: Arlington Heights, *E. A. Burt*; Cambridge, *W. G. Farlow* (in Mo. Bot. Gard. Herb., 54920); North Scituate, *W. G. Farlow* (in Farlow Herb.); Stony Brook, *E. A. Burt*.

Connecticut: East Hartford, *C. C. Hammer*.

New York: Altamont, *E. A. Burt*; Bronx, *W. A. Murrill* (in N. Y. Bot. Gard. Herb.); Canandaigua, *O. F. Cooke* (in N. Y. Bot. Gard. Herb.); Chappaqua, *Mrs. C. E. Rider & Mrs. W. A. Murrill* (in N. Y. Bot. Gard. Herb.); Clyde, *O. F. Cooke* (in N. Y. Bot. Gard. Herb.); East Galway, *E. A. Burt*; Fabius, *L. M. Underwood* (in N. Y. Bot. Gard. Herb.); Horicon, *C. H. Peck*, type of *M. Pruni* (in Coll. N. Y. State and in Mo. Bot. Gard. Herb.); Karner, *H. D. House* (in N. Y. State Mus. Herb. and in Mo. Bot. Gard. Herb.); Lake Placid, *W. A. Murrill*, 65, 208, 671 (all in N. Y. Bot. Gard. Herb.); New York City, *W. H. Ballou* (in N. Y. Bot. Gard. Herb.) and *W. A. Murrill* (in N. Y. Bot. Gard. Herb.); Syracuse, *L. M. Underwood* (in N. Y. Bot. Gard. Herb.).

- New Jersey: *J. B. Ellis*, in *Ellis*, N. Am. Fungi, 507; Englewood, *W. H. Ballou*, two collections (in N. Y. Bot. Gard. Herb.).
- Pennsylvania: Carbondale, *E. A. Burt*; Trexlertown, *W. Herbst*.
- Maryland: Takoma Park, *C. L. Shear*, 1189.
- Virginia: Great Falls, *J. R. Weir*, 8005 (in Mo. Bot. Gard. Herb., 54932); Mountain Lake, *W. A. Murrill*, 394, 395 (both in N. Y. Bot. Gard. Herb.).
- West Virginia: Nuttallburg, *L. W. Nuttall*, in *Ell. & Ev.*, Fungi Col., 213.
- North Carolina: *W. A. Murrill* (in N. Y. Bot. Gard. Herb.); Chapel Hill, *W. C. Coker*, 997 (in N. Y. Bot. Gard. Herb.); Black Rock Mountain, *G. F. Atkinson*, 11893 (in N. Y. Bot. Gard. Herb.).
- South Carolina: *H. W. Ravenel*, in *Ravenel*, Fungi Car. 2: 22, 3: 15; Aiken, *H. W. Ravenel*, in *Ravenel*, Fungi Am., 715.
- Florida: Tallahassee, *E. Bartholomew*, 5727 (in Mo. Bot. Gard. Herb., 44263), and in *Bartholomew*, Fungi Col., 4941.
- Alabama: Lee County, *F. S. Earle*, 79 (in N. Y. Bot. Gard. Herb.); Montgomery County, *R. P. Burke*, 11 (in N. Y. Bot. Gard. Herb.), and 59, 114, 320 (in Mo. Bot. Gard. Herb., 18206, 19801, and 54942, respectively).
- Louisiana: St. Martinville, *A. B. Langlois*, 2805.
- Texas: Beaumont, *W. H. Long*, 21732 (in Mo. Bot. Gard. Herb.).
- Wisconsin: Madison, *W. Trelease* (in Mo. Bot. Gard. Herb., 55146).
- Indiana: Greencastle, *L. M. Underwood* (in N. Y. Bot. Gard. Herb.).
- Illinois: Bloomington, *H. von Schrenk* (in Mo. Bot. Gard. Herb., 43834).
- Kentucky: Crittenden, *C. G. Lloyd*, 1401 (in *Lloyd Herb.*).
- Missouri: Allenton, *G. W. Letterman*, 26 (in Mo. Bot. Gard. Herb., 4062); Benton, *L. H. Pammel* (in Mo. Bot. Gard. Herb., 54921); Columbia, *B. M. Duggar*, 575; Creve Coeur, *E. A. Burt* (in Mo. Bot. Gard. Herb., 54328, 54329, 54923,

- 54924); O'Fallon, *W. Trelease* (in Mo. Bot. Gard. Herb., 4060).
- Arkansas: Batesville, *E. Bartholomew*, in *Bartholomew*, Fungi Col., 2844 (in Mo. Bot. Gard. Herb.); Bertig, *W. Trelease* (in Mo. Bot. Gard. Herb., 4076, 4084); Womble, *W. H. Long*, 19912 (in Mo. Bot. Gard. Herb., 8962).
- Oklahoma: Spiro, *E. Bartholomew*, in *Bartholomew*, Fungi Col., 4437.
- Idaho: Priest River, *W. H. Long*, 19912 (in Mo. Bot. Gard. Herb., 10722).
- Washington: Seattle, *W. A. Murrill*, 154, 155 (both in N. Y. Bot. Gard. Herb.).
- Mexico: Jalapa, *W. A. Murrill*, 310 (in N. Y. Bot. Gard. Herb.); Orizaba, *J. G. Smith* (in Mo. Bot. Gard. Herb., 4066).

5. *M. ambiguus* Berkeley, *Grevillea* 1: 69. 1872; *Sacc. Syll. Fung.* 6: 416. 1888.

Type: type distribution in *Ravenel*, Fungi Car. 1: 24.

Fructification orbicular, sometimes resupinate, usually narrowly reflexed, coriaceous-soft, with the reflexed portion tomentose, often concentrically sulcate, drying whitish to pale smoke-gray; hymenium drying from tawny olive to Rood's brown, the folds at first radiate, flexuous, and branching, then transversely connected and forming shallow, angular pores about $1 \times \frac{1}{2}$ mm.; in structure 300–600 μ thick, with (1) the layer next to the substratum 50–100 μ thick, composed of loosely interwoven, hyaline hyphae, and with (2) a much broader gelatinous layer bearing the hymenium and constituting the rest of the fructification; spores hyaline, even, $4-5 \times 2-2\frac{1}{2}$ μ .

Fructifications 2–6 cm. in diameter, often laterally confluent, the reflexed margin 2–10 mm. broad.

On bark of logs of *Pinus palustris*, *P. ponderosa*, *P. echinata*, *P. austriaca*, *P. resinosa*, etc. New Jersey to New Mexico and in Minnesota and Idaho. May to November.

This fine species is intermediate between *M. corium* and



Fig. 5
M. ambiguus.
Spores $\times 870$.
See pl. 20, f. 4.

M. tremellosus; it resembles the former in general aspect and thin fructifications, which are, however, finally much larger than in that species, not quite so soft, with much larger and more rectangular pores, and with the subhymenial layer composed of hyphae having their walls gelatinously modified. The large pores and the gelatinous subhymenial layer are suggestive of *M. tremellosus*, but the fructification of *M. ambiguus* is thin and somewhat pliant when dry and softens upon applying water so that it may be sectioned at once, and the spores are a little longer, broader, and not as curved as those of *M. tremellosus*; with a single exception, it has been collected so far on species of pine, while *M. tremellosus* is usually common on frondose species.

Specimens examined:

- Exsiccati: Ellis, N. Am. Fungi, 925; Ell. & Ev., N. Am. Fungi, 3205; Ravenel, Fungi Car. 1: 24, type distribution under the name *Merulius fugax*; Ravenel, Fungi Am., 217.
- New Jersey: Newfield, J. B. Ellis, in Ellis, N. Am. Fungi, 925, and in Ell. & Ev., N. Am. Fungi, 3205.
- South Carolina: H. W. Ravenel, in Ravenel, Fungi Car. 1: 24; Society Hill, M. A. Curtis, 2399 (in Curtis Herb.).
- Georgia: Darien, H. W. Ravenel, in Ravenel, Fungi Am., 217.
- Florida: Mrs. H. Russell (in N. Y. Bot. Gard. Herb.); on *Quercus*, De Funiak Springs, W. H. Long, 18566 (in Mo. Bot. Gard. Herb., 54936).
- Texas: Quitman, W. H. Long, 12062 (in Mo. Bot. Gard. Herb., 54925, and in N. Y. Bot. Gard. Herb.).
- Michigan: Sailor's Encampment, E. T. & S. A. Harper, 897.
- Minnesota: Cass Lake, J. R. Weir, 8004 (in Mo. Bot. Gard. Herb., 54931).
- Arkansas: Womble, W. H. Long, 19810, 19862 (in Mo. Bot. Gard. Herb., 8631 and 15957, respectively).
- Idaho: Grangeville, J. R. Weir, 8001 (in Mo. Bot. Gard. Herb., 54929). This specimen is referred to *M. ambiguus* with some doubt.
- New Mexico: Pecos National Forest, W. H. Long, 21260 (in Mo. Bot. Gard. Herb., 54932); San Mateo Mountains, W. H. Long, 19579 (in Mo. Bot. Gard. Herb., 54928); Tejano Ex-

periment Station, W. H. Long & P. W. Seay, comm. by W. H. Long, 21485 (in Mo. Bot. Gard. Herb., 54911); Tyom Experiment Station, W. H. Long, 21355, 21867 (in Mo. Bot. Gard. Herb., 54927 and 54926).

6. *M. confluens* Schweinitz, Naturforsch. Ges. Leipzig Schrift. 1: 92. 1822; Fries, Elenchus Fung. 1: 57. 1828; Epicr. 500. 1838; Sacc. Syll. Fung. 6: 411. 1888.

Merulius haedinus Berk. & Curtis, Grevillea 1: 69. 1872; Sacc. Syll. Fung. 6: 414. 1888.—*M. Ulmi* Peck, N. Y. State Mus. Bul. 105: 26. 1906; Sacc. Syll. Fung. 21: 361. 1913.—An *M. sulcatus* Peck, Bot. Gaz. 4: 138. 1879?

Type: in Herb. Schweinitz, a portion in Curtis Herb., and probably in Herb. Fries.

Fructification resupinate, longitudinally effused, coriaceous, soft, thin, the margin free, inflexed, subtomentose, shallowly, concentrically sulcate when broadly reflexed, drying white to pallid neutral gray; the hymenium drying pinkish cinnamon to pecan-brown, reticulately porose with pores about 2–4 to a mm., shallow; in structure 300–500 μ thick, composed of loosely interwoven, hyaline hyphae 3–3½ μ in diameter, incrusted near the hymenium; no cystidia; spores hyaline, even, cylindric, flattened on one side, 4½–5 × 2½ μ .

Fructifications 1–4 cm. in diameter, usually laterally confluent on a horizontal surface for 4–10 cm. and more, the reflexed margin 1–10 mm. broad.

On bark of dead branches of alder, etc., rare on conifers. Canada to Alabama, Tennessee to Nebraska, British Columbia to Oregon, and in Bermuda and Cuba. July to January.

M. confluens has the general aspect of *M. corium*, but is distinguished from that species by frequently a more broadly reflexed margin, which is shallowly, concentrically sulcate when broadly reflexed, by larger and usually deeper pores, by the incrusted hyphae of the subhymenial region, and by the small spores. Dr. House is unable to find the type of *M. sulcatus*

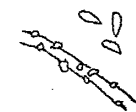


Fig. 6
M. confluens.
Spores, incrusted
hypha × 870.
See pl. 20, f. 5.

in Coll. N. Y. State; there is nothing in the description which shows the species distinct from *M. confluens*.

Specimens examined:

Exsiccati: Ravenel, Fungi Car. 1: 23; originally under the name *Merulius confluens*, which was changed later to *M. corium*; Ravenel, Fungi Car. 4: 8, type distribution of *M. haedinus*.

Canada: Lower St. Lawrence Valley, *J. Macoun*, 8.

Vermont: Middlebury, *E. A. Burt*.

Massachusetts: Boston, *H. Webster*, Boston Mycological Club Herb., 8.

Connecticut: Redding, *L. M. Underwood* (in N. Y. Bot. Gard. Herb.).

New York: Alcove, *C. L. Shear*, 1217; Long Island, *J. H. Barnhart* (in N. Y. Bot. Gard. Herb.); Vaughns, *S. H. Burnham*, type of *M. Ulmi* (in Coll. N. Y. State).

Virginia: *C. L. Shear*, 1143.

North Carolina: Salem, *Schweinitz*, type (in Herb. Schweinitz and in Curtis Herb.); West Raleigh, *W. C. Cromwell* (in N. Y. Bot. Gard. Herb.).

South Carolina: *H. W. Ravenel*, in Ravenel, Fungi Car. 1: 23; Clemson College, *P. H. Rolfs*, 1825.

Florida: *Mrs. H. Russell* (in N. Y. Bot. Gard. Herb.); New Smyrna, *C. G. Lloyd*, 2117.

Alabama: *T. M. Peters*, in Ravenel, Fungi Car. 4: 8; Moulton, *T. M. Peters*, 170 (in Curtis Herb., 3812); Montgomery, *R. P. Burke*, 44, 159 (in Mo. Bot. Gard. Herb., 11740, 44958).

Tennessee: Elkmont, *C. H. Kauffman*, 83 (in Mo. Bot. Gard. Herb., 18641).

Missouri: Creve Coeur, *C. W. Dodge*, 573 (in Mo. Bot. Gard. Herb., 44811).

Kansas: Rockport, *E. Bartholomew* (in Mo. Bot. Gard. Herb., 4073).

British Columbia: Agassiz, *J. R. Weir*, 384 (in Mo. Bot. Gard. Herb., 20634); Sidney, *J. Macoun*, 13 (in Mo. Bot. Gard. Herb., 5731); Vancouver Island, *J. Macoun*, comm. by *J. Dearness*, 28 (in Mo. Bot. Gard. Herb., 19523).

Washington: Bingen, *W. N. Suksdorf*, 748, 850, 887; Cascade Mountains, *C. H. Kauffman*, 15 (in Mo. Bot. Gard. Herb., 17203).

Oregon: Corvallis, *C. E. Owens*, 2086 (in Mo. Bot. Gard. Herb., 44250), and *W. A. Murrill*, 893, 898 (both in N. Y. Bot. Gard. Herb.).

Bermuda: *S. Brown*, *N. L. Britton & F. J. Seaver*, 1421 (in N. Y. Bot. Gard. Herb.).

Jamaica: Cinchona, *W. A. Murrill*, 420 (in N. Y. Bot. Gard. Herb.).

7. *M. pallens* Schweinitz, Am. Phil. Soc. Trans. N. S. 4: 161. 1832. Not *M. pallens* Berkeley, Outl. Brit. Fung. 256. 1860.

Type: in Herb. Schweinitz and a portion in Curtis Herb.

Fructifications resupinate, long and broadly effused, longitudinally confluent, grown out into reflexed pilei on all sides, whitish, minutely tomentose, subimbricate, inflexed; hymenium of type has dried vinaceous-russet, irregularly reticulate, poroid, with shallow pores about 2-3 to a mm.; in structure 300-400 μ thick, with the folds extended out 200 μ more, composed of interwoven, obliquely ascending, hyaline hyphae 3 $\frac{1}{2}$ -4 μ in diameter, granule-incrusted towards the hymenium and intermixed there with fine granular matter, brownish, sometimes turning vinaceous by action of KHO solution on the sections and with brownish droplets in this region in the permanent preparations; spores hyaline, even, flattened on one side, 4 $\frac{1}{2}$ -5 $\frac{1}{2}$ \times 2 $\frac{1}{2}$ μ . See pl. 20, f. 6.

Fructifications were stated by Schweinitz as effused for 15 cm. The resupinate fragment without natural margin in Curtis Herb. is 2 cm. square, and the reflexed fragment has the reflexed portion 7 mm. broad.

On fallen branches. Canada to Texas, and in California.

The general aspect, geographic range, spore characters, and structure of *M. pallens*, with the exception of the brownish hymenial and subhymenial zone in preparations stained with eosin and the vinaceous color change with KHO solution, are so similar to *M. confluens* that it seems highly probable that the former is a vegetative phase of *M. confluens*. This can

be decided by making frequent collections of this species through a season in some locality where it occurs. The Canadian collection cited below is referred to *M. pallens* with doubt, because the specimen is a resupinate fragment not having any portion of its natural margin.

Specimens examined:

Canada: Wakefield, *J. Macoun*, 53 (in N. Y. Bot. Gard. Herb.).

Pennsylvania: Bethlehem, *Schweinitz*, type (portion in Curtis Herb.), and the *Merulius crispatus* of Syn. N. Am. Fungi, 499 (portion in Curtis Herb.).

Louisiana: St. Martinville, *A. B. Langlois*, *am* (in N. Y. Bot. Gard. Herb.).

Florida: West Palm Beach, *R. Thaxter*, 78 (in Mo. Bot. Gard. Herb., 4064, and in Farlow Herb.).

Texas: *Billings*, 78, comm. by Ravenel (in Curtis Herb., under the name *M. corium*).

California: Alcantrar, *C. Wright*, U. S. Pac. Ex. Exped., 254 (in Curtis Herb., under the name *M. corium*).

8. *M. corium* Fries, Elenchus Fung. 1: 58. 1828; Epicr. 500. 1838; Hym. Eur. 591. 1874; Sacc. Syll. Fung. 6: 413. 1888.

Fructification resupinate, effused, coriaceous, soft, thin, the margin at length free, reflexed, villose, white; hymenium reticulately porose, drying pinkish buff to cinnamon, the pores about 3 to a mm., shallow; in structure 300–500 μ thick, composed of loosely interwoven, hyaline hyphae 3–4 μ in diameter, not incrustated, not nodose-septate; no cystidia; spores hyaline, even, cylindric, flattened on one side, $4\frac{1}{2}$ –5 \times $1\frac{3}{4}$ –2 $\frac{1}{2}$ μ

in American collections (6–7 \times 3 μ in the European specimens, but 6–12 \times 2 $\frac{1}{2}$ –4 μ according to Bresadola and Brinkmann).

Fructifications 1–4 cm. in diameter, often laterally confluent on a horizontal surface for 6 cm., the reflexed margin 1–3 mm. broad.

On bark of dead limbs of frondose species. Massachusetts



Fig. 7

M. corium.
Hypha, spores
 \times 870.
See pl. 20, f. 7.

to Texas, Michigan to Nebraska, and British Columbia, Washington, Mexico, Cuba, and Jamaica. Throughout the year. Common.

The fertile specimens distributed by Krieger in his exsiccati agree closely in aspect and structure with immature sterile specimens collected by Murrill near Stockholm and are presumably *M. corium* as known by Fries. The specimens distributed by Berkeley in his British Fungi, 18, as *M. corium*, have subglobose spores 4 μ in diameter and incrustated hyphae and are specifically distinct from the Swedish specimens. For this reason I have omitted citation of European synonymy and illustrations. Our American collections, when fertile, have smaller spores than the Krieger specimens and are tomentose rather than villose when broadly reflexed. The absence of incrustated hyphae in *M. corium* affords a simple means of distinguishing specimens of *M. corium* from *M. confluens* and *M. pallens*.

Specimens examined:

Exsiccati: Ellis, N. Am. Fungi, 316; Ell. & Ev., Fungi Col., 1113; Krieger, Fungi Sax., 1957; Ravenel, Fungi Am., 136. Sweden: Stockholm, *W. A. Murrill* (in N. Y. Bot. Gard. Herb.).

Germany: Saxony, Königstein, *W. Krieger*, in Krieger, Fungi Sax., 1957.

Massachusetts: *Murray*, comm. by Sprague, 1065 (in Curtis Herb.).

New York: White Plains, *L. M. Underwood* (in N. Y. Bot. Gard. Herb.).

New Jersey: Newfield, *J. B. Ellis*, in Ellis, N. Am. Fungi, 316, and Ell. & Ev., Fungi Col., 1113.

District of Columbia: Takoma Park, *C. L. Shear*, 955, 1232.

South Carolina: Aiken, *H. W. Ravenel*, in Ravenel, Fungi Am., 136; Clemson College, *P. H. Rolfs*, 1612.

Florida: New Smyrna, *C. G. Lloyd*, 2133.

Alabama: Auburn, *Alabama Biological Survey*, and *F. S. Earle*, 84 (the latter in N. Y. Bot. Gard. Herb.); Montgomery, *R. P. Burke*, 95, 128 (in Mo. Bot. Gard. Herb., 22317, 22619) and 47 (in Lloyd Herb.).

- Texas: Austin, *W. H. Long*, 12042 (in Mo. Bot. Gard. Herb., 54937).
 Michigan: Ann Arbor, *C. H. Kauffman* (in N. Y. Bot. Gard. Herb.).
 Illinois: Wilmette, *E. T. & S. A. Harper*, 822.
 Missouri: Creve Coeur, *E. A. Burt* (in Mo. Bot. Gard. Herb., 44764).
 Arkansas: Bigflat, *W. H. Long*, 19860 (in Mo. Bot. Gard. Herb., 9139).
 Nebraska: Roco, *C. L. Shear*, 1013.
 British Columbia: Sidney, *J. Macoun*, 75 (in Mo. Bot. Gard. Herb., 5751); Victoria, *J. Macoun*, 578b (in Mo. Bot. Gard. Herb., 1292).
 Washington: Bellingham, *J. R. Weir*, 549 (in Mo. Bot. Gard. Herb., 17795); Seattle, *W. A. Murrill*, 52, 56 (both in N. Y. Bot. Gard. Herb.); Mt. Paddo, *W. N. Saksdorf*, 728.
 Mexico: Guernavaca, *W. A. & E. L. Murrill*, 369 (in N. Y. Bot. Gard. Herb.); Orizaba, *W. A. & E. L. Murrill*, 786 (in N. Y. Bot. Gard. Herb.).
 Cuba: San Antonio de los Baños, Havana Province, *Earle & Murrill*, 97 (in N. Y. Bot. Gard. Herb.).
 Jamaica: Cinchona, *F. S. Earle*, 357 (in N. Y. Bot. Gard. Herb.).

9. *M. sordidus* Berk. & Curtis in Cooke, *Grevillea* 19: 108. 1891; *Sacc. Syll. Fung.* 11: 104. 1895.

Type: type and cotype in Kew Herb. and Curtis Herb.

Fructifications effused, sometimes resupinate and sometimes narrowly reflexed, with the reflexed portion about 3 mm. broad, tomentose on the upper surface, drying cinnamon-buff; hymenial surface drying between vinaceous-brown and Hay's brown, minutely porose in the reflexed specimens with pores about 2-3 to a mm. and so shallow as to be barely outlined by the folds; sections become vinaceous by action of KHO solution; in structure 400-500 μ thick, with the upper surface formed of loosely interwoven, thick-walled, colored hyphae 6 μ in diameter, with the intermediate layer composed of longitudinally arranged, nearly hyaline hyphae 3 μ in diam-

eter, and with the hymenial layer poorly developed and showing here and there only a few small basidia bearing attached spores; these spores hyaline, even, $3 \times 1\frac{1}{2}$ μ , probably immature—published by Cooke as dilute fuscous, 7×5 μ .

The resupinate fructification is 7×4 cm.; two reflexed fructifications are $1\frac{1}{2}$ and $1\frac{1}{2}$ cm. respectively, with the reflexed margin 3 mm. broad.

On wood. Venezuela.

The description of this extra limital species is given, because the species may range further north into the West Indies, Central America or Mexico.

Specimens examined:

Venezuela: *Fendler*, 143—possibly 743, for the first digit is ambiguous on the label—cotype (in Curtis Herb.).

10. *M. deglubens* (Berk. & Curtis) Burt, n. comb.

Phlebia deglubens Berk. & Curtis in Cooke, *Grevillea* 20: 3. 1891; *Sacc. Syll. Fung.* 11: 113. 1895.

Type: in Curtis Herb. and Kew Herb.

Fructification resupinate, effused, narrowly reflexed, the reflexed portion 2-3 mm. broad, drying Sayal-brown, somewhat zonate, radially fibrillose, slightly shining; hymenium drying between light seal-brown and Hay's brown, reticulate-plicate, becoming irregularly porose, with the folds somewhat grown out and crested and with the shallow pores about 4 to a mm.; in structure 400-500 μ thick, with the folds standing out 200-250 μ further, composed of densely arranged, colored, thick-walled hyphae $3\frac{1}{4}$ -4 μ in diameter, not incrustated, not nodose-septate, running parallel with the substratum, curving into the hymenium, and giving their color to the fructification; no cystidia; spores hyaline, even, $3\frac{1}{2} \times 2$ μ .

Fructification $1\frac{1}{2}$ cm. broad, extending 2 cm. along under side of a limb and broken off at both ends.

On frondose limbs. Venezuela.

The description of this extra limital species is given because it may be expected to range further north into the West Indies, Central America, and Mexico, and would be sought

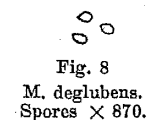


Fig. 8
M. deglubens.
 Spores $\times 870$.

under *Merulius* rather than *Phlebia*, as originally published.

Specimens examined:

Venezuela: *Fendler*, 140, type (in Curtis Herb.).

11. *M. cubensis* Burt, n. sp.

Type: in N. Y. Bot. Gard. Herb.

Fructification resupinate, effused, separable, thin, soft, the margin often free and narrowly reflexed, pubescent, concentrically sulcate when more broadly reflexed, drying whitish to wax-yellow; hymenium drying ochraceous buff to fawn-color, the minute folds about 4 to a mm., sinuous, branching, forming shallow, sinuous pores and then growing out somewhat into granular or irpiciform projections; in structure 300–400 μ thick, with the hyphae longitudinally and densely arranged, thick-walled, hyaline, not incrusted, not nodose-septate, $4\frac{1}{2}$ –5 μ in diameter; no cystidia; spores hyaline, even, allantoid, $3 \times \frac{1}{2}$ μ , strongly curved.

Fructifications $1\frac{1}{2}$ –4 cm. in diameter, sometimes laterally confluent, with the reflexed margin 1–4 mm. broad.

On bark of dead wood of a frondose species in low, dense, virgin forest. Cuba. March.

This species is related to *M. tremellosus* and *M. ambiguus*, from both of which it is distinct by the absence of a gelatinous layer, and from the former, furthermore, by its thin, pliant fructification and minute folds and pores and from the latter by minute folds and pores, very small, allantoid spores, and coarse hyphae.

Specimens examined:

Cuba: Alto Cedro, Santiago de Cuba Province, *Earle & Merrill*, 554, type (in N. Y. Bot. Gard. Herb.).

12. *M. niveus* Fries, *Elenchus Fung.* 1: 59. 1828; *Hym. Eur.* 592. 1874; *Sacc. Syll. Fung.* 6: 414. 1888.

Plicatura Alni Peck, N. Y. State Mus. Rept. 24: 76. 1872.—*Trogia Alni* Peck, N. Y. State Mus. Rept. 29: 66. 1878; *Sacc. Syll. Fung.* 5: 637. 1887.—*Plicatura nivea* (Fries) Karsten,

Finl. Basidsv. 342. 1889; *Murrill, N. Am. Fl.* 9: 163. 1910.—*An Merulius rimosus* Berk. in *Cooke, Grevillea* 19: 108. 1891?

Fructification effused, reflexed, thin, membranaceous, soft, drying whitish to pinkish buff; hymenium contracting in drying and becoming fissured, drying cream-color to ochraceous tawny, with the folds narrow, rugaeform, interrupted, somewhat gyrose but not forming pores; in structure 1–1 $\frac{1}{4}$ mm. thick, composed of loosely interwoven, rather rigid, hyaline hyphae 3–4 μ in diameter, which bear a very dense hymenium; no cystidia; spores hyaline, even, slightly curved, $4\frac{1}{2} \times \frac{1}{2}$ –1 μ , borne four to a basidium.

Fructification 1–2 $\frac{1}{2}$ cm. in diameter, sometimes laterally confluent, with the reflexed margin 1–10 mm. broad.

On bark of dead alders. Newfoundland to New York and in Michigan and British Columbia. March to December.

This species is characterized by its flabby structure, pale color, very slender spores, and occurrence on alder. It has been regarded by some mycologists as cogeneric with *Trogia crispa*, but the folds are less lamellaeform than those of *Merulius aureus*. I have not been able to study the type in Kew Herbarium of *Merulius rimosus*, collected in northern New York by Ellis, and the cotype cannot be found in New York Botanical Garden Herbarium, but the description of the species applies well to *M. niveus*.

Specimens examined:

Exsiccati: Ell. & Ev., N. Am. Fungi, 2017; de Thümen, Myc. Univ., 804, 907.

Finland: Mustiala, *P. A. Karsten*, in de Thümen, Myc. Univ., 907.

Newfoundland: *A. C. Waghorne*, 4 (in Mo. Bot. Gard. Herb., 3742).

Canada: Billings Bridge, *J. Macoun*, 210 (in N. Y. Bot. Gard. Herb.).

Ontario: Toronto, Lorne Park, *J. H. Faull*, Univ. Toronto Herb., 360 (in Mo. Bot. Gard. Herb., 44844).

Maine: Orono, *F. L. Harvey*, in Ell. & Ev., N. Am. Fungi, 2017; Harrison, *J. Blake*, comm. by P. L. Ricker.



Fig. 10

M. niveus.
Spores $\times 870$.
See pl. 20, f. 9.



Fig. 9

M. cubensis.
Spores $\times 870$.
See pl. 20, f. 8.

Vermont: Middlebury, *E. A. Burt*; Ripton, *E. A. Burt*.
 Connecticut: West Goshen, *L. M. Underwood* (in *N. Y. Bot. Gard. Herb.*).
 New York: Albany, *C. H. Peck*, in de Thümen, *Myc. Univ.*, 804, under the name *Trogia Alni*; North Elba, *C. H. Kauffman*, 2 (in *Mo. Bot. Gard. Herb.*, 21400).
 Michigan: Isle Royal, *Allen & Stuntz*, 19, *Univ. of Wisconsin Herb.*
 British Columbia: *J. Macoun*, comm. by *J. Dearness*, 3862 (in *Mo. Bot. Gard. Herb.*, 12239).

13. *M. gyrosus* Burt, n. sp.

Type: in *Mo. Bot. Gard. Herb.*

Fructification resupinate, effused, soft, separable, membranaceous, the margin cottony, whitish, here and there free; hymenium drying Capucine-buff, even near the margin, gyrose-plicate in the middle region, with the folds but little elevated, obtuse, not forming pores; in structure 400 μ thick, with the folds standing out 200–400 μ further, composed of interwoven, branching, hyaline hyphae 3½–4 μ in diameter, nodose-septate, incrusted near the substratum; no cystidia; spores hyaline, even, often slightly curved, 4½–5 × 1–2 μ .

Fructification 3 cm. long, 1½ cm. broad, fractured at both ends.

On rotten birch log. Michigan. August. Rare.

This species is related to *M. fugax*, but its hymenium has stouter, more obtuse folds than those of *M. fugax*, and the spores are of the slender, curved type. *M. borealis* of Lapland has very similar aspect and coloration but with thinner folds, non-incrusted hyphae, and longer spores; perhaps future collections of *M. gyrosus* may show that these differences are not constant.

Specimens examined:

Michigan: Vermillion, *A. H. W. Povah*, 7, type (in *Mo. Bot. Gard. Herb.*, 9088).



Fig. 11
M. gyrosus.
 Spores × 870.
 See pl. 20, f. 10.

14. *M. sororius* Burt, n. sp.

Type: in *Burt Herb.*

Fructification resupinate, effused, membranaceous, thin, separable, the margin white, narrow, byssoid, often barely free but not reflexed; hymenium drying cartridge-buff, waxy, shining, gyrose-plicate with slightly elevated, scattered folds, not forming pores; in structure 100–200 μ thick, with the folds standing out 200–400 μ ; hyphae hyaline, curving rather than straight, only rarely nodose-septate, not incrusted, 2½–3 μ in diameter towards the hymenium, 4½–5 μ near the substratum; no cystidia; spores hyaline, even, flattened on one side, 3–4 × 2 μ .

Fructifications small, orbicular, 3–5 mm. in diameter, becoming laterally confluent into masses up to 3 cm. long, 5–7 mm. broad.

On decayed, decorticated pine wood. Maryland. November. Rare.

This species is related to *M. fugax* in gyrose-plicate hymenium, cottony margin, and being separable from substratum, but it is paler and thinner than *M. fugax*, with smaller, slenderer spores, with hyphae not incrusted and only rarely nodose-septate. Furthermore, the fructifications form by confluence of many small fructifications and do not cover large areas in sheet-like masses.

Specimens examined:

Maryland: Takoma Park, *C. L. Shear*, 1135, type.

15. *M. lichenicola* Burt, n. sp.

Type: in *Mo. Bot. Gard. Herb.* and *N. Y. State Herb.*

Fructification resupinate, effused, composed of cobwebby filaments, which form a perforate, thin, tender, whitish membrane loosely borne on the substratum, the margin cobwebby; hymenium forming slightly elevated, reticulate, colonial buff folds, then imperfectly porose, with the pores shallow, angular, about 4 to a mm.; in structure 45 μ thick, with folds standing up 90–120 μ further,



Fig. 12
M. sororius.
 Spores × 870.
 See pl. 21, f. 11.



Fig. 13
M. lichenicola.
 Spores × 870.
 See pl. 21, f. 12.

consisting of a few hyaline hyphae 2–3 μ in diameter, thin-walled, not incrustated, nodose-septate, often collapsed; no cystidia; basidia clavate; spores hyaline, even, subglobose, apiculate at base, $2\frac{1}{2}$ μ in diameter.

Fructification 13 mm. long, 2–3 mm. broad.

Running over podetia of the lichen, *Stereocaulon*. New York. September. Rare.

This *Merulius* may be recognized by the tenuity and cobwebby structure of the membranous portion of its fructification in contrast with the more compact, elevated, colonial buff folds, by the small subglobose, hyaline spores, and by occurrence on a lichen, perhaps.

Specimens examined:

New York: North Elba, *C. H. Peck*, *P33*, type (in Mo. Bot. Gard. Herb., 43612, and N. Y. State Herb.).

16. *M. dubius* Burt, n. sp.

Type: in N. Y. Bot. Gard. Herb.

Fructification resupinate, effused, fleshy, separable, translucent when fresh, drying from pinkish buff to pale ecru-drab, the margin determinate, lobed, barely free in some places;



Fig. 14

M. dubius.
Spores $\times 870$.
See pl. 21, f. 13.

hymenium reticulate-plicate near the margin, with the folds growing out to form oblique angular pores 2–3 mm. long, about 3–4 to a mm., with the dissepiments thin, edges entire and acute; in structure 150 μ thick, composed of hyaline hyphae running parallel with the

substratum and crowded densely together, 3 μ in diameter, not incrustated, not nodose-septate; spores hyaline, even, subglobose, $3\frac{1}{2}$ –4 μ in diameter, borne four to a basidium.

Fructifications 4–8 cm. long, $2\frac{1}{2}$ –4 cm. broad.

On rotten stump in beech woods. New York? September.

The specimens of this species were growing on the side of the stump, with their tubes nearly vertical and showing full length of pores and their mouths in only a few small portions of the best-developed fructification. Sections from near the margin where the hymenium is merely reticulate-plicate show the hymenium well developed and with spores borne on the

basidia in abundance, hence I conclude that this species is a *Merulius* rather than a *Poria*. It is chiefly characterized by translucence when fresh, changing to pinkish buff or a little darker on drying, by longer tubes than those of any other species known to me, and by the globose, hyaline spores. It is possible that this species may have been already published as a *Poria*, but if so, I am unaware of the fact.

Specimens examined:

New York?: *W. A. Merrill*, type (in N. Y. Bot. Gard. Herb.).

17. *M. bellus* Berk. & Curtis, *Grevillea* 1: 69. 1872; Sacc. *Syll. Fung.* 6: 418. 1888.

Type: type and cotype in Kew Herb. and Curtis Herb.

Fructification resupinate, effused, membranaceous, soft, separable, the margin byssoid, whitish; hymenium drying pale olive-buff to warm buff and ochraceous buff, even at first, becoming minutely pitted with very shallow, angular pores about 2–4 to a mm.; in structure 100–200 μ thick, with the folds standing out up to 200 μ more, composed of loosely interwoven, rather straight, hyaline hyphae 3 μ in diameter, which branch at a right angle and are incrustated towards the hymenium, not usually nodose-septate, and form a narrow, more or less interrupted, Isabella-colored subhymenial zone in preparations stained with eosin; no cystidia; spores hyaline, even, flattened on one side, $3\frac{1}{2}$ – $4\frac{1}{2}$ \times $1\frac{1}{2}$ –2 μ .

Fructifications 2–7 cm. long, 1–3 cm. broad.

On wood and bark of pine, spruce, hemlock, and cedar. Vermont to Alabama and westward to Michigan. August to October. Rare.

This species may be distinguished from *M. ceracellus* by its somewhat pulverulent, rather than waxy, surface, occurrence on coniferous wood and bark, straighter and incrustated hyphae, and fructification separable as a membrane. It belongs in the group with *M. fugax*, from which it differs in having pores, smaller spores not broadly oval or subglobose,



Fig. 15

M. bellus.
Spores $\times 870$.
See pl. 21, f. 14.

hyphae minutely incrustated towards the hymenium and not regularly nodose-septate.

Specimens examined:

Exsiccati: Ravenel, *Fungi Am.*, 428, in *Mo. Bot. Gard. Herb.* copy and in Burt Herb. copy but not in the copy in Farlow Herb.

Vermont: Grand View Mt., *E. A. Burt.*

New York: Albany, *H. D. House & J. Rubinger* (in *Mo. Bot. Gard. Herb.*, 16048); Orient Point, *R. Latham*, comm. by N. Y. State Herb., P 66 (in *Mo. Bot. Gard. Herb.*, 43604).

South Carolina: Aiken, *H. W. Ravenel*, in *Ravenel, Fungi Am.*, 428.

Alabama: *Peters, 1043*, cotype (in *Curtis Herb.*).

Michigan: New Richmond, *C. H. Kauffman, 45* (in *Mo. Bot. Gard. Herb.*, 11278).

18. *M. Ravenelii* Berkeley, *Grevillea* 1: 69. 1872; *Sacc. Syll. Fung.* 6: 417. 1888.

Type: type distribution in *Ravenel, Fungi Car.* 4: 9.

Fructification resupinate, effused, 1 mm. thick when dry, soft, the margin white, tomentose, and, with the subiculum, thick and spongy; hymenium drying Hay's brown to dark vinaceous-brown, even at first, then reticulate-plicate, at length porose with nearly equal, angular, shallow pores about 3 to a mm.; in structure 3 mm. thick when wet, composed of loosely interwoven, thick-walled hyphae about $4-4\frac{1}{2}$ μ in diameter, not incrustated, not nodose-septate, which are hyaline elsewhere but dark-colored in the sub-hymenium and hymenium, and, with the colored, short-celled, filiform paraphyses, give the dark color to the hymenium; no cystidia; spores hyaline, even, allantoid, $3\frac{1}{2}-4 \times \frac{1}{2}-1\frac{1}{2}$ μ .

Fructifications 4-12 cm. long, 2-6 cm. broad.

On bark of pine and spruce logs. New York and South Carolina. August and September.

M. Ravenelii is distinct from the other resupinate species of this genus by its thick structure, dark fructification with



Fig. 16

M. Ravenelii.
Spores, paraphysis
 $\times 870$.
See *pl. 21, f. 15.*

broad, white margin, small, hyaline, allantoid spores, and colored paraphyses. In its peculiar color and margin, it strikingly resembles *Polyporus haematodus* Rost. (= *Polyporus incarnatus* Karst.) as received from Romell, and which I find in a very scanty specimen under the name *Merulius serpens* in Rabenhorst, *Herb. Myc.*, 6, and Sydow, *Myc. March.*, 3327, but all these European specimens are truly porose from the first, have thick dissepiments, and owe their dark color to dark, incrusting granules upon the hyphae.

Specimens examined:

Exsiccati: Ravenel, *Fungi Car.* 4: 9, originally issued under the name *Merulius serpens* but changed later.

New York: Clearwater, Adirondack Mountains, *G. F. Atkinson*, Bot. Dept. Cornell Univ., 4608.

South Carolina: *H. W. Ravenel*, in *Ravenel, Fungi Car.* 4: 9, type distribution; Santee Canal, *H. W. Ravenel, 658* (in *Curtis Herb.*), and *Curtis Herb.*, 2965 (in *Curtis Herb.*).

19. *M. sulphureus* Burt, n. sp.

Type: in Farlow Herb. and *Mo. Bot. Gard. Herb.*

Fructification resupinate, effused, thin, membranaceous, separable, somewhat pulverulent, drying between primrose-yellow and naphthalene-yellow throughout, the margin byssoid, concolorous; hymenium reticulate-plicate, becoming shallowly porose, with the pores subequal, angular, about 2-3 to a mm.; in structure 250-300 μ thick, with the folds standing out up to 400 μ further, composed of loosely interwoven, rather stiff, hyaline hyphae $3-4\frac{1}{2}$ μ in diameter, not incrustated, not nodose-septate; no cystidia; spores hyaline, even, $4\frac{1}{2}-6 \times 2\frac{1}{2}-3\frac{1}{2}$ μ .

Fructifications 3-5 cm. long, 1-2 cm. broad.

On rotten frondose wood. Florida. Autumn. Rare.

This *Merulius* should be easily recognized at sight by its resemblance in color, texture, and habit to *Coniophora byssoidea*, but differing by reticulate folds, pores, and microscopic structure.



Fig. 17.

M. sulphureus.
Spores $\times 870$.
See *pl. 21, f. 16.*

Specimens examined:

Florida: Palm Beach, *R. Thaxter*, 54, type (in Farlow Herb. and in Mo. Bot. Gard. Herb., 43891).

20. *M. albus* Burt, n. sp.

Type: in Mo. Bot. Gard. Herb.

Fructification resupinate, effused, thick, somewhat coriaceous-fleshy, separable, white when received, becoming somewhat cartridge-buff in the herbarium, the margin thinning out; hymenium reticulate-plicate near the margin, at the center porose with shallow, angular, unequal pores about 1 or 2 to a mm.; in structure 700–800 μ thick, with the folds standing out up to 300–500 μ further, composed of hyaline, thick-walled, compactly interwoven, stiff hyphae 4½–5 μ in diameter towards the hymenium, with occasional hyphae 7–8 μ in diameter near the substratum, not incrustated, not nodose-septate; no cystidia; spores hyaline, even, 6–7½ × 3–3½ μ , flattened on one side.

Fructification 4½–7 cm. long, 2½–4 cm. broad.

On pine bark and adjacent earth. Alabama. June. Rare.

M. albus may be recognized among our resupinate, white-spored species by its white color, firm structure, thick fructification, large angular pores, coarse hyphae, and much larger spores than other species of this section. It approaches *Poria* but should, I believe, be regarded as a *Merulius*.

Specimens examined:

Alabama: Montgomery, *R. P. Burke*, 136 bis, type (in Mo. Bot. Gard. Herb., 10343).

21. *M. tomentosus* Burt, n. sp.

Type: in Mo. Bot. Gard. Herb.

Fructification resupinate, effused, adnate, tomentose, drying between warm buff and cream-buff, the margin rather thick, determinate, tomentose, concolorous; hymenium sinuous-plicate and reticulate-plicate, becoming somewhat sinuous-porose, with the pores shallow, about 3 to a mm., not glabrous; in structure 140 μ thick,



Fig. 18

M. albus.
Spores × 870.
See pl. 21, f. 17.



Fig. 19

M. tomentosus.
Spores × 870.
See pl. 21, f. 18.

with the folds standing out 100–300 μ further, composed of suberect, closely crowded, thin-walled, hyaline hyphae 2½–3 μ in diameter, incrustated, occasionally nodose-septate; spores hyaline, even, flattened on one side, 6 × 2½–3 μ .

Fructifications 2–3 cm. long, 1–1½ cm. broad.

On bark of decaying frondose wood. British Columbia. January. Probably rare or local.

This species is well characterized by its adnate habit, tomentose surface, sinuous pores and folds—the latter with thick edges—warm buff color, and erect, incrustated hyphae.

Specimens examined:

British Columbia: Sidney, *J. Macoun*, 15, type (in Mo. Bot. Gard. Herb., 5733).

22. *M. hirtellus* Burt, n. sp.

Type: type in Farlow Herb. and Mo. Bot. Gard. Herb.

Fructification resupinate, effused, adnate, thin, the margin byssoid, drying vinaceous-gray; hymenium light buff and minutely pitted when young or near the margin, then becoming pinkish buff, waxy, reticulately plicate and shallowly porose with angular pores about 2 to a mm.; in structure 300–400 μ thick, with the folds standing out 50–200 μ more, composed of loosely interwoven, hyaline hyphae 3–3½ μ in diameter, not nodose-septate, occasionally incrustated in the tramal tissue of the folds but not elsewhere; cystidia are weak, cylindrical, obtuse, granule-incrustated hairs 3–4 μ in diameter, emerging 15–30 μ from the folds; spores hyaline, even, ellipsoidal, 3–3½ × 1½–2 μ as seen on basidia; in preparations stained with eosin a narrow subhymenial zone is stained Isabella-color temporarily.

Fructifications 1½–4 cm. long, 1–1½ cm. broad.

On frondose wood. Massachusetts. November. Rare.

Only two fructifications of this species were collected. Both have the central portion of the fructification pinkish buff and

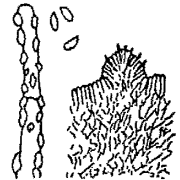


Fig. 20

M. hirtellus.
Protruded part of
cystidium, spores
× 870; section of
fructification with
cystidia on fold
× 45. See pl. 21,
f. 19.

the margin vinaceous-gray—a color contrast by which this species is noteworthy—but in addition hair-like cystidia are present on the convex edges of the folds; cystidia have been found in but four other species of *Merulius* which I have studied.

Specimens examined:

Massachusetts: Sharon, A. P. D. Piguet, type (in Farlow Herb., 174, and in Mo. Bot. Gard. Herb., 54974).

23. *M. Farlowii* Burt, n. sp.

Type: in Farlow Herb. and in Mo. Bot. Gard. Herb.

Fructification resupinate, effused, adnate, glabrous, very thin, the margin thinning out, narrow, byssoid, whitish; hymenium drying between drab-gray and ecru-drab, even near the margin, becoming reticulate-plicate, porose in the central region, with the subequal, angular, shallow pores about 3 or 4 to a mm.; in structure 50 μ thick, with the folds standing out up to 150 μ further, composed of a very few hyphae running along the substratum and bearing a broad, dense hymenium; hyphae hyaline, not incrustated, rarely nodose-septate, thin-walled, collapsed; cystidia present on the folds in the form of scattered, flexuous, tapering, non-incrustated hairs 2½ μ in diameter, emerging up to 20 μ ; spores hyaline, even, flattened on one side, 3 × 1½ μ ; in preparations stained with eosin a narrow subhymenial zone is stained Isabella-color temporarily.

Fructification 7 cm. long, 2½ cm. broad.

On *Pinus*. New Hampshire. August. Rare.

M. Farlowii belongs in the group with *M. ceracellus* but is of different color from that species, does not crack and scale off from the substratum, and has cystidia; from *M. hirtellus*, which has cystidia, the present species differs in coloration, in being adnate, in being distinctly angular-porose, and in not having its cystidia incrustated. What I understand from European specimens to be *M. crispatus* Müller, Flora Danica, pl. 716, f. 2, has a thicker fructification, larger pores and spores, and lacks cystidia.



Fig. 21

M. Farlowii.
Spores × 870.
See pl. 21, f. 20.

Specimens examined:

New Hampshire: Lonely Lake, Chocorua, W. G. Farlow, type (in Farlow Herb. and in Mo. Bot. Gard. Herb., 44965).

24. *M. rugulosus* Berk. & Curtis, Linn. Soc. Bot. Jour. 10 : 323. 1868; Sacc. Syll. Fung. 6 : 413. 1888.

Corticium saccharinum Berk. & Curtis, Linn. Soc. Bot. Jour. 10 : 336. 1868; Sacc. Syll. Fung. 6 : 622. 1888.

Type: type and cotype in Kew Herb. and Curtis Herb.

Fructification resupinate, effused, coriaceous-fleshy, the margin rather thick, lobed, colored like the hymenium; hymenium drying cream-buff and ochraceous salmon to tawny olive, somewhat pulverulent, even at first, then somewhat gyrose-plicate and becoming reticulate and imperfectly and shallowly porose with pores about 1 to a mm.; in structure 200–400 μ thick, with densely arranged, obliquely ascending, interwoven, thick-walled, hyaline hyphae 4–4½ μ in diameter, not incrustated, among which in the subhymenial region and hymenium are numerous clavate, flexuous, yellowish-colored gloeocystidia 60–100 × 8–10 μ ; spores hyaline, even, flattened on one side, 7–8½ × 4–4½ μ .



Fig. 22

M. rugulosus.
Gloeocystidium × 510; spores × 870.
See pl. 21, f. 21.

Commencing growth in small orbicular patches which become confluent in fructifications perhaps 7 cm. long, 5 cm. broad.

On dead wood and bark of frondose species. Cuba and Jamaica. January to March. Probably frequent.

Fully developed specimens of this species are easily recognized at sight by their rugulose surface, cream-buff color, and firm structure. In the less-developed stage with the hymenium nearly even, the colored gloeocystidia, as seen best in lactic acid preparations, afford a positive character by which the species may be separated from Cuban *Corticiums* and *Peniophoras*.

Specimens examined:

Cuba: *C. Wright*, 245, cotype (in Curtis Herb.), and 569, cotype of *Corticium saccharinum* (in Curtis Herb.); Alto Cedro, *L. M. Underwood & F. S. Earle*, 1527A, N. Y. Bot. Gard. Herb.; Ceballos, *C. J. Humphrey*, 2582 (in Mo. Bot. Gard. Herb., 16058); Ciego de Avila, *F. S. Earle & W. A. Murrill*, 612, 620, N. Y. Bot. Gard. Herb.; Herradura, *F. S. Earle & W. A. Murrill*, 109, N. Y. Bot. Gard. Herb.; San Diego de los Baños, *F. S. Earle & W. A. Murrill*, 226, 315, N. Y. Bot. Gard. Herb.

Jamaica: Troy and Tyre, Cockpit Country, *W. A. Murrill & W. Harris*, 918, 965, N. Y. Bot. Gard. Herb.

25. *M. rufus* Persoon, Syn. Fung. 498. 1801; Fries, Syst. Myc. 1: 327. 1821; Elenchus Fung. 1: 63. 1828; Epicr. 502. 1838; Hym. Eur. 593. 1874; Sacc. Syll. Fung. 6: 417. 1888; Bresadola, Ann. Myc. 1: 83. 1903.

Xylomyzon rufum Persoon, Myc. Eur. 2: 31. 1825.—*X. isoporum* Persoon, Myc. Eur. 2: 33. pl. 16. f. 1, 2. 1825.

Illustrations: Persoon, Myc. Eur. 2: pl. 16. f. 1, 2.

Type: authentic specimen probably in Persoon Herb. in Leiden.

Fructification resupinate, effused, waxy-soft, the margin somewhat naked and colored like the hymenium; hymenium drying fawn-color to carob-brown and Natal-brown, porose, with the equal, angular pores about 2 to a mm.; in structure about 100–300 μ thick, with the folds standing out up to 300 μ further, composed of loosely interwoven, hyaline hyphae 3–3½ μ in diameter, not incrustated, not nodose-septate, not forming a gelatinous layer; no cystidia; spores hyaline, even, slightly curved, 4–4½ × 1½–2½ μ .

On decaying pine and frondose wood. Vermont, Illinois, and Cuba. Rare.

Herbarium specimens of *Merulius rufus* have the color and aspect of dried cartilage. The infrequency of specimens of this species in herbaria may be due to the specimens having been passed by as immature *M. tremellosus* or *M. ambiguus*,



Fig. 23

M. rufus.
Spores × 870.
See pl. 21, f. 22.

from both of which this species differs by being truly resupinate, by having smaller, equal pores, and by not having a gelatinous layer.

Specimens examined:

Sweden: Stockholm, *L. Romell*, 391; Upsala, *C. G. Lloyd*, 08430 (in Lloyd Herb.).

Germany: Westfalen, *W. Brinkmann*, comm. by G. Bresadola.

Vermont: Middlebury, *E. A. Burt*.

Illinois: River Forest, *E. T. & S. A. Harper*, 966.

Cuba: Managua, Havana Province, *Earle & Murrill*, 13 (in N. Y. Bot. Gard. Herb.).

26. *M. ceracellus* Berk. & Curtis, Grevillea 1: 69. 1872; Sacc. Syll. Fung. 6: 418. 1888.

Type: type and cotype in Kew Herb. and Curtis Herb.

Fructification wholly resupinate, adnate, thin, the margin thin, whitish; hymenium drying ochraceous cream-buff to pinkish buff, rarely paler, even at first, becoming minutely pitted with pores about 4–6 to a mm., contracting in drying and cracking so as to show the cottony subiculum and sometimes flaking away from the substratum; in structure 60–200 μ thick, with the folds standing out up to 140 μ further, composed of interwoven, hyaline hyphae 2–3 μ in diameter, not incrustated, not usually nodose-septate; with a more or less interrupted, Isabella-colored subhymenial zone in preparations stained with eosin; no cystidia; spores hyaline, even, flattened on one side, 4–4½ × 1½–2 μ .

Fructifications 2½–5 cm. long, 1–2 cm. broad.

Under side of decaying limbs of oak and other frondose species. Canada to Alabama and in New Mexico and Washington. July to March. Common.

M. ceracellus is related to specimens from Sweden, communicated by Romell as *M. serpens*, but our American specimens have smaller and shallower pores, are thinner, have hyphae which are usually not nodose-septate, and in my stained preparations show only here and there an incomplete, Isabella-colored zone confined to the subhymenial region. In



Fig. 24

M. ceracellus.
Spores × 870.
See pl. 21, f. 23.

the Swedish specimens of *M. serpens* received from Romell the pores are about 2-3 to a mm., the fructification is about 400 μ thick, has an Isabella-colored middle zone, and its hyphae are regularly nodose-septate. Specimens of *M. serpens* as understood by Bresadola and collected by him at Trento, Austria-Hungary, have hair-like cystidia and lack an Isabella-colored middle zone in the stained sections. *M. ceracellus* appears to be a well-characterized American species.

Specimens examined:

Exsiccati: Ell. & Ev., N. Am. Fungi, 2603; Ell. & Ev., Fungi Col., 1114.

Canada: J. Macoun, 2, 53, 89; Hull, J. Macoun, 174 (in N. Y. Bot. Gard. Herb.).

New Hampshire: Chocorua, W. G. Farlow, 6, an unnumbered specimen, and c5 (the latter two in Mo. Bot. Gard. Herb., 8639 and 44040).

Vermont: Middlebury, C. G. Lloyd, 07201 (in Lloyd Herb.).

New York: Altamont, E. A. Burt; North Elba, C. H. Kauffman, 12 (in Mo. Bot. Gard. Herb., 16880); Saranac Lake, C. H. Peck, 10.

New Jersey: J. B. Ellis, in Ell. & Ev., N. Am. Fungi, 2603, Fungi Col., 1114, in Burt Herb., and (in Lloyd Herb., 2140).

Pennsylvania: Bethlehem, Schweinitz, the *Polyporus xylostromeus* of Schweinitz, Syn. N. Am. Fungi, No. 465 (in Curtis Herb.).

South Carolina: Society Hill, M. A. Curtis, 2802, cotype (in Curtis Herb.).

Alabama: Peters, 1065 (in Curtis Herb.).

West Virginia: Eglon, C. G. Lloyd, 1407 (in Lloyd Herb.).

Kentucky: Crittenden, C. G. Lloyd, 07348 (in Lloyd Herb.).

New Mexico: Sulphur Canyon, W. H. Long, 21406 (in Mo. Bot. Gard. Herb., 54975).

Washington: Chehalis, C. J. Humphrey, 1286.

27. *M. lacrymans* Wulfen ex Fries, Syst. Myc. 1: 328. 1821; Elenchus Fung. 1: 59. 1828; Hym. Eur. 594. 1874.

Boletus lacrymans Wulfen in Jacquin, Misc. Austr. 2: 111. pl. 8. f. 2. 1781.—*Merulius destruens* Persoon, Syn. Fung. 496.

1801.—*Xylomyzon destruens* Persoon, Myc. Eur. 2: 27. 1825. —*Merulius vastator* Tode, Halle Naturforsch. Ges. Abhandl. 1: 351. pl. 2. f. 1, 2. 1783; Persoon, Syn. Fung. 497. 1801.—*M. domesticus* Falck in Möller's Hausschwammforsch. 6: 53-55. text f. 12. pl. 1-3, 8. 1912.

Illustrations: Jacquin, loc. cit.; Boudier, Icones Myc. 1: pl. 165; Dufour, Atlas Champ. pl. 65; Fl. Dan. pl. 2026; Fries, Sv. Atl. Svamp. pl. 70; Gillet, Champ. Fr. Hym.; Krombholz, Abbild. und Beschr. pl. 46. f. 1, 2; Patouillard, Tab. Anal. Fung. f. 132; Falck in Möller's Hausschwammforsch. 6: text f. 12. pl. 1-3, 8; Lloyd, Myc. Notes 44: 616. text f. 872.

Fructifications large, resupinate, effuso-reflexed or producing stalked tubercles from a medial placenta, thick, spongy-fleshy, moist, yellow-ferruginous, drying Brussels-brown to warm sepia, the margin tumid, tomentose, white; hymenium with folds large, porose, and gyrose-dentate, the pores about 1-2 mm. in diameter and of the same depth or half as deep; in structure ranging from 2 to 10 mm. thick, consisting mostly of the layer bearing the hymenium—this layer composed of densely arranged, interwoven, nodose-septate hyphae, of which some are colored like the spores, thick-walled, 5-6 μ in diameter, and the others are hyaline, 4-4½ μ in diameter, and occur between the colored hyphae and gradually predominate towards the hymenium; no cystidia; spores warm sepia in a spore collection, citron-yellow under the microscope, even, 9-10½ × 5½-6 μ , somewhat flattened on one side.

Fructifications large, 8-15 cm. in diameter, up to 1 cm. or more thick when growing.

Under side of coniferous logs in woods, usually under floors and timbers in buildings and very destructive to wood. Canada and Connecticut, westward to Arizona. June to January. Rare.

The distinguishing characters of *M. lacrymans* are its very large, thick, fleshy fructifications and its hymenium which dries rust-colored—nearly Brussels-brown—and is either somewhat regularly porose with large and rather deep pores



Fig. 25
M. lacrymans.
Spores × 870.
See pl. 21, f. 24.

or has the dissepiments grown out into raduloid teeth. The layer bearing the hymenium is very thick—2 mm. thick in the specimen in Krieger's *Fungi Sax.*, 420—and is composed of intermixed, densely arranged hyphae, both colored and hyaline, as shown by Falcik in pl. 8, cited above. The colored hyphae are not differentiated quite to the hymenium in the European specimens which I have examined and do not extend quite as near to it in our American specimens cited below as in the European ones, but all these specimens agree in having such a broad, dense layer of fleshy structure; this layer appears to be a good histological character for distinguishing *M. lacrymans* from other species with colored spores. *M. americanus* has hymenial configuration and coloration like *M. lacrymans*, but is very thin and has its broad layer of intermixed colored and hyaline hyphae next to the substratum and with these hyphae loosely interwoven. The raduloid teeth develop when growing on an inclined substratum.

Specimens examined:

Exsiccati: Bartholomew, *Fungi Col.*, 5036; Krieger, *Fungi Sax.*, 120, 420, 1911; Linhart, *Fungi Hung.*, 443.

Germany: locality not given, *R. Hartig*, comm. by H. von Schrenk (in *Mo. Bot. Gard. Herb.*, 42955); Königstein, Saxony, *W. Krieger*, in *Krieger, Fungi Sax.*, 120, 420; Sächs Schweiz, *W. Krieger*, in *Krieger, Fungi Sax.*, 1911.

Austria-Hungary: Petrovzseny, *G. Linhart*, in *Linhart, Fungi Hung.*, 443.

Canada: London, Ontario, *J. Dearness* (in *Mo. Bot. Gard. Herb.*, 9446) and in Bartholomew, *Fungi Col.*, 5036.

Connecticut: Bridgeport, *G. P. Clinton* (in *Clinton Herb.*).

New York: New York, *H. J. Banker* (in *N. Y. Bot. Gard. Herb.*).

Illinois: Cobden, *F. S. Earle* (in *Mo. Bot. Gard. Herb.*, 54909).

New Mexico: Senorito, *M. Bletcher*, comm. by W. H. Long, 21454 (in *Mo. Bot. Gard. Herb.*, 54916).

Arizona: Fort Valley Experiment Station, *W. H. Long*, 21462 (in *Mo. Bot. Gard. Herb.*, 54917).

28. *M. aureus* Fries, *Elenchus Fung.* 1: 62. 1828; *Hym. Eur.* 592. 1874; *Sacc. Syll. Fung.* 6: 415. 1888.

M. vastator Fries, *Syst. Myc.* 1: 329. 1821, but not of Tode. Illustration: *Fl. Dan. pl. 2027, f. 2 super.*

Type: authentic specimen unknown to me.

Fructification resupinate, effused or sometimes effuso-reflexed with a narrowly reflexed margin, membranaceous, soft, cottony next the substratum and on upper side of the reflexed portion, readily separable, margin and upper surface of pileus drying buff-yellow; hymenium drying ochraceous orange to russet, radiately plicate-porose, gyrose-crisped, the folds about $\frac{1}{2}$ –1 mm. apart, with the radiate or longitudinal folds the more prominent at first and towards the margin, the edges thin and acute; in structure 300–400 μ thick, with the folds standing out up to 1 mm. more, composed of loosely interwoven, nodose-septate hyphae $2\frac{1}{2}$ –4 μ in diameter; spores cylindric, even, $3\text{--}4\frac{1}{2} \times 1\frac{1}{2}$ –2 μ , very pale, slightly colored and concolorous with the basidia and hyphae in lactic acid preparations, yellowish in a spore collection; no cystidia.

Fructifications small, often laterally confluent, usually about $\frac{1}{2}$ cm. broad and 1 cm. long.

On decaying pine wood. Canada to North Carolina and westward to Montana and Arizona. August to November. Apparently rare.

M. aureus is well characterized by its small, nearly circular, yellow fructifications, with margin along the upper side occasionally free or slightly reflexed, golden yellow hymenium, and small, cylindric spores whose color is so slight as likely to be disregarded unless seen in the mass in spore collections.

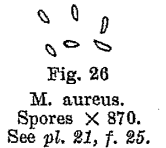
Specimens examined:

Exsiccati: Ellis, *N. Am. Fungi*, 508; Romell, *Fungi Exs. Scand.*, 119.

Sweden: Stockholm, *L. Romell*, in *Romell, Fungi Exs. Scand.*, 119; Femsjö, *C. G. Lloyd*, 09125 (in *Lloyd Herb.*).

Austria: Trento, *G. Bresadola*.

Canada: Billings Bri., *J. Macoun*, 52 (in *N. Y. Bot. Gard.*



- Herb.); Blueberry Pt., Aylmer, *J. Macoun*, 490 (in N. Y. Bot. Gard. Herb.).
 Quebec: Wakefield, *J. Macoun*, 115 (in N. Y. Bot. Gard. Herb.).
 New Hampshire: Chocorua, *W. G. Farlow*, two collections (in Farlow Herb.).
 Vermont: Lake Dunmore, *W. G. Farlow* (in Farlow Herb.).
 Massachusetts: Sharon, *A. P. D. Piguet* (in Farlow Herb. and in Mo. Bot. Gard. Herb., 54908).
 New York: West Fort Ann, *S. H. Burnham*, 22 (in Lloyd Herb.).
 New Jersey: Newfield, *Ellis & Harkness*, in Ellis, N. Am. Fungi, 508.
 North Carolina: Blowing Rock, *G. F. Atkinson*, Cornell Univ. Herb., 10536 (in N. Y. Bot. Gard. Herb.).
 Michigan: New Richmond, *C. H. Kauffman*, 85 (in Mo. Bot. Gard. Herb., 44989).
 Minnesota: Harlan, *F. W. Dewart* (in Farlow Herb.).
 Montana: Libby, *J. R. Weir*, 8002 (in Mo. Bot. Gard. Herb., 54910).
 Arizona: Fort Valley Experiment Station, *W. H. Long*, 21118 (in Mo. Bot. Gard. Herb., 54915).

29. *M. spadiceus* Berk. & Curtis, Linn. Soc. Bot. Jour. 10: 323. 1868; Sacc. Syll. Fung. 6: 413. 1888.

Type: type and cotype in Kew Herb. and Curtis Herb.

Fructification effuso-reflexed, with the reflexed portion flabelliform, spongy, tomentose, and drying Sayal-brown on the upper side, the margin thin and entire; hymenium drying thin and fuscous, not shining, mostly even, with shallow pores, about 4 to a mm., near the base of the reflexed portion; in structure 1400 μ thick, tawny olive throughout, with (1) a broad spongy layer from substratum to hymenium, formed by non-incrusted, thick-walled, rather rigid, colored hyphae 2½–3 μ in diameter, which are agglutinated into strands and masses and sep-

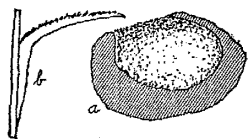


Fig. 27

M. spadiceus.
 a, fructification seen from above; b, vertical section of same. Both natural size.

arated here and there to form the spongy interspaces, and with (2) a very dense hymenial layer 120 μ thick; spores colored, paler than the hyphae, even, flattened on one side, 3×2 μ , none found attached to basidia.

On sticks, mosses, etc. Cuba.

Fructification of the cotype has the free portion 1½ cm. broad, about 2 cm. long, attenuated at base to 1 cm. long, and the resupinate portion of equal area, 1½×2 cm.

The spore characters are those of a few spores which were squeezed from the surface of the hymenium of sections and may have been foreign, for no spores were demonstrated on basidia. The reflexed form, dark color, remarkable spongy structure, very dense hymenium, nearly even for the greater portion of its area and with minute shallow pits near base, are characters which distinguish this species.

Specimens examined:

Cuba: *C. Wright*, 186, cotype (in Curtis Herb.).

30. *M. americanus* Burt, n. sp.

Merulius lacrymans var. *tenuissimum* Berkeley in Ravenel, Fungi Am., 134. 1878; Grevillea 6: 131. 1878; Sacc. Syll. Fung. 6: 419. 1888.—Not *Merulius tenuissimus* Berk. & Broome, Linn. Soc. Bot. Trans. 2: 62. 1883.

Type: type distribution in Ravenel, Fungi Am., 134.

Fructification resupinate, effused, membranaceous, separable, thin, fragile, not fleshy, drying Brussels-brown to bone-brown, the margin not thickened; hymenium gyrose-porose, with the folds growing out into raduloid teeth on an inclined substratum, the pores about 1–1½ mm. in diameter and depth or half as deep; in structure 400–600 μ thick, with (1) a layer 300–450 μ thick next to the substratum, composed of loosely interwoven, thick-walled, rigid, nodose-septate, colored hyphae 4½–6 μ in diameter, and of hyaline hyphae intermixed throughout, the latter sometimes granule-incrusted, and with (2) a narrow layer about 100–150 μ broad, bearing the hymenium, composed of densely arranged, hyaline or nearly hyaline hyphae; no



Fig. 28

M. americanus.
 Spores × 870.
 See pl. 21, f. 26.

cystidia; spores even, $9 \times 6 \mu$, olive-yellow in lactic acid under the microscope, bone-brown in a spore collection.

Fructifications 3–15 cm. in diameter.

Under side of coniferous logs and boards in moist places. Canada to Louisiana and westward to Montana. June to January.

M. americanus has hymenial configuration and coloration like *M. lacrymans*, but is always resupinate, very thin, dry rather than fleshy, and in its structure is composed of two quite distinct hyphal layers not graduating into each other, of which the layer composed of intermixed colored and hyaline hyphae is loosely interwoven and next to the substratum. *M. brassicaefolius* has its hymenium with a broad marginal portion as even as that of *Coniophora arida* and with the hymenial dissepiments never grown out into teeth.

Specimens examined:

Exsiccati: Ravenel, *Fungi Am.*, 134, type distribution.

Canada: Ottawa, *J. Macoun*, 39 (in *N. Y. Bot. Gard. Herb.*). New York: Syracuse, *L. M. Underwood* (in *N. Y. Bot. Gard. Herb.*).

Pennsylvania: Carbondale, *E. A. Burt*.

District of Columbia: Washington, *C. L. Shear*, 1284 (in *Mo. Bot. Gard. Herb.*, 4079).

South Carolina: Aiken, *H. W. Ravenel*, in *Ravenel, Fungi Am.*, 134; Society Hill, *M. A. Curtis* (in *Curtis Herb.*, under the name *M. lacrymans*).

Louisiana: St. Martinville, *A. B. Langlois*, an unnumbered specimen.

Kentucky: Crittenden, *C. G. Lloyd*, 1408 (in *Lloyd Herb.*).

Illinois: Chicago, *L. H. Pammel* (in *Mo. Bot. Gard. Herb.*, 4078).

Missouri: St. Louis (in *Mo. Bot. Gard. Herb.*, 4061).

Wyoming: *A. Nelson* (in *N. Y. Bot. Gard. Herb.*); Medicine Bow Mountains, *A. Nelson*, 9673 (in *Mo. Bot. Gard. Herb.*, 43754).

31. *M. terrestris* (Peck) Burt, n. comb.

Merulius lacrymans var. *terrestris* Peck, *N. Y. State Mus. Rept.* 49: 45. 1897. (Botanist's edition p. 31, 1896).—Not

Merulius lacrymans forma *terrestris* Ferry, *Rev. Myc.* 17: 72. 1895.

Type: in Coll. N. Y. State and a portion in Burt Herb.

Fructification resupinate, widely effused, membranaceous, thin, drying amber-brown, the subiculum and margin whitish; hymenial surface with slightly elevated, obtuse, gyrose folds between which are shallow, labyrinthiform depressions; in structure 600–1000 μ thick, 2-layered, with (1) a layer 200 μ thick next to substratum, of loosely interwoven, thick-walled, rigid hyphae $4\frac{1}{2}$ –6 μ in diameter, nodose-septate, aniline-yellow under the microscope, and with (2) a broad layer of hyaline, thin-walled, often collapsed hyphae 3 μ in diameter, which bear the basidia; no cystidia; spores aniline-yellow under the microscope and concolorous with the hyphae next to the substratum, even, 7 – $9 \times 4\frac{1}{2}$ – 6μ .

Fructification 3–10 cm. in diameter.

On earth walls of cellars and in greenhouses. Massachusetts to Nebraska. October and November.

Although originally published as a variety of *M. lacrymans*, *M. terrestris* has nothing in common with that species. The configuration of the hymenial surface of *M. terrestris* is daedaloid, with very slightly elevated folds and shallow depressions; the color is bright ferruginous (amber-brown of Ridgway); the fructification is thin and not fleshy; and the spores distinctly brighter-colored than those of *M. lacrymans*. The several collections of *M. terrestris* which are known agree well in the characters enumerated.

Specimens examined:

Vermont: Middlebury, *C. G. Lloyd*, 10619 (in *Lloyd Herb.*). Massachusetts: greenhouse of Botanic Garden, Cambridge, *E. A. Burt*.

Michigan: Alma, *C. A. Davis*, type (in Coll. N. Y. State).

Nebraska: Lincoln, *V. B. Walker*, 1 (in *Mo. Bot. Gard. Herb.*, 15861).

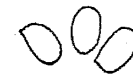


Fig. 29

M. terrestris.
Spores $\times 870$.
See pl. 21, f. 27.

32. *M. brassicaefolius* Schweinitz, Naturforsch. Ges. Leipzig Schrift. 1: 93. 1822; Fries, Elenchus Fung. 1: 60. 1828; Epicr. 502. 1838; Sacc. Syll. Fung. 6: 420. 1888.

Type: not known to be in existence unless the portion received by Fries has been preserved in Herb. Fries.

Fructification resupinate, widely effused, membranaceous, easily separable, run through with rhizomorphic veins, drying warm sepia (fuscescens or olivaceo-fuscens of Fries), the margin undulate; hymenium even towards the margin and in young specimens, porose-sinuate at the center by the accumulation of folds; in structure 200–300 μ thick, 2-layered, with (1) a narrow layer next to substratum, composed of loosely interwoven, pale-colored, nodose-septate hyphae up to 5 μ in diameter, more or less incrustated, and with (2) a broad layer reaching to the hymenium, of densely interwoven, hyaline, nodose-septate hyphae 3½–4 μ in diameter, with occasional colored hyphae intermixed; spores even, 10–12 × 6–8 μ , cream-color under the microscope; no cystidia.



Fig. 30

M. brassicaefolius.
Spores × 870.
See pl. 22, f. 28.

Fructifications up to 10 cm. in diameter in specimens seen, but published as 40–50 cm.

On wood in cellars. Massachusetts to Louisiana. Winter.

Since no specimen of *M. brassicaefolius* is in existence in Herb. Schweinitz, nor could be found there in 1856 when Berkeley and Curtis published their 'Commentary on Schweinitz, Synopsis Fungorum,' it is very fortunate that a specimen was sent by Schweinitz to Fries, who compared it with the original description, noted the color, which had not been stated by Schweinitz, and drew up and published in 'Elenchus Fungorum' a revised description of this species, in which its characters are compared with those of the other species of its section, viz., *M. lacrymans*, *M. pulverulentus*, *M. papyracens*, *M. umbrinus*, and *M. squalidus*. The specimens of *M. brassicaefolius* distributed in Ravenel, Fungi Car. 2: 23, agree well with the descriptions of this species, were from the same general region and in a similar location, and they are not referable to any other species. I have based my conception

of *M. brassicaefolius*, therefore, upon the original description, the revision by Fries, and the specimens distributed by Ravenel. This species is somewhat intermediate between resupinate specimens of *M. lacrymans* and *M. himantioides*. Fructifications of *M. brassicaefolius* are not as thick and fleshy as those of *M. lacrymans*, and the hymenium is not deeply porose nor having folds grown out into Irpex-like or raduloid teeth, and the spores are slightly larger and much paler than those of *M. lacrymans*. The dried specimens of *M. brassicaefolius* are thicker and much larger than those of *M. himantioides*, less fragile, readily separable from the substratum in large sheet-like masses like those of the sterile mycelium of *Himantia*, and the hymenium is as even as that of *Coniophora arida* for a broad marginal portion and becomes porose-sinuate at the center by accumulation of hymenial folds there. I have seen no specimens of *M. pulverulentus*, a species remarkable by having the hymenial folds best developed towards the margin and with the center becoming even and decaying.

Specimens examined:

Exsiccati: Ravenel, Fungi Car. 2: 23; Ravenel, Fungi Am., 432, under the name *Merulius pulverulentus*.

Massachusetts: Boston, *J. F. Joor* (in Mo. Bot. Gard. Herb., 4067, 4070).

Pennsylvania: Bethlehem, *Schweinitz* (in Herb. Schweinitz), the 506 of Syn. N. Am. Fungi, under the name *Merulius himantioides* and determined by Berkeley & Curtis as *M. brassicaefolius*.

South Carolina: *H. W. Ravenel*, in Ravenel, Fungi Car. 2: 23; Aiken, *H. W. Ravenel*, in Ravenel, Fungi Am., 432.

Alabama: *Peters*, 1153 (in Curtis Herb.).

Louisiana: *Professor Featherman*, 4 (in Curtis Herb.); St. Martinville, *A. B. Langlois*, 1590.

33. *M. himantioides* Fries, Syst. Myc. 1: 329. 1821; Epicr. 501. 1838; Hym. Eur. 592. 1874; Sacc. Syll. Fung. 6: 415. 1888; Romell, Arkiv för Bot. 11^s: 28. pl. 2. f. 19. 1911.

Merulius tenuis Peck, N. Y. State Mus. Rept. 47: 147. 1894; Sacc. Syll. Fung. 11: 105. 1895.

Illustrations: Fries, *Icones Hym. pl. 193. f. 1*; Romell, *loc. cit.*

Type: authentic specimen in Kew Herb.

Fructification resupinate, effused, thin, drying brittle, separable but not as large fructifications, coming off in small pieces, drying raw umber when fully mature, the margin thin-



Fig. 31

M. himantioides.
Spores $\times 870$.
See *pl. 22, f. 29*.

ning out and whitish; hymenium with thin, slightly elevated, gyrose folds which outline more or less completely the shallow pores, the latter about $\frac{3}{4}$ – $1\frac{1}{2}$ mm. in diameter and sometimes divided into smaller pores; in structure about 100μ thick, with (1) a narrow layer next to the substratum, of a few honey-yellow hyphae ranging up to 6 – 7μ in diameter, not incrusted, and with (2) a broader layer extending to the hymenium, of loosely interwoven, hyaline hyphae 4μ in diameter; spores honey-yellow under the microscope, even, 9 – $10 \times 6 \mu$.

Fructifications 2–5 cm. in diameter.

On fallen trunks of pine and other conifers, usually in mountain forests. Canada and New Hampshire to Washington. June to November.

Fries placed this species in the white-spored section of *Merulius*, and his illustration of this species was based upon a young specimen in which white and sordid yellow are more conspicuous than in fully mature specimens. Romell has kindly shared with me specimens which he collected in northern Sweden, which show both the young stage of Fries' *Icones, pl. 193. f. 1*, and the fully mature stage, and the determination of which he has further confirmed by comparison with the authentic specimen from Fries in Kew Herb. I have based my description upon the more mature of these specimens. *M. himantioides* differs from *M. lacrymans* in being much thinner, not compact nor fleshy, in having the thin, acute dissepiments but little raised, not grown out into teeth, and often mere gyrose folds which barely suggest location of pores, in having the hyphae less densely interwoven in sections, and in having paler spores.

Specimens examined:

Exsiccati: Ell. & Ev., Fungi Col., 1115, under the name of *Merulius lacrymans*.

Sweden: northern Sweden, *L. Romell, 386, 387*.

Ontario: Humber Valley, Toronto, *J. H. Faull*, Univ. of Toronto Herb., 323 (in Mo. Bot. Gard. Herb., 44913).

New Hampshire: Profile House, *W. G. Farlow* (in Farlow Herb. and in Mo. Bot. Gard. Herb., 54912).

New York: Adirondack Mountains, *C. H. Peck* (in Coll. N. Y. State, under the name *M. tenuis*), and *C. H. Kauffman, 36* (in Lloyd Herb.); Catskill Mountains, *C. H. Peck* (in Coll. N. Y. State, under the name *M. tenuis*); Ithaca, *Dudley*, type of *Merulius tenuis* (in Coll. N. Y. State); *G. F. Atkinson*, Cornell Univ. Herb., 22967; Syracuse, *L. M. Underwood*, two collections (in N. Y. Bot. Gard. Herb.).

West Virginia: Nuttallburg, *L. W. Nuttall*, in Ell. & Ev., Fungi Col., 1115.

Missouri: Barnhart, *H. von Schrenk*.

Idaho: Priest River, *J. R. Weir, 8000* (in Mo. Bot. Gard. Herb., 54913).

Washington: Lake Wilderness, Cascade Mountains, *C. H. Kauffman* (in Mo. Bot. Gard. Herb., 20861).

34. *M. hexagonoides* Burt, n. sp.

Type: in N. Y. Bot. Gard. Herb.

Fructification resupinate, effused, dry, papery, separable, drying between buffy brown and Saccardo's umber, the margin thin and fimbriate; hymenium with only very slightly elevated, broad folds which become reticulately connected and form shallow, hexagonal pores about 1–2 to a mm., with folds of the largest pores nearly obliterated; in structure 1000μ thick, with the broad folds extending 100 – 150μ more, composed throughout of thin-walled, non-incrusted, slightly colored, occasionally nodose-septate hyphae 4 – 5μ in diameter, somewhat loosely interwoven; no cystidia; spores concolorous with the hyphae, even, 5 – $7\frac{1}{2} \times 4\frac{1}{2} \mu$, borne four to a basidium.



Fig. 32

M. hexagonoides.
Spores $\times 870$.
See *pl. 22, f. 30*.

Fructification is in fragments, but perhaps about 6 cm. in diameter originally.

On charred wood in hollow of *Sequoia sempervirens*. California. February.

The principal characters of this species are small, shallow, hexagonal pores, the buffy brown color throughout and at the margin—much paler, however, in the case of individual hyphae and spores under high magnification—, and the absence of thick-walled, deeply colored, rigid hyphae. *M. hexagonoides* does not closely resemble in aspect or structure any other of our species known to me.

Specimens examined:

California: Muir Woods, *R. A. Harper*, type (in N. Y. Bot. Gard. Herb.).

35. *M. fugax* Fries, Obs. Myc. 1: 100. 1815; Syst. Myc. 1: 328. 1821; Elenchus Fung. 1: 63. 1828; Epicr. 501. 1838; Hym. Eur. 593. 1874; Sacc. Syll. Fung. 6: 416. 1888; Romell, Arkiv för Bot. 11^o: 30. pl. 2. f. 18. 1911.

Merulius molluscus Fries, Syst. Myc. 1: 329. 1821; Epicr. 501. 1838; Hym. Eur. 592. 1874; Karsten, Finska Vet.-Soc. Bidrag Natur och Folk 37: 86. 1882; Sacc. Syll. Fung. 6: 416. 1888; Bresadola, Ann. Myc. 1: 83. 1903; Romell, Arkiv för Bot. 11^o: 29. pl. 2. f. 18. 1911.—*M. subaurantiacus* Peck, N. Y. State Mus. Rept. 38: 93. 1885; Sacc. Syll. Fung. 6: 415. 1888.

Illustrations: Fries, Icones Hym. pl. 193. f. 2; Romell, loc. cit.

Type: authentic specimens in Herb. Fries, and in Blytt Herb. at Christiania, according to Romell.

Fructification resupinate, effused, membranaceous, tender, very soft, separable, the margin and subiculum byssoid, whitish or paler-colored than the hymenium; hymenium variable in color, drying cream-color, pinkish buff with or without more or less of a tinge of orange, gyrose-plicate; in structure 300 μ thick, composed of loosely interwoven, long-celled, nodose-septate hyphae 3–4 μ in diameter,

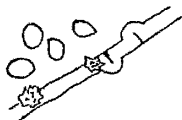


Fig. 33

M. fugax.
Spores, incrusting
hypha $\times 870$. See
pl. 22, f. 31.

sparingly and coarsely granule-incrusted towards the substratum; no cystidia; spores hyaline or slightly yellowish under the microscope, even, globose-ellipsoidal, $4-5 \times 3-3\frac{1}{2}$ μ in sectional preparations.

Fructifications 3–10 cm. in diameter.

On decaying wood and bark of logs of coniferous species usually. Canada and Maine to Washington and California, and in Jamaica. August to April. Common.

This species is well marked by large, yellowish fructifications which have their surface merely gyrose-plicate, not becoming porose, by the broad and often slightly colored spores, and by the nodose-septate hyphae which are incrusted with scattered, large granules in the half of fructification towards the substratum. The name *Merulius fugax* should be employed for this species, because it is based upon authentic specimens, which is not the case for *M. molluscus*, so far as known at present. *M. fugax* has priority also.

Specimens examined:

Exsiccati: Ell. & Ev., Fungi Col., 214, under the name *Merulius ceracellus*; de Thümen, Myc. Univ., 2008.

Sweden: northern Sweden, *L. Romell*, 385; Stockholm, *L. Romell*, 389, 390; Upsala, *C. G. Lloyd*, 08429 (in Lloyd Herb.).

Finland: Mustiala, *P. A. Karsten*, in de Thümen, Myc. Univ., 2008.

Austria-Hungary: Trento, *G. Bresadola*.

Canada: *J. Macoun*, comm. by J. B. Ellis; Fairy Lake, *J. Macoun*, 41 (in N. Y. Bot. Gard. Herb.).

Quebec: Hull, *J. Macoun*, 217 (in N. Y. Bot. Gard. Herb.).

Ontario: Belleville, *J. Macoun*, 76, and (in N. Y. Bot. Gard. Herb.); Besserers Grove, *J. Macoun*, 389 (in N. Y. Bot. Gard. Herb.); Ottawa, *J. Macoun*, 205 (in N. Y. Bot. Gard. Herb.).

Maine: *W. A. Murrill*, 2550 (in N. Y. Bot. Gard. Herb.).

New Hampshire: Chocorua, *W. G. Farlow* (in Farlow Herb. and in Mo. Bot. Gard. Herb., 54973).

Vermont: Middlebury, *E. A. Burt*.

New York: Altamont, *E. A. Burt*; central New York, *L. M.*

Underwood (in N. Y. Bot. Gard. Herb.); Ithaca, *C. Thom*, Cornell Univ. Herb., 13601; Osceola, *C. H. Peck*, type of *Merulius subaurantiacus* (in Coll. N. Y. State); Syracuse, *L. M. Underwood*, in Ell. & Ev., Fungi Col., 214, and (in N. Y. Bot. Gard. Herb., 109).

Michigan: Ann Arbor, *C. H. Kauffman*, 17, 30 (the latter in Mo. Bot. Gard. Herb., 21208).

Tennessee: Elkmont, *C. H. Kauffman*, 91 (in Mo. Bot. Gard. Herb., 44991).

Idaho: Kaniksu National Forest, Priest River, *J. R. Weir*, 27, 71, 72, 8003 (the last in Mo. Bot. Gard. Herb.).

Washington: Olympia, *C. J. Humphrey*, 1317.

California: *R. A. Harper* (in N. Y. Bot. Gard. Herb.).

Jamaica: Sir John Peak, *W. A. Murrill*, 813 (in N. Y. Bot. Gard. Herb.).

36. *M. montanus* Burt, n. sp.

Type: in Mo. Bot. Gard. Herb.

Fructification resupinate, effused, membranaceous, separable in small pieces, contracting in drying so as to form wide fissures, drying between avellaneous and wood-brown, the subiculum and margin fibrillose and buffy citrine; hymenium with folds minute, subreticulate, not outlining pores; in structure 300–400 μ thick, with the folds extending 200–400 μ more, composed of suberect, loosely branched and interwoven hyphae 2–3 μ in diameter, occasionally nodose-septate, pale olive-buff under the microscope, and of a very dense hymenial layer containing great numbers of spores in a zone 80 μ broad; spores pale olive-buff under the microscope, even, $3 \times 1\frac{1}{2}$ –2 μ , flattened on one side; no cystidia.

Fructification in pieces, the largest of which is 4 \times 2 cm. and has a margin with curvature indicating a diameter of 10 cm.

On rotten wood of *Pinus monticola*. Idaho. June.

M. montanus somewhat resembles *M. himantioïdes* in configuration of hymenium, but is distinct from this species by



Fig. 34

M. montanus.
Hypha, spores
 $\times 870$.
See pl. 22, f. 32.

its color, much smaller folds, and small spores. *M. umbrinus* is much thicker than *M. montanus* and distinctly porose with pores 1 mm. deep and in diameter.

Specimens examined:

Idaho: Priest River, *J. R. Weir*, 8006, type (in Mo. Bot. Gard. Herb., 54914), and 12122 (in Lloyd Herb.).

37. *M. umbrinus* Fries, Elenchus Fung. 1: 61. 1828; Epicr. 503. 1838; Hym. Eur. 594. 1874; Sacc. Syll. Fung. 6: 420. 1888.

Fructification resupinate, effused, membranaceous, soft, determinate, naked at the circumference and revolute; hymenium drying sepia to Chaetura-drab, with folds continuous, gyrose-porose, with pores about $\frac{1}{2}$ –1 mm. in diameter and of about the same depth; in structure 500–1500 μ thick, composed throughout of hyaline, thin-walled, nodose-septate hyphae 2–3 μ in diameter, somewhat longitudinally arranged and interwoven but neither densely nor loosely; no cystidia; spores olive-buff under the microscope, even, $4\frac{1}{2}$ –6 \times 3–3 $\frac{1}{2}$ μ .

Fructifications 2 $\frac{1}{2}$ –6 cm. in diameter.

On rotting wood in cellar and damp places. Maine and Pennsylvania. November.

In the small specimens of this species which have been available for study, thick-walled, colored hyphae are not present anywhere in the sectional preparations. If these fructifications were wholly removed from the substratum, the absence of colored hyphae, such as are present in related species having colored spores, is a noteworthy specific character for *M. umbrinus* and, taken in connection with the small spores, should render this species readily distinguishable. The revolute margin may not be of fundamental importance as a specific character of this species, but at least three of the dried specimens cited below have the margin somewhat thickened and curved upward. I am indebted to Bresadola for a European specimen determined by him as *Merulius umbrinus*.

Specimens examined:

Exsiccati: Ellis, N. Am. Fungi, 1307, under the name *Me-*



Fig. 35

M. umbrinus.
Spores $\times 870$.
See pl. 22, f. 33.

rulius lacrymans; Libert, Pl. Crypt. Arduennae, 320, under the name *Merulius lacrimans*.

Austria-Hungary: Hungary, *Kmet*, comm. by G. Bresadola.
France: Ardennes, *M. A. Libert*, in Libert, Pl. Crypt. Arduennae, 320.

Maine: Portland, *Morse*, comm. by Sprague, 250 (in Curtis Herb., under the name *Merulius lacrymans*).

Pennsylvania: West Chester, *B. M. Everhart*, in Ellis, N. Am. Fungi, 1307.

38. *M. pinastri* (Fries) Burt, n. comb.

Hydnum pinastri Fries, Obs. Myc. 1: 149. 1815; Syst. Myc. 1: 417. 1821; Elenchus Fung. 1: 138. 1828; Hym. Eur. 614. 1874; Sacc. Syll. Fung. 6: 464. 1888.—*Hydnum sordidum* Weinmann, Fl. Ross. 370. 1836; Fries, Hym. Eur. 614. 1874; Sacc. Syll. Fung. 6: 464. 1888.—*Merulius irpicinus* Peck, N. Y. State Mus. Rept. 47: 146. 1894; Sacc. Syll. Fung. 11: 105. 1895.—*M. himantioides* of Bresadola, Ann. Myc. 1: 83. 1903, but not of Fries.—An *M. hydnoides* Hennings, Hedwigia 42: 178, 183. 1904?—An *M. minor* Falck, in Möller's Hausschwammforsch. 6: 53–55. pl. 6. 1912?

Type: type of *M. irpicinus* in Coll. N. Y. State.

Fructification resupinate, effused, membranaceous, soft, loosely attached to the substratum, separable, pinard-yellow at first, then olive-ocher, drying a little darker, more or less tomentose beneath and whitish, the margin whitish; hymenium at first gyrose-porose, the folds at length prolonged into subulate or Irpex-like teeth; in structure up to 1 mm. thick, composed of loosely interwoven, nodose-septate hyphae 4–5 μ in diameter, deeply staining; no cystidia; spores pale ochraceous in a spore collection, distinctly colored, even, broadly ovoid to subglobose, 5–6 \times 4–5 μ .

Fructifications 2–15 cm. and more in diameter.

On compost and earth in mushroom beds and greenhouses, and walls of greenhouses and on decaying wood and bark, usually coniferous. Vermont to Nebraska and in California



Fig. 36

M. pinastri.
Spores \times 870.
See pl. 22, f. 34.

and Arizona. October and November out of doors; December to February in greenhouses. More common and more luxuriantly developed in greenhouses.

This species is noteworthy by its olive-ocher color, combination of the hymenial characters of *Merulius*, *Hydnum*, and *Irpex*, and small, nearly subglobose, distinctly colored spores. Until the fructification is old, its hymenium is merely gyrose-plicate or showing only a few dissepiments prolonged into subulate teeth, and such specimens must be cautiously separated from *M. aureus*. The latter is of somewhat similar color, but its fructifications are smaller, have the radial dissepiments the more prominent, and spores very pale, smaller, and cylindric. Fries included *M. pinastri* in the genus *Hydnum* on account of the subulate teeth which are finally present in the best-developed specimens. I am strongly confirmed in my opinion that this species really belongs in *Merulius* by its having been twice independently described as a *Merulius* with reference in the specific name to hydroid characters and by the fact that all the collections so far distributed in the published exsiccati have been given out as *Merulius aureus*. I am indebted to Romell for a fine specimen of *Hydnum pinastri* with its European synonymy and showing well the unique characters of the species.

Specimens examined:

Exsiccati: Krieger, Fungi Sax., 1910, under the name *Merulius aureus*; Sydow, Myc. March., 1206, under the name *Merulius aureus*; de Thümen, Myc. Univ., 1908, under the name *Merulius aureus*.
Sweden: Stockholm, *L. Romell*, 388; Upsala, *C. G. Lloyd*, 08411 (in Lloyd Herb.).
England: Brandon-Norfolk, *C. B. Plowright*, in de Thümen, Myc. Univ., 1908.
Germany: *P. Sydow*, in Sydow, Myc. March., 1206; Saxony, *W. Krieger*, in Krieger, Fungi Sax., 1910.
Austria-Hungary: Trento, *G. Bresadola*.
Vermont: Middlebury, *C. W. Dodge*, 1066 (in Dodge Herb.).
New York: Ithaca, *Dudley*, type of *Merulius irpicinus* (in

Coll. N. Y. State); Albany, *C. G. Lloyd*, 10107 (in Lloyd Herb.).

Indiana: Fern, *L. M. Underwood* (in N. Y. Bot. Gard. Herb.).

Illinois: Peoria, *C. J. Humphrey* (in Mo. Bot. Gard. Herb., 42599).

Missouri: Mo. Bot. Gard. greenhouses, St. Louis, three collections, *G. T. Moore*, *E. A. Burt*, *H. von Schrenk* (in Mo. Bot. Gard. Herb., 54904-54906, respectively).

Nebraska: Lincoln, *Leva B. Walker* (in Mo. Bot. Gard. Herb., 54448).

California: Claremont, *L. M. Clency*, Pomona Coll. Herb., 1641 (in Lloyd Herb.).

Arizona: Fort Valley Experiment Station, *W. H. Long*, 21299 (in Mo. Bot. Gard. Herb., 54938).

39. *M. byssoideus* Burt, n. sp.

Type: in Mo. Bot. Gard. Herb.

Fructification resupinate, effused, dry, flaxy, drying between Saccardo's umber and Dresden-brown throughout, separable from the substratum, the margin rather thick and undulate; hymenium minutely rugose-porose, with very slightly elevated, thin folds which outline rather imperfect, shallow pores about 2-4 to a mm.; in structure 300-400 μ thick, with the folds extending about 400 μ more, composed of loosely interwoven, thin-walled hyphae 3-4 $\frac{1}{2}$ μ in diameter, occasionally nodose-septate, having the general color of the fructification but losing their color by solvent action of the alcohol when being sectioned; spores even, 4 $\frac{1}{2}$ -6 \times 3 $\frac{1}{2}$ -4 $\frac{1}{2}$ μ , deep olive-buff under the microscope, concolorous with the fructification; no cystidia.

Fructification 3 cm. long, 2 cm. broad.

On soil. Rio Piedras, Porto Rico. August.

The distinctive characters of *M. byssoideus* are its flaxy, dry structure, Dresden-brown color throughout, minutely gyrose-porose hymenium, and small, colored spores. It is not a *Poria*, because sections show the specimen bearing spores



Fig. 37

M. byssoideus.
Spores \times 870.
See pl. 22, f. 35.

in abundance and with the hymenium continuous and as well developed on the edges of the folds as elsewhere. This species is related to *M. Pinastri*, but the latter is not dry in structure and has larger pores and the folds often grown out into hydroid teeth.

Specimens examined:

Porto Rico: Rio Piedras, *J. R. Johnston*, comm. by *J. A. Stevenson*, 4664, type (in Mo. Bot. Gard. Herb., 56589).

40. *M. atrovirens* Burt, n. sp.

Type: in N. Y. Bot. Gard. Herb.

Fructification resupinate, effused, membranaceous, separable, drying between dark ivy-green and dark olive-gray in the central region, bordered by obscure wood-brown, the margin whitish and thinning out; hymenium at first reticulate-plicate, at length porose with angular pores about 1-1 $\frac{1}{2}$ mm. deep and about 1 $\frac{1}{2}$ -2 to a mm.; in structure 400-600 μ thick, with (1) the layer next to the substratum composed of loosely interwoven, somewhat colored hyphae 3 μ in diameter, occasionally nodose-septate, incrustated, and with (2) a broader layer extending to the hymenium, with hyphae densely interwoven and hyaline; no cystidia; spores citron-yellow under the microscope, even, 4 $\frac{1}{2}$ -5 \times 3-3 $\frac{1}{2}$ μ .

Fructification 3-8 cm. long, 2-4 cm. broad.

Under side of decaying log of *Liriodendron tulipifera*. Along Caney River, on lower slope of Mt. Mitchell, Yancey County, North Carolina. September.

This species is related to *M. himantioides*, but is distinct by its dark green color, small spores, and thicker fructification.

Specimens examined:

North Carolina: Mt. Mitchell, Yancey County, *G. F. Atkinson*, Cornell Univ. Herb., 11934, type (in N. Y. Bot. Gard. Herb.).

EXCLUDED SPECIES

M. patellaeformis Berk. & Curtis, *Grevillea* 1: 70. 1872.



Fig. 38

M. atrovirens.
Spores \times 870.
See pl. 22, f. 36.

Type: type and cotype in Kew Herb. and Curtis Herb.

Fructification small, orbicular, flattened, wholly resupinate, probably separable, fleshy, drying fuscous-black, the margin thinning out, entire; hymenial surface pitted with very shallow, angular pores about 5 to a mm., with thin, entire dissepiments; in structure 400 μ thick, with dissepiments extending 9–12 μ , composed of compactly interwoven hyphae $4\frac{1}{2}$ μ in diameter, which ascend somewhat obliquely to the hymenial surface, not incrustated, not nodose-septate, hyaline in the region near the substratum, becoming fuscous towards the hymenial surface; no cystidia; no basidia; a few spores—perhaps foreign—in and along the hymenial surface appear very slightly colored, even, $3\frac{1}{2} \times 2\frac{1}{2}$ –3 μ .

The three fructifications comprising the cotype range from $\frac{1}{2}$ to 3 \times 2 mm.

On very rotten wood whitened and disorganized into strands by weathering and decay. Connecticut.

Since the fructifications show no basidia and afford no evidence that a hymenium is continuous over the edges of the dissepiments, or that the porose stage is preceded by hymenial folds, the position of this species in *Merulius* must be regarded as very doubtful until confirmed by better specimens.

Specimens examined:

Connecticut: *C. Wright*, 51, cotype (in Curtis Herb., 6361).

Poria incrassata (Berk. & Curtis) Burt, n. comb.

Merulius incrassatus Berk. & Curtis, Hooker's London Jour. Bot. 1: 234. 1849; Grevillea 1: 70. 1872; Sacc. Syll. Fung. 6: 412. 1888.—*M. spissus* Berkeley, Grevillea 1: 70. 1872; Sacc. Syll. Fung. 6: 412. 1888.—*Polyporus pineus* Peck, N. Y. State Mus. Rept. 41: 78. 1888.—*Poria pinea* Peck in Sacc. Syll. Fung. 9: 194. 1891.

Type: type and cotype in Kew Herb. and Curtis Herb.

Fructification resupinate, effused, originally described as shortly reflexed, fleshy, dingy whitish, becoming blackish where bruised, drying mouse-gray and aniline-black; tubes oblique, unequal, angular, 1–3 to a mm., ranging up to 3 mm.

long, with dissepiments 90–120 μ thick, having their tramal hyphae slightly colored, not incrustated, not nodose-septate, $2\frac{1}{2}$ –3 μ in diameter, densely arranged side by side, not interwoven; no cystidia nor setae; spores even, fuscous, flattened on one side, 10 – 12×6 – $7\frac{1}{2}$ μ .



Fig. 39
Poria incrassata.
Spores \times 870.

The portion of the fructification in Curtis Herb. 9 cm. long, $4\frac{1}{2}$ cm. broad.

On side of pine stump. New York and South Carolina. June.

Where forming towards the margin, the tubes are very shallow, as stated by the authors of the species, but truly porose there and so greatly elongated in the older portion of the fructification that this species is certainly a *Poria*. Collectors should look for it among their collections which have been roughly classified as *Poria*, as a fleshy *Poria* becoming black where bruised and drying nearly black, having large colored spores, tubes 3 mm. long and 1–3 to a mm. The paler color of the surface of the type is probably due to a mould which is present. The description of *M. spissus* and collector's reference to it, published in 'Grevillea,' were not sufficient for positive location of the cotype in Curtis Herb.; I am indebted to Miss Wakefield for critical notes and to the Director of Kew Herbarium for a fragment of the type, which have made confirmation of the cotype possible.

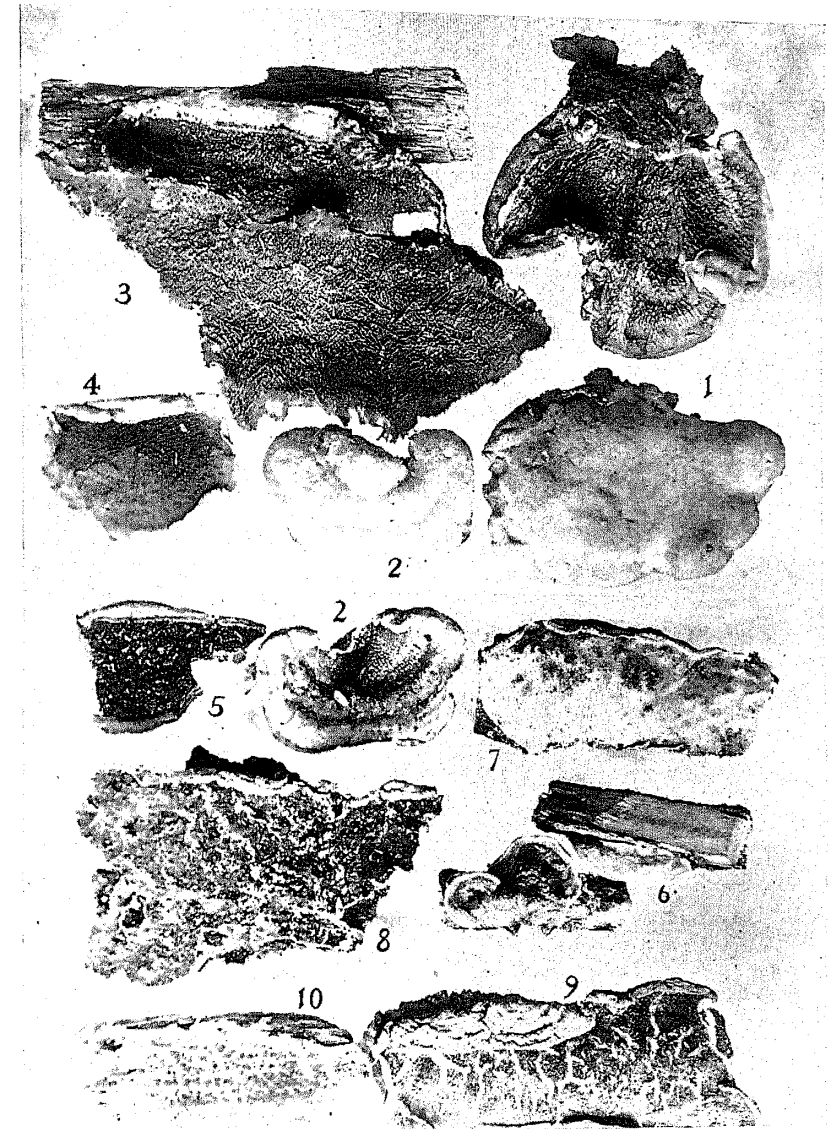
Specimens examined:

New York: Selkirk, *C. H. Peck*, type of *Polyporus pineus* (in Coll. N. Y. State, and a portion in Mo. Bot. Gard. Herb.).

South Carolina: Society Hill, *M. A. Curtis*, 1504 (cotype in Curtis Herb. of *Merulius incrassatus*); definite locality not stated, *M. A. Curtis*, unnumbered specimen (in Curtis Herb., with same data and characters as fragment of the type of *Merulius spissus*).

INDEX TO SPECIES OF MERULIUS

	Page		Page
<i>albus</i>	334	<i>minor</i>	356
<i>Alna</i> (<i>Plicatura</i>)	326	<i>molluscus</i>	352
<i>Alna</i> (<i>Trogia</i>)	326	<i>montanus</i>	354
<i>ambiguus</i>	317		
<i>americanus</i>	345	<i>nivea</i> (<i>Plicatura</i>)	326
<i>atrovirens</i>	359	<i>niveus</i>	326
<i>aureus</i>	343		
<i>bellus</i>	331	<i>pallens</i>	321, 362
<i>brassicifolius</i>	348	<i>patellaeformis</i>	359
<i>byssoides</i>	358	<i>pinastri</i> (<i>Hydnum</i>)	356
		<i>pinastri</i>	356
<i>ceracellus</i>	359	<i>pinca</i> (<i>Poria</i>)	300
<i>confluens</i>	319	<i>pinus</i> (<i>Polyporus</i>)	300
<i>corium</i>	322	<i>Pruni</i>	313
<i>cubensis</i>	326	<i>pulverulentus</i>	349
<i>deglubens</i>	325	<i>Ravenelii</i>	332
<i>deglubens</i> (<i>Phlebia</i>)	325	<i>rimosus</i>	327
<i>destruens</i>	340	<i>rubellus</i>	310
<i>destruens</i> (<i>Xylomyzon</i>)	341	<i>rufum</i> (<i>Xylomyzon</i>)	338
<i>domesticus</i>	341	<i>rufus</i>	338
<i>dubius</i>	330	<i>rugulosus</i>	337
<i>Farlowii</i>	336	<i>saccharinum</i> (<i>Corticium</i>)	337
<i>fugax</i>	352	<i>serpens</i>	339
		<i>sordidum</i> (<i>Hydnum</i>)	356
<i>gyrosus</i>	328	<i>sordidus</i>	324
		<i>sororius</i>	329
<i>haedinus</i>	319	<i>spadiceus</i>	344
<i>hexagonoides</i>	351	<i>spissus</i>	300
<i>himantioides</i>	349	<i>subaurantiacus</i>	352
<i>himantioides</i>	356	<i>sulcatus</i>	319
<i>hirsutus</i>	312	<i>sulphureus</i>	333
<i>hirtellus</i>	335		
<i>hydnoides</i>	356	<i>tenuis</i>	340
		<i>tenuissimus</i>	345
<i>incarnatus</i> (<i>Cantharellus</i>)	310	<i>terrestris</i>	346
<i>incarnatus</i>	310	<i>tomentosus</i>	334
<i>incrassata</i> (<i>Poria</i>)	300	<i>tremellosus</i>	313
<i>incrassatus</i>	360		
<i>irpioinus</i>	356	<i>Ulmi</i>	319
<i>isoporum</i> (<i>Xylomyzon</i>)	338	<i>umbrinus</i>	355
<i>lacrymans</i> (<i>Boletus</i>)	340	<i>vastator</i>	341, 343
<i>lacrymans</i>	340	<i>Wrightii</i>	312
<i>lacrymans</i> forma terrestris	347		
<i>lacrymans</i> var. <i>tenuissimum</i>	345		
<i>lacrymans</i> var. <i>terrestris</i>	346		
<i>lichenicola</i>	320		



BURT—MERULIUS IN NORTH AMERICA
 1. MERULIUS INCARNATUS.—2. M. HIRSUTUS.—3. M. TREMELLOSUS.—4. M. AMBIGUUS.—
 5. M. CONFLUENS.—6. M. PALLENS.—7. M. CORIUM.—8. M. CUBENSIS.—
 9. M. NIVEUS.—10. M. GYROSUS.

ALL NATURAL SIZE.