THE THELEPHORACEAE OF NORTH AMERICA. X[1]

HYMENOCHAETE

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HYMENOCHAETE

Hymenochaete Léveillé, Ann. Sci. Nat. Bot. III. **5** : 150. 1846; Berk. & Curtis, Linn. Soc. Bot. Jour. **10** : 333. 1868; Cooke, Grevillea **8** : 145. 1880; Sacc. Syll. Fung. **6** : 588. 1888; Massee, Linn. Soc. Bot. Jour. **27** : 95. 1890; Engl. & Prantl, Nat. Pflanzenfam. (**1** : 1**) : 121. 1898.

Fructifications coriaceous to hard, of varied form from stipitate to resupinate; hymenium even or rarely granular, containing slender, somewhat conical, colored setae between the basidia; basidia simple; spores hyaline, even.

There is no type species, for this genus is a fine example of basing the generic conception upon a group of thelephoraceous species, some stipitate, some dimidiate, some reflexed, and some resupinate, which agree in having setae in the hymenium.

In addition to the distinctive morphological character of elongated, conical setae in the hymenium, there is also a chemical substance in the tissue of all the species of *Hymenochaete* which I have studied, that causes an immediate darkening of sections when dilute potassium hydrate is brought in contact with them. This darkening is so great as to make the sections too opaque for study if more than a mere trace of this usually useful reagent is employed to swell the sections. One has to use instead lactic acid to have the sections remain clear enough to show their fine structural details. The greatly elongated, colored cystidia and conducting organs which are present in the deeper tissue and curve into, or even protrude above, the hymenial surface in some species of *Stereum*, as, for example, *S. umbrinum*, *S. abietinum*, *S. glaucescens*, etc.,

[1] Issued December 23, 1918.

have been confused by some authors with setae and have led to the publication of several such species under *Hymenochaete*. Istvanffi[1] has shown that there is a fundamental difference between such organs and the conical, pointed setae which are characteristic of *Hymenochaete*. In any doubtful case which the student may meet it would be well to aid conclusion by the color reaction with solution of potassium hydrate already mentioned. In my experience the dimensions of setae are not sufficiently constant to hardly more than grade these organs as large, medium, and small.

According to our present knowledge, *Hymenochaete* attains its greatest development both in form and in number of species in the western continent where it culminates in a small group of indigenous stipitate species. Temperature conditions are important in the geographical distribution of the species of this genus; this is shown by the long east and west range across North America of common species, in comparison with the much shorter north and south range. Furthermore, *Hymenochaete* is a genus of tropical species rather than of the cooler portion of the north temperate zone, for in contrast with the 29 species occurring from the Gulf States to Brazil only 13 species are known north of the latitude of Virginia, and from Europe perhaps 9 species, of which 6 are well known.

Original descriptions of the species of *Hymenochaete* have required considerable modification with regard to characters referring to form, because they were based upon too limited an amount of material. In the case of species of *Thelephoraceae* growing on prostrate logs, the inclination of the substratum at the point of attachment and the position of the substratum as to whether over or under the fructification are important in determining the habit and form of the fructification. For example, a species present in quantity on a log slightly raised above the ground will often show fine resupinate specimens on the under side of the log; about an eighth of a circumference up the side of the log the upper margin is reflexed, becoming longer reflexed and with a shorter resu-

[1] Physiologische Anatomie der Pilze. Jahrb. f. wiss. Bot. 29 : 410. 1896.

pinate base as the fungus occurs higher on the side of the log; beyond one-fourth of a circumference upward from the bottom of the log, umbonate-sessile, dimidiate, and flabelliform specimens are frequently collected. I have a fine campanulate specimen of *Stereum fasciatum* which I found on the top of a log surrounded by this species. For these reasons the form of fungi growing on prostrate logs is not as reliable a character as it is in case of species growing on the ground or in the case of a flowering plant, and a student having in hand only a resupinate or only a flabelliform fructification from some herbarium must not be too confident that the respective species are always resupinate or always flabelliform.

The degree of differentiation in structure of the fructification of *Hymenochaete* has not been used in systematic work heretofore, so far as I am aware. Such structure affords, however, constant, positive, fundamental characters of easy determination. In the simplest condition of the fructification in this genus, only a setigerous layer is present, in the next degree higher of development, a hyphal layer connects the setigerous layer with the substratum or may be extended from the substratum as the upper surface of the pileus; in a still more highly developed condition, the hyphal layer is differentiated into an intermediate layer and a denser and dark zone, and usually into a second hyphal layer adnate to the substratum or forming the surface of the pileus.

Key to the Species

Fructifications in preparations of sections show at least both a setigerous layer and a hyphal layer destitute of setae 1
Fructifications lack a hyphal layer, i. e., have the setigerous layer seated directly on the substratum 16
Fructifications dimidiate or flabellate, of unknown structure ....*37. H. pallida*
1. Not stratose, i. e., consisting of but one setigerous layer of more or less thickness and of a hyphal layer 2
1. Stratose, composed of two or more strata, of which each consists of a setigerous layer and a hyphal layer 6
2. Hyphal layer simple and homogeneous throughout, i. e., not with a portion differentiated as an internal or bordering, conspicuously denser and darker zone 3
2. Hyphal layer not simple but differentiated into an intermediate layer and at least a bordering, denser and darker zone on the side towards the substratum or upper surface of the reflexed part 9
3. Fructification stipitate, erect; stem with two or more short branches at or near its apex and each bearing an expanded pileus..*1. H. damaecornis*

3. Old, dark, zonate specimens of above.....*Stage *H. formosa*
3. Fructification stipitate, erect; stem bearing a single reniform pileus.... .....*2. H. reniformis*
3. Not stipitate, but resupinate, or with pileus reflexed or sessile..... 4
4. Always resupinate so far as known yet. Guard against locating here the first-stratum stage of the stratose species and resupinate stages of reflexed species of the *H. aspera* group..... 5
4. Reflexed or dimidiate; resupinate specimens of *H. Cacao* and *H. aspera* have been found and perhaps may yet be found for the other species in this group..... 7
5. Fructification clay-color to antique brown, 100–140 μ thick, with hyphae loosely interwoven, suberect, 3–4 μ in diameter; setae 30–75×6–8 μ, scattered in the outer half of fructification; on *Corylus*, *Ostrya*, and *Vaccinium* .....*18. H. arida*
5. Hyphal layer very thin usually and may be overlooked unless substratum is included in the sections; setigerous layer up to 500 μ or more thick, zonate; causes a pocketed rot of wood; in Cuba, Venezuela, and Brazil .....*19. H. unicolor*
5. Hyphal layer 1–2 mm. thick, very compact; setae few, 70–90×9 μ, starting from the dark subhymenium; parasitic on living limbs of *Alnus*, *Benzoin*, etc., where they rub together.....*20. H. agglutinans*
6. Not cracked, antique brown to Brussels-brown, finally 2–6 strata thick, with the setigerous layers 30–45 μ thick and equalled or exceeded by the alternating hyphal layers.....*21. H. cinnamomea*
6. Not cracked, antique brown to Brussels-brown, finally up to 15 strata thick; strata with layers thinner than in the preceding species; paraphyses colored, with branched tips; in Panama .....*22. H. digitata*
6. Cracking in drying, Argus-brown, very compact, finally several strata thick, with setigerous layers 45–200 μ thick, and exceeding the hyphal layers.....*23. H. spreta*
7. Setigerous layer 90 μ thick, with setae crowded together in all its parts; in Cuba, Jamaica, and Venezuela.....*3. H. Cacao*
7. Setigerous layer not more than 60 μ thick..... 8
8. Pileus rough on the upper side with strigose, matted fibers; hymenium granular like that of *Thelephora terrestris;* margin with bright-colored mycelial strands; in Cuba, Jamaica, and Venezuela .....*4. H. aspera*
8. Pileus bay, sericeous, becoming somewhat zonate, radially plicate; margin lobed, often proliferous, yellow ocher; setae very large, 90–120×12–15 μ; in Jamaica and Guiana.....*5. H. Berkeleyana*
8. Pileus Argus-brown above and beneath, concentrically sulcate and somewhat zonate and shining above, very thin and papery; setae 65–90×9–10½ μ; in South Carolina and the West Indies to Chile .....*6. H. Sallei*
8. Pileus Brussels-brown to cinnamon-brown, radiately fibrillose with adnate fibrils, concentrically ridged; hymenium snuff-brown; setae 60–90×7½–10 μ; from Ontario to New Jersey....*7. H. borealis*
9. Setigerous layer not more than 50 μ thick..... 10
9. Setigerous layer more than 50 μ thick..... 13
10. Always resupinate so far as known. Compare also *H. Curtisii* and *H. rigidula,* which are sometimes resupinate..... 11
10. Usually reflexed or dimidiate, sometimes resupinate..... 12
11. Hymenium Isabella-color to tawny olive, cracked, margin somewhat sulphur-yellow; the adnate, bordering, dark zone next to substratum absent in some places; from Alabama to Mexico.....*24. H. epichlora*
11. Hymenium between wood-brown and Saccardo's umber; intermediate layer, connecting dark zone, and hyphal layer adnate to substratum are present; in Cuba.....*25. H. dura*
12. Becoming narrowly reflexed, Benzo-brown, rather rigid; hymenium Benzo-brown; setae crowded together in all parts of the setigerous layer; in Cuba and Venezuela.....*8. H. rigidula*

12. Resupinate or reflexed, drying pliant, antique brown; hymenium velvety, antique brown; setae few and usually far apart, 60–70×6–8 μ; Massachusetts to Texas and westward to Oregon ..... *9. H. Curtisii*

12. Dimidiate and imbricated, or effuso-reflexed, concentrically sulcate, Argus-brown, pliant; hymenium buckthorn-brown; setae few and far apart, 30×5–6 μ; Porto Rico to Venezuela and Guiana..... ..... *10. H. lutco-badia*

13. Always resupinate so far as known yet. Compare *H. tabacina* and *H. rubiginosa* which are frequently resupinate..... 14

13. Usually reflexed or dimidiate, sometimes resupinate..... 15

14. 200–700 μ thick, tawny olive to Brussels-brown, separable from the substratum; a narrow, dark zone divides the hyphal layer into an intermediate layer and a broad layer attached to the substratum; Arkansas to Mexico and in Cuba.....*26. H. leonina*

14. 120–260 μ thick, fulvous; lower dark zone is adnate to substratum; cystidia present; in Louisiana and Jamaica.....*27. H. fulva*

14. 120–240 μ thick, between Verona-brown and cinnamon-drab, slightly glaucous, adnate; lower dark zone bordering the intermediate layer is adnate to substratum; paraphyses colored, with pinnatifid tips; Georgia to Mexico, and in Cuba and Jamaica..*28. H. pinnatifida*

15. Usually reflexed, sometimes resupinate, thin, sericeous, and antique brown at first, finally glabrous and deep brownish drab, the margin and intermediate layer orange-yellow; hymenium snuff-brown to sepia, deeply cracked in resupinate portions into radiating systems, about one system for each centimeter of area; common throughout Canada and United States.....*11. H. tabacina*

15. Fructifications imbricated, conchiform, umbonate-sessile, or reflexed, sericeous, lineate-radiate, becoming variegated with concentric brown zones; closely related to *H. tabacina* but not cracking into radiating systems; found on vertical surfaces; Canada to Carolina..... .....*12. H. badio-ferruginea*

15. Reflexed, sometimes resupinate, coriaceous-rigid, thick, concentrically sulcate, Brussels-brown, becoming fuscous-black, the margin ochraceous-tawny; hymenium colliculose, bister, with conspicuous setae; Canada to Mexico and westward to the Pacific, and in Porto Rico.*13. H. rubiginosa*

15. Broadly reflexed, coriaceous-rigid, shallowly concentrically sulcate, zonate, Prout's brown; hymenium even, Sudan-brown; setigerous layer zonate, 300–400 μ thick, having scattered setae 35–40×4½–5 μ; in Jamaica.....*14. H. reflexa*

15. Imbricated, flabelliform, dimidiate, umbonate-sessile, or reflexed, thin, pliant when dry, concentrically sulcate, becoming snuff-brown to Rood's brown; hymenium even, antique brown; setigerous layer 80–100 μ thick, having setae 35–45×4½–6 μ; in Cuba and Porto Rico.....*15. H. cubensis*

16. Fructifications somewhat hoof-shaped, sessile, with a black, hard crust on the upper side; hymenium whitish, 3 mm. thick, zonate within; in Mexico.....*16. H. ungulata*

16. Fructification with upper edge sometimes barely reflexed, and black; hymenium drab, 400–1000 μ thick; growing on bark of living trunks of oak, elm, etc.; New Jersey to Florida and in the West Indies.....*17. H. corticolor*

16. Always resupinate so far as known..... 17

17. Setae crowded, 27–45×4½–5 μ; hymenium cinnamon-brown to Prout's brown; in Cuba and Jamaica.....*29. H. multisetae*

17. Colorless, incrusted cystidia and colored setae present, the setae about 30×4½ μ, only rarely emergent; hymenium vinaceous-buff; in Cuba.. .....*30. H. anomala*

17. Having setae larger than 27–45×4½–5 μ and not having cystidia..... 18

18. Cinnamon-brown to bister and Rood's brown, cracked into small 4–6-sided areas, 150–500 μ thick; setae 60–70×8–12 μ, starting in all parts of the fructification; Canada to Texas, westward to Kentucky, and in Jamaica.....*31. H. corrugata*

18. Tawny olive, not cracked, up to 90 μ thick; setae 60–90×9–12 μ, all starting from the dark zone next to the substratum; Vermont to Pennsylvania and Illinois.....*32. H. episphaeria*
18. Dresden-brown, differs in structure from *H. episphaeria* by having spores 7–9×3½ μ and by containing crystalline masses 12–15 μ in diameter; in Louisiana and Cuba.....*33. H. cervina*
18. Between bister and Vandyke-brown, slightly velvety when young, becoming glabrous, cracked, 200–300 μ thick, dark and opaque; setae 50–90×8–10 μ, starting in all parts of the fructification; in Jamaica .....*34. H. opaca*
18. Raw umber to mummy-brown, somewhat cracked, 30–75 μ thick; setae 36–45×5–7 μ; on *Thuja* and *Tsuga;* Vermont to Florida and in British Columbia.....*35. H. tenuis*
18. Bister to warm sepia, somewhat colliculose, not cracked; 150–200 μ thick; setae abundant, 60–75×8–9 μ, starting in all parts of the fructification; with general aspect of resupinate *H. rubiginosa* but thin and adnate; in Vermont, Maryland, Ohio, and Kentucky .....*36. H. fuliginosa*

ARRANGEMENT OF THE SPECIES

1. **Hymenochaete damaecornis** Link ex Léveillé, Ann. Sci. Nat. Bot. III. **5**: 151. 1846; Sacc. Syll. Fung. **6**: 589. 1888; Massee, Linn. Soc. Bot. Jour. **27**: 96. 1890. Plate 16, fig. 1.

Stereum damicorne Link, Ges. Naturforsch. Freunde Berlin Mag. **3**: 40. 1809; Fries, Epicr. 546. 1838; R. Soc. Sci. Upsal. Actis III. **1**: 109. 1851; Lloyd, Letter 46: 6. 1913.—*Thelephora damaecornis* Link ex Fries, Linnaea **5**: 524. 1830.—*Hymeno-*

chaete formosa Léveillé, Ann. Sci. Nat. Bot. III. **5** : 151. 1846. —An *Thelephora speciosa* Fries, Linnaea **5** : 525. 1830?

Fructifications with several to many pilei borne on very short branches of a common central stem at or near its apex; stem cylindric, velutinous with setae, hazel to Brussels-brown; pilei coriaceous, thin, expanded, drying strongly inrolled, even or sometimes rugose, silky and antique brown when young, finally glabrous except for setae which are scattered over the upper surface and more abundant towards the stem, bister, and sometimes concentrically zonate with narrow dark zones near the margin; hymenium a little darker than the upper surface, Prout's brown to Mars brown, abundantly and conspicuously setulose; in structure 200–500 μ thick, composed of a setigerous layer up to 150 μ thick and of a hyphal layer constituting the remainder and not bordered on either side by a dense, dark zone; setae 90–150×9–15 μ, emerging up to 60 μ, tapering upward from the base, starting from all parts of the setigerous layer; spores hyaline, even, 5–5½× 4–4½ μ.

Fructifications 3–15 cm. high, 1½–3 cm. broad; individual pilei 1–1½ cm. long, 1–3 cm. broad; stem 2–14 cm. long, 2–3 mm. in diameter in dried specimens not cited under *H. formosa* on a following page.

On roots of trees and among leaves in thick woods. West Indies and Mexico to Brazil. October to March.

H. damaecornis exhibits wide variation in the dimensions of its fructifications and in the number of pilei which are borne on the central stem; the short branches of the latter are somewhat flattened in radial planes with respect to the central stem if so many pilei are present that some are borne along the sides of the stem below the terminal cluster. Where only four pilei are present in a symmetrical terminal cluster, there is bifurcation of the main stem into two flattened branches, and of these again into the more broadly flattened bases of the individual pilei. There is often a curious twisting of the end of the branch and base of the pileus through an angle of 90 degrees to bring the plane of the pileus dorsiventral, if we may compare it with a leaf. In this connection,

the lateral pilei of *H. Schomburgkii* in Hennings' figure in Engler & Prantl's 'Nat. Pflanzenfam.' are perhaps conventional. In the collection made in Jamaica by Murrill and Harris, 1057, as cited below, there is one old fructification with pileus dark-colored and obscurely zonate which could be referred to *H. formosa;* this fructification is in a cluster of younger, azonate fructifications. The specimen upon which Fries based his *Thelephora speciosa* was evidently a fructification of *H. damaecornis* with upper surface of the pilei bearing more setae than the normal, for he gives its distinctive character as "undique velutino" and on the preceding page has described the stem of *H. damaecornis* as "velutinus," which we know to be by setae. The specimen collected by Peck in Providence, New York, which is cited in Sacc. 'Syll. Fung.' as the northern station of *Hymenochaete speciosa,* has no setae and should not have been referred to this species. I have omitted reference to Plumier, Filic. Am. pl. 168. figs. H, K, as illustrations of *H. damaecornis,* for it is incredible that the draftsman who executed pls. 1–167 of that work could have had before him a specimen of *H. damaecornis* when he made figs. H and K of pl. 168.

Specimens examined, additional to those cited under *H. formosa:*

Cuba: *C. Wright, 272* (Curtis Herb.); Sierra Nipe, Oriente, *J. A. Shafer, 3326* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55553).

Jamaica: Mabiss River, *L. M. Underwood, 1399,* comm. by N. Y. Bot. Gard. Herb.; Troy and Tyre, *W. A. Murrill & W. Harris, 1057* (in N. Y. Bot. Gard. Herb., Mo. Bot. Gard. Herb., 55552, and in Burt Herb.).

Honduras: *M. E. Peck* (in N. Y. Bot. Gard. Herb.).

* Stage **H. formosa** Léveillé, Ann. Sci. Nat. Bot. III. **5** : 151. 1846; Sacc. Syll. Fung. **6** : 589. 1888; Massee, Linn. Soc. Bot. Jour. **27** : 96. 1890.—Compare Bresadola, Hedwigia **35** : 289. 1896. Plate 16, fig. 2.

An *Hymenochaete Schomburgkii* Hennings in Sacc. Syll. Fung. **9** : 227. 1891; Engl. & Prantl, Nat. Pflanzenfam. (**I.** 1**) : 121. *f. 68 F.* 1898?

Illustrations: Broteria 5 : *pl. 2. f. 3.*

Fructifications with several to many pilei borne on very short branches of a common central stem at or near its apex; stem cylindric, velutinous with setae, hazel to Brussels-brown; pilei coriaceous, thin, expanded, drying strongly inrolled, even or sometimes rugose, silky and antique brown when young, finally glabrous except for setae which are scattered over the upper surface and more abundant towards the stem, bister, concentrically zonate, with narrow, dark zones near the margin; hymenium a little darker than the upper surface, Prout's brown to Mars brown, abundantly and conspicuously setulose; in structure 250–400 μ thick, composed of a setigerous layer up to 150 μ thick and of a hyphal layer constituting the remainder, and not bordered on either side by a denser dark zone; setae 90–150$\times$9–15 μ, emerging up to 40 μ, tapering upward from the base, starting from all parts of the setigerous layer; spores not found.

Fructifications 5–8 cm. high, 2–3 cm. broad; individual pilei up to 2 cm. broad and 2 cm. long in specimens seen; stem 3–5 cm. long, 2–4 mm. in diameter in dried specimens.

On the ground and buried wood. Guadaloupe and Honduras to Brazil. October.

I have seen only two collections which seem referable to *H. formosa* and the one of these from Honduras contains a young, bright-colored fructification which affords the details concerning the young stage given in the body of the above description and does away with the distinction as to zonation of pileus upon which Léveillé founded *H. formosa,* the original description of which appears to have been based upon an old form of *H. damaecornis* at a period in mycological work when mere form differences were over-emphasized. I give *H. formosa* with full description in the hope that more ample collections may be accumulated which are not confined to a single stage of development.

Specimens examined:

Exsiccati: Rick, Fungi Austro-Am., 10.

British Honduras: *M. E. Peck* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55551).

Brazil: Sao Leopoldo, Rio Grande do Sul, *J. Rick,* in Rick, Fungi Austro-Am., 10.

2. **H. reniformis** (Fries) Léveillé, Ann. Sci. Nat. Bot. III. 5 : 151. 1846; Cooke, Grevillea **8** : 145. 1880; Sacc. Syll. Fung. **6** : 588. 1888; Massee, Linn. Soc. Bot. Jour. **27** : 96. *pl. 5. f. 1.* 1890; Romell, K. Svenska Vet.-Akad. Bihang till Handl. Afd. III. **26**[16]: 42. 1901.

Stereum reniforme Fries, Epicr. 546. 1838; R. Soc. Sci. Upsal. Actis III. **1** : 109. 1851; Léveillé, Ann. Sci. Nat. Bot. III. **2** : 210. 1844; Berkeley, Ann. & Mag. Nat. Hist. **10** : 382. *pl. 11. f. 11.* 1842.

"*S. reniforme,* coriaceum, cinnamomeum, pileo dimidiato *reniformi* integerrimo *zonato,* stipite e basi torulosa decumbente adscendente, hymenio laevi velutino. In American calidiori. Eumorphum, subvelutinum. Pileus uncialis."

—Original description of Fries.

In typical specimens of this species a single reniform pileus is borne at the apex of the stem. Berkeley, *loc. cit.,* referred to this species a specimen whose pileus is slightly bilobed, which he figured, and he noted that the whole fructification was sprinkled with short, bright, brown setae. Romell describes the spores as hyaline, obliquely ellipsoidal, 5–6×4 μ.

H. reniformis has been collected several times in Brazil but not yet in the West Indies or Central America, so far as I know.

3. **H. Cacao** Berkeley, Linn. Soc. Bot. Jour. **10** : 333. 1868; Linn. Soc. Trans. II. **1** : 403. *pl. 46. f. 1–3.* 1879; Sacc. Syll. Fung. **6** : 592. 1888; Massee, Linn. Soc. Bot. Jour. **27** : 100. 1890.

Stereum Cacao Berkeley, Hooker's London Jour. Bot. **6** : 169. 1854.

Illustrations: Linn. Soc. Trans. II. **1** : *pl. 46. f. 1–3;* Engl. & Prantl, Nat. Pflanzenfam. (I. 1**) : 122. *text f. 68 D, E.*

Type: in Kew Herb. and a portion in Mo. Bot. Gard. Herb.

Fructifications sessile, flabelliform, connate, deeply lobed and plicate, upper surface velvety, concentrically sulcate, Brussels-brown; hymenium between fuscous and blackish

brown (3); in structure 600 μ thick, composed of a setigerous layer 90 μ broad and of a hyphal layer 500 μ broad, having densely arranged, colored hyphae 4½ μ in diameter, running longitudinally, curving on the one side into the hymenium and on the other into the surface of the pileus; setae ventricose at base, 18×4½–5 μ, densely crowded together in all parts of the broad setigerous layer; spores hyaline, even, 4×3 μ.

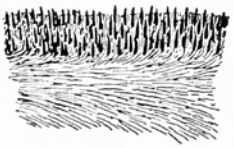

Fig. 1
H. Cacao.
Section × 68. From type.

Fructifications 3½ cm. broad, 3 cm. long.

On dead wood. Jamaica, Cuba, and Venezuela. July. Rare.

By the kindness of Sir David Prain, I have been able to study a portion of the type of *H. Cacao* collected in the Khasia Mountains, India; it has the hymenium olive-drab now but is of the same form and structure as American specimens. The American specimens are a rich tobacco-brown with darker hymenium. This species is noteworthy by having the setae densely crowded together through a zone 90 μ broad. The collection by Earle, 406, cited below, seems referable to *H. Cacao* on account of the color of the hymenium and structure in section but it is wholly resupinate.

Specimens examined:

India: Khasia Mts., *Dr. Hooker,* portion of type comm. by Sir David Prain (in Mo. Bot. Gard. Herb., 55559).

Jamaica: Cinchona, *F. S. Earle, 406,* comm. by N. Y. Bot. Gard. Herb., and *W. J. Robinson* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55481).

Cuba: *C. Wright, 526* (in Curtis Herb.).

Venezuela: *Fendler* (in Curtis Herb.).

4. H. aspera Berk. & Curtis, Linn. Soc. Bot. Jour. **10**: 334. 1868; Sacc. Syll. Fung. **6**: 592. 1888; Massee, Linn. Soc. Bot. Jour. **27**: 100. 1890.

An *Hydnum resupinatum* Swartz, Prodr. 149. 1788; Fl. Ind. Occ. **3**: 1921. 1806?—An *Thelephora setosa* Swartz in Berkeley, Ann. & Mag. Nat. Hist. **10**: 381. *pl. 11. f. 10.* 1842? Not *Hymenochaete setosa* Berk. & Curtis, Grevillea **1**: 165.

1873; Sacc. Syll. Fung. **6**: 538. 1888.—*Hydnochaete setosa* (Swartz) Lloyd, Myc. Notes 41: 559. *text f. 766.* 1916.

Illustrations: Berkeley, Ann. & Mag. Nat. Hist. **10**: *pl. 11. f. 10;* Lloyd, Myc. Notes 41: 559. *text f. 766.*

Type: in Kew Herb. and Curtis Herb., and of *Thelephora setosa* in Brit. Mus. Herb.

Fructifications broadly reflexed and with a narrow, resupinate base, or dimidiate, sessile, imbricated, laterally confluent, very thin, drying pliable, with upper surface rough with coarse, strigose, matted fibers, very shallowly concentrically sulcate; hymenium granular, snuff-brown; in structure 150–400 μ thick, with a narrow setigerous layer consisting of the hymenium, and with the hyphal layer composed of longitudinally arranged, colored hyphae 2 μ in diameter which curve outward and become interwoven to form the upper surface of the pileus—no dense, dark zones present; setae scattered, 60–75×6 μ, tapering from the base, emerging up to 30 μ, some starting from the subhymenium but mostly from the hymenium; spores hyaline, even, 3×2 μ as seen on basidia.

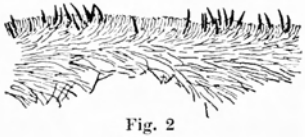

Fig. 2
H. aspera.
Section × 68. See *pl. 16, f. 3.*

Pilei of fructifications 1–2½ cm. long, 1–5 cm. broad, sometimes resupinate on areas up to 5×3 cm.

On dead frondose wood on the ground in forests. Cuba, Jamaica, and Venezuela. October to March.

H. aspera may be recognized by its thin, pliant pileus, which is rough on the upper surface with strigose matted fibers, by granular hymenium which is as granular as in *Thelephora terrestris,* and by the short, brighter-colored mycelial strands which form the resupinate margin.

Specimens examined:

Cuba: *C. Wright, 211,* type (in Curtis Herb.); Alto Cedro, *F. S. Earle, 340, Earle & Murrill, 488,* and *Underwood & Earle, 1513,* all from N. Y. Bot. Gard. Herb.; Ciego de Avila, Puerto Principe, *Earle & Murrill, 605,* comm. by N. Y. Bot. Gard. Herb.

5. H. Berkeleyana (Montagne) Cooke, Grevillea **8**: 147. 1880; Sacc. Syll. Fung. **6**: 596. 1888.

Stereum Berkeleyanum Montagne, Ann. Sci. Nat. Bot. IV. **1**: 140. 1854; Syll. Crypt. 178. 1856.

Type: authentic specimen in Kew Herb.—probably portion of type.

Fructifications effuso-reflexed, cespitose-imbricated, often dimidiate, radiately rugose, sericeous, with the hairs radially decumbent, bay, becoming somewhat zonate with interrupted blackish zones, radially plicate, the margin lobed, sometimes proliferous, yellow ocher; hymenium not rimose, antique brown; in structure 500–600 μ thick, with the hyphal layer not bordered on either side by a dark, dense zone, and composed of closely and longitudinally arranged, colored, very thick-walled hyphae $3\frac{1}{2}$–4 μ in diameter and up to 5 μ on the upper surface of the pileus; setae scattered, not crowded, 90–120×12–15 μ, emerging 60–75 μ, tapering from the base upward to a slender point; spores hyaline, even, $6\times3\frac{1}{2}$ μ.

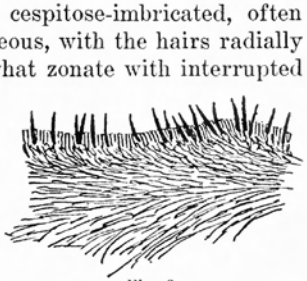

Fig. 3
H. Berkeleyana.
Section × 44. See *pl. 16, f. 5.*

Fructifications with reflexed part 1 cm. broad, 1 cm. long, laterally confluent into clusters up to 3 cm. broad.

On bark and rotten wood. Jamaica and Guiana. December and January. Rare.

The general aspect of *H. Berkeleyana* is suggestive of that of *H. badio-ferruginea* but the former has its pilei more crowded together than the latter and radially plicate. The absence of any dark zones bordering the intermediate layer of *H. Berkeleyana* sharply separates this species from the *H. tabacina* group when sections are examined, and places the species in the group with *H. attenuata* and *H. Sallei*, from both of which it is distinct by its plicate, more crowded pilei, covering of the pilei, and larger setae. I had not received the collections from Jamaica, cited below, when I studied the authentic specimen from Montagne at Kew, but these later

collections agree so well with the original description and my preparation of *H. Berkeleyana* that I regard them as certainly the same species.

Specimens examined:

Jamaica: Chester Vale, *W. A. & Edna L. Murrill, 371,* comm. by N. Y. Bot. Gard. Herb.; Cinchona, *W. A. & Edna L. Murrill, 445,* comm. by N. Y. Bot. Gard. Herb.

Guiana: Cayenne, from Montagne (in Kew Herb.).

6. H. Sallei Berk. & Curtis, Linn. Soc. Bot. Jour. **10**: 333. 1868; Cooke, Grevillea **8**: 146. 1880; Sacc. Syll. Fung. **6**: 593. 1888; Massee, Linn. Soc. Bot. Jour. **27**: 101. 1890.

Stereum elegantissimum Speggazini, Soc. Cientif. Argentina Anal. **16**: 38. 1883.—*Hymenochaete elegantissima* (Speg.) Sacc. Syll. Fung. **6**: 594. 1888; Massee, Linn. Soc. Bot. Jour. **27**: 99. 1890.—*Stereum tenuissimum* Fries, R. Soc. Sci. Upsal. Actis III. **1**: 111. 1851, but not of Berkeley, Hooker's London Jour. Bot. **6**: 510. 1847.—*Hymenochaete tenuissima* Berkeley, Linn. Soc. Bot. Jour. **10**: 333. 1868, but not *Stereum tenuissimum* Berkeley, Hooker's London Jour. Bot. **6**: 510. 1847.

Illustrations: Broteria **5**: *pl. 2. f. 4.* 1906.

Type: in Kew Herb. and Curtis Herb.

Fructifications very thin, papery, flexible when dry, umbonate-sessile and laterally confluent, or reflexed and imbricated, at first fibrous on the upper surface, antique brown, soon silky-fibrous, with the fibers radially arranged, Argus-brown to auburn, concentrically sulcate, and at length somewhat zonate and shining, the margin lobed; hymenium Argus-brown; in structure 200–400 μ thick, with the hyphal layer simple, not bordered by a dark zone, composed of somewhat loosely interwoven and longitudinally arranged, thick-walled, colored hyphae $3\frac{1}{2}$–$4\frac{1}{2}$ μ in diameter; setae 65–90×9–$10\frac{1}{2}$ μ, emerging up to 60 μ, starting from the subhymenium which is not ap-

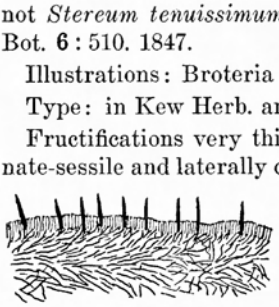

Fig. 4
H. Sallei.
Section × 68. From type.
See *pl. 17, f. 15.*

preciably darker than adjacent tissue; spores hyaline, even, 3–4×1½–2½ μ.

Fructifications 1½–3 cm. in diameter and laterally confluent, or with reflexed part 1–2½ cm. long, up to 4 cm.., and more, broad by lateral confluence.

On dead twigs, prostrate limbs, and at base of trees of frondose species. South Carolina, West Indies, Mexico, and South America to Paraguay and Chile. September to May. Common.

Fully developed specimens of *H. Sallei* may be recognized by their thin, papery pileus which may be folded without breaking, which is a rich Argus-brown both on the upper side and hymenium, and concentrically sulcate, somewhat zonate, and shining on the upper side also. Collections of young specimens of this species when first found were referred by early authors to *H. tenuissima,* a Ceylon species, of which good material is now available for comparison in the collection from Ceylon distributed in Sydow, Fungi Exotici Exs., 318, and in Elmer, Philippine Island Plants, 9850, both of which I have compared with a portion of the type communicated by Sir David Prain through the kindness of Miss Wakefield. The true *H. tenuissima* has its upper surface clothed with coarse pubescence, as stated in the original description, and the fibers of this pubescence do not finally become decumbent, radiately arranged, and the surface shining; the hymenium of *H. tenuissima* is somewhat radiately rugose and between Isabella-color and Dresden-brown — not antique brown.

Specimens examined:

Exsiccati: Balansa, Pl. du Paraguay, 3916, under the name *Hymenochaete elegantissima;* Ravenel, Fungi Am., 718, under the name *Hymenochaete badio-ferruginea;* Rick, Fungi Austro-Am., 31, under the name *Hymenochaete tenuissima;* Smith, Central Am. Fungi, 149, under the name *Hymenochaete tabacina.*

South Carolina: Seaboard, *H. W. Ravenel,* in Ravenel, Fungi Am., 718.

Florida: *C. G. Lloyd, 2071.*

Cuba: *C. Wright, 278,* type (in Kew Herb. and in Curtis Herb.), and *531,* under the name *H. tenuissima* (in Kew Herb.), and *275,* under the name *H. tenuissima* (in Curtis Herb.); Alto Cedro, *F. S. Earle, 339,* and *Earle & Murrill, 514, Underwood & Earle, 1512, 1569, 5182,* all comm. by N. Y. Bot. Gard. Herb.; Artemisa, *O. Ames & R. G. Leavitt,* comm. by W. G. Farlow; El Yunque, Mt. Baracoa, *Underwood & Earle, 765, 1235,* comm. by N. Y. Bot. Gard. Herb.; La Gloria, Camagüey, *J. A. Shafer, 741* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55509); Omaja, *C. J. Humphrey, 2750* (in Mo. Bot. Gard. Herb., 8639); Sierra Nipe, *J. A. Shafer, 3375* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55510); Tacajo, Nipe Bay, *F. S. Earle, B.*

Porto Rico: Espinosa, *J. A. Stevenson, 6373* (in Mo. Bot. Gard. Herb., 55081).

Jamaica: Castleton Gardens, *F. S. Earle, 246,* comm. by N. Y. Bot. Gard. Herb.; Cinchona, *W. A. & Edna L. Murrill, 445,* comm. by N. Y. Bot. Gard. Herb.; Mandeville, *A. E. Wight,* comm. by W. G. Farlow; Mansfield, near Bath, *Wm. R. Maxon,* comm. by W. G. Farlow, and *L. M. Underwood, 2780,* comm. by N. Y. Bot. Gard. Herb.; Moore Town, *W. A. & Edna L. Murrill, 162, 1113,* comm. by N. Y. Bot. Gard. Herb.; Troy and Tyre, *L. M. Underwood, 2970,* comm. by N. Y. Bot. Gard. Herb., and *W. A. Murrill & W. Harris, 858, 924, 1010,* comm. by N. Y. Bot. Gard. Herb.

St. Kitts: Molyneaux Estate, *N. L. Britton & J. F. Cowell, 338,* comm. by N. Y. Bot. Gard. Herb.

Grenada: Grand Etang, *R. Thaxter,* comm. by W. G. Farlow, 1.

Mexico: Cordoba, *Salle* (in Kew Herb.); Xuchiles, Cordoba, *W. A. & Edna L. Murrill, 1215* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 54606); Jalapa, *W. A. & Edna L. Murrill, 190* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 54447), and *C. L. Smith,* in Smith, Central Am. Fungi, 149; Orizaba, *W. A. & Edna L. Murrill, 751, 794* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 54630, 54642).

Brazil: Rio Grande do Sul, *J. Rick,* in Rick, Fungi Austro-Am., 31.

Paraguay: in Balansa, Pl. du Paraguay, 3916 (in Kew Herb.).

Chile: Central Chile, *R. P. Nataniel Costes* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 44782).

7. H. borealis Burt, n. sp.

Type: in Burt Herb.

Fructifications thin, pliant, imbricated, reflexed, attenuated towards the base, or umbonate-sessile and attached along one side, radiately fibrillose, concentrically ridged, Brussels-brown to cinnamon-brown; hymenium even, not cracked, snuff-brown; in structure 240–340 μ thick, with the setigerous layer 60 μ thick, and with the hyphal layer not bordered on either side by a dense, dark zone, and having its hyphae rather loosely interwoven and longitudinally arranged, colored, 2½ μ in diameter; setae scattered, 60–90×7½–10 μ, emerging up to 60 μ, starting from all parts of the setigerous layer; spores hyaline, even, 4–6×2–3 μ.

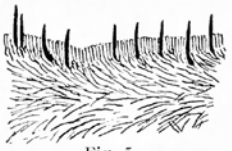

Fig. 5
H. borealis.
Section × 68. From type.
See *pl. 16, f. 6.*

Fructifications 8–12 mm. in diameter, reflexed portion up to 4 mm. long.

On decorticated frondose wood. Ontario to New Jersey. October to April. Rare.

H. borealis is distinguished by having a simpler structure in section than any other of the pileate species which occur in the north. The absence of dark, dense zones bordering on an intermediate layer separates it at once from *H. badio-ferruginea. H. attenuata* of the East Indies is a closely related species but the latter has its pileus strigose-hirsute.

Specimens examined:

Ontario: London, *J. Dearness, 1017* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55513).

Vermont: Abby Pond, Ripton, *E. A. Burt,* type.

New Jersey: Newfield, *J. B. Ellis* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55503).

8. **H. rigidula** Berk. & Curtis, Linn. Soc. Bot. Jour. **10**: 334. 1868; Cooke, Grevillea **8**: 146. 1880; Sacc. Syll. Fung. **6**: 593. 1888; Massee, Linn. Soc. Bot. Jour. **27**: 99. 1890.

An *H. fulvella* Berk. & Curtis in Cooke, Grevillea **8**: 148. 1880; Sacc. Syll. Fung. **6**: 598. 1888; Massee, Linn. Soc. Bot. Jour. **27**: 104. 1890?—An *H. pulcherrima* Massee, Linn. Soc. Bot. Jour. **27**: 104. *pl. 5. f. 4.* 1890; Sacc. Syll. Fung. **9**: 229. 1891?—An *H. scruposa* Massee in Cooke, Grevillea **20**: 11. 1891; Sacc. Syll. Fung. **11**: 123. 1895?

Type: in Kew Herb. and Curtis Herb.

Fructifications resupinate, effused, becoming narrowly reflexed, lobed, coriaceous, rather rigid, with the upper surface of the reflexed part velvety, snuff-brown at first, later Benzo-brown; hymenium Benzo-brown, ochraceous-tawny near the margin; in structure 300–500 μ thick, with the setigerous layer 30–45 μ broad and with the intermediate layer comprising most of the thickness of the fructification and bordered on each side by a narrow, dense, dark zone, of which that on the setigerous side is the less distinct; hyphae of intermediate layer 3–4 μ in diameter, colored, somewhat interwoven and longitudinally arranged; setae conical, 30–45×6–8 μ, larger ones sometimes found, emerging up to 30 μ, very numerous, starting from all portions of the setigerous layer; spores probably hyaline, even, 4×1½–2 μ.

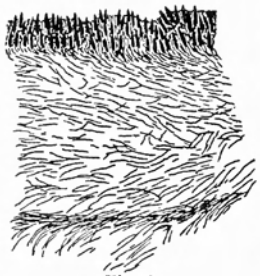

Fig. 6
H. rigidula.
Section × 68. From type.

Fructifications with reflexed portion ½–1 cm. long, resupinate over areas 4×1–1½ cm.

On dead wood and bark of frondose species. Cuba and Venezuela. March. Rare.

On account of the dark zones bordering its intermediate layer, *H. rigidula* belongs in the small group, of which *H. tabacina* and *H. rubiginosa* are more common examples; it is distinguishable from all these species by the great number and crowded arrangement of its setae in the setigerous layer,

a feature which it shares with *H. Cacao*. *H. rigidula* differs from *H. Cacao* by having its intermediate layer bordered by a prominent dark zone on its outer side, by being effuso-reflexed, and with less black in the color of its hymenium. In dried condition it is more rigid than *H. tabacina* and the other species of its group with the exception of *H. rubiginosa*, from all forms of which it may be distinguished at sight by less conspicuous setae when viewed with a hand lens and by the much thinner, setigerous layer when sections are examined. So few spores of *H. rigidula* have been seen in the preparations that the spore dimensions given are very doubtful. My belief in the specific identity of *H. fulvella* is based upon the similarity of sectional preparations; since noting this similarity of structure, I have not had an opportunity to confirm my opinion by placing the original specimens side by side and comparing them with regard to general aspect. I did not find *H. pulcherrima* when I was at Kew, and in reply to my letter to Miss Wakefield concerning the original Fendler number for this type, Sir David Prain has written, "With regard to *H. pulcherrima* Mass., the specimen indicated by Massee as No. 3721a was removed by him from a gathering of *H. fulvella* B., the label of which, in Berkeley's handwriting, is 'Stereum fulvellum B. & C. 173, Venezuela.' Massee named it on the sheet 'H. scruposa,' but evidently he changed the name before publishing it."—It seems probable that in the year following the publication of *H. pulcherrima*, Cooke saw the specimen upon which it was based, still labelled with only the herbarium name *H. scruposa* Massee and published the latter. I have studied the specimen in Curtis Herbarium labelled "*Stereum fulvellum* B. & C., Fendler, 173. Venezuela" and found it to have the characteristic structure of *H. rigidula* and *H. fulvella* and to agree well with the published descriptions of *H. fulvella, H. pulcherrima,* and *H. scruposa*.

Specimens examined:

Cuba: *C. Wright, 529,* type (in Kew Herb. and in Curtis Herb.); Herradura, *Earle & Murrill, 170,* comm. by N. Y. Bot. Gard. Herb.; San Diego de los Baños, *Earle & Murrill, 219,* comm. by N. Y. Bot. Gard. Herb.

Grenada: Grand Etang, *R. Thaxter,* comm. by W. G. Farlow. Venezuela: *Fendler, 175,* type of *Hymenochaete fulvella* (in Kew Herb.), and *173* (in Curtis Herb., under the name *Stereum fulvellum*).

9. **H. Curtisii** (Berk.) Morgan, Cincinnati Soc. Nat. Hist. Jour. **10**: 197. 1888.

Stereum Curtisii Berkeley, Grevillea **1**: 164. 1873; Sacc. Syll. Fung. **6**: 581. 1888; Massee, Linn. Soc. Bot. Jour. **27**: 195. 1890.

Type: type distribution in Ravenel, Fungi Car. **3**: 26.

Fructifications at first orbicular, then effused, confluent, becoming reflexed, coriaceous, thin, separable, drying pliant, the upper surface at first silky, fibrillose, somewhat concentrically ridged, antique brown, becoming glabrous and hair-brown when old; hymenium not cracking, velvety, antique brown; in structure 140–240 μ thick, with intermediate layer bordered by a narrow, dense, dark zone towards the upper surface of the pileus or the substratum, the hyphae densely and longitudinally arranged, colored, thin-walled, 2½ μ in diameter; setae few and far apart usually, 60–70×6–8 μ, emerging up to 45 μ, tapering upward to a sharp point; spores hyaline, allantoid, 6–7×1½–2 μ.

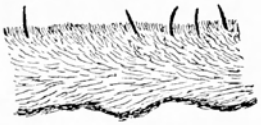

Fig. 7
H. Curtisii.
Section × 68. From type.
See *pl. 17, f. 9.*

Fructifications confluent along under side of limbs for 2–20 cm. or more, 1½–2½ cm. broad; reflexed lobes 5 mm. long, 10–15 mm. broad.

On rotting limbs of *Quercus* and other frondose species. Massachusetts to Texas and westward to Oregon—in low altitudes. April to December. Common.

H. Curtisii may be recognized by its rich antique brown color, thin, pliant, reflexed portions, velvety hymenium which is not at all cracked, and by the notable scarcity of setae which cannot be found in the hymenium with a pocket lens and are sometimes lacking in thin sections in microscopic prepara-

tions. The geographical range of *H. Curtisii* overlaps on the north the southern range of *H. tabacina,* and it is itself displaced in the West Indies, Mexico, and further south by *H. Sallei.*

Specimens examined:

Exsiccati: Bartholomew, Fungi Col., 2381, 2882, 4290, 4635; Ellis, N. Am. Fungi, 16; Ell. & Ev., Fungi Col., 103; Rabenhorst-Winter, Fungi Eur., 3525, under the name *Stereum tabacinum,* with note; Ravenel, Fungi Am., 222, 446; Fungi Car. **3** : 26; de Thümen, Myc. Univ., 113.

Massachusetts: Cambridge, *L. M. Underwood, 1080* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55542); East Sudbury, *A. B. Seymour, T 18* (in Seymour Herb., and in Mo. Bot. Gard. Herb., 18349).

Connecticut: Central Valley, *J. L. Sheldon, 5,* comm. by N. Y. Bot. Gard. Herb.

New York: Grand View, *H. von Schrenk* (in Mo. Bot. Gard. Herb., 43024); New York Botanical Garden, Bronx Park, *Class in Mycology* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55533); Staten Island, *S. C. Edwards,* in Lloyd Herb., 06902; White Plains, *W. H. Ballou* (in Mo. Bot. Gard. Herb., 55032).

New Jersey: from Laning Herb. (in Mo. Bot. Gard. Herb., 5182); Forked River, *W. H. Ballou, 2;* Lakefield, *E. A. Daniels,* comm. by H. Webster; Newfield, *J. B. Ellis,* comm. by Lloyd Herb., also (in Mo. Bot. Gard. Herb., 55534), and in Ellis, N. Am. Fungi, 16, in Ell. & Ev., Fungi Col., 103, and in de Thümen, Myc. Univ., 113.

Pennsylvania: from Michener Herb., two specimens (in Mo. Bot. Gard. Herb., 55528, 55529); Bethlehem, *Schweinitz* (in Herb. Schweinitz, under the name *Thelephora leprosa* of Syn. N. Am. Fungi, No. 636); Ohio Pyle, *W. A. Murrill, 1067* (in N. Y. Bot. Gard. Herb.).

Maryland: Hyattsville, *F. L. Scribner, 83,* comm. by U. S. Dept. Agr. Herb.; Takoma Park, *C. L. Shear, 1074.*

District of Columbia: *W. A. Murrill, 1464* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55535); Takoma Park, *P. L. Ricker, 819.*

Virginia: *W. A. Murrill* (in N. Y. Bot. Gard. Herb.); Arlington, *W. H. Long, 12690* (in Mo. Bot. Gard. Herb., 44164); Mt. Vernon, *P. L. Ricker, 1122;* Woodstock, *C. L. Shear, 1190.*

North Carolina: *H. W. Ravenel* (in Curtis Herb., 1646).

South Carolina: *H. W. Ravenel,* type distribution, in Ravenel, Fungi Car. **3** : 26; Aiken, *H. W. Ravenel,* in Ravenel, Fungi Am., 446; Clemson College, *P. H. Rolfs, 1822, 1823,* and *H. D. House,* in Bartholomew, Fungi Col., 2381.

Georgia: Darien, *H. W. Ravenel,* in Ravenel, Fungi Am., 222.

Florida: *C. G. Lloyd, 2116* (in Lloyd Herb.); West Palm Beach, *R. Thaxter, 83* (in Mo. Bot. Gard. Herb., 43900).

Alabama: Auburn, *F. S. Earle, 123,* and *an unnumbered specimen* (in Mo. Bot. Gard. Herb., 55537, 55538); New Albany, *A. B. Seymour, 2930* (in N. Y. Bot. Gard. Herb.).

Mississippi: Jackson, *E. Bartholomew, 5791* (in Mo. Bot. Gard. Herb., 44123), and in Bartholomew, Fungi Col., 4635; Ocean Springs, *F. S. Earle, 182* (in Mo. Bot. Gard. Herb., 5176), and *an unnumbered specimen,* comm. by U. S. Dept. Agr. Herb.

Louisiana: Acadia Parish, *A. B. Langlois;* Alden Bridge, *W. Trelease* (in Mo. Bot. Gard. Herb., 5169); St. Martinville, *A. B. Langlois,* comm. by Lloyd Herb., 2423.

Texas: Gonzales, *C. L. Shear, 1230;* Houston, *H. W. Ravenel, 36, 38, 134, 160,* comm. by U. S. Dept. Agr. Herb.

Ohio: Oberlin, *F. D. Kelsey, 821* (in N. Y. Bot. Gard. Herb.).

Kentucky: Crittenden, *C. G. Lloyd, 3126;* Mammoth Cave, *C. G. Lloyd, 1189.*

Tennessee: Elkmont, *C. H. Kauffman, 76* (in Mo. Bot. Gard. Herb., 44997).

Wisconsin: Blue Mounds, *Miss A. O. Stucki, 29,* Univ. of Wisconsin Herb.; Madison, *W. Trelease, 77, 79* (in Mo. Bot. Gard. Herb., 5169, 5170, and in Seymour Herb.), and *Miss A. O. Stucki, 63,* Univ. of Wisconsin Herb.

Minnesota: Princeton, *C. J. Humphrey, 990* (in Mo. Bot. Gard. Herb., 10274).

Missouri: Bismarck, *L. O. Overholts* (in Mo. Bot. Gard. Herb., 55539); Columbia, *B. M. Duggar, 88;* Perryville, *C.*

H. Demetrio, in Rabenhorst-Winter, Fungi Eur., 3525; Jefferson Barracks, St. Louis, *E. A. Burt,* and *L. O. Overholts* (in Mo. Bot. Gard. Herb., 43774 and 44049 respectively).

Arkansas: Batesville, *E. Bartholomew,* in Bartholomew, Fungi Col., 2882; Cass, *W. H. Long, 19804* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 9141).

Oklahoma: Spiro, *E. Bartholomew,* in Bartholomew, Fungi Col., 4290.

Nebraska: Long Pine, *V. B. Walker, 9* (in Mo. Bot. Gard. Herb., 13932).

Oregon: Portland, *J. R. Weir, 544* (in Lloyd Herb., 0311, and in Mo. Bot. Gard. Herb., 19624).

10. H. luteo-badia (Fries) v. Höhn. & Litsch. K. Akad. Wiss. Wien Sitzungsber. **116** : 754. 1907.

Thelephora luteo-badia Fries, Linnaea **5** : 526. 1830.—*Stereum luteo-badium* Fries, Epicr. 547. 1838; Sacc. Syll. Fung. **6** : 571. 1888; Lloyd, Letter 46 : 6. 1913.—*Thelephora Kunzei* Hooker, Bot. Misc. **2** : 163. *pl. 85.* 1831.—*Hymenochaete Kunzei* (Hooker) Massee, Linn. Soc. Bot. Jour. **27** : 100. 1890; Sacc. Syll. Fung. **11** : 122. 1895.—*Stereum laetum* Berkeley, Acad. Nat. Sci. Phila. Jour. **2** : 279. 1853.—*Hymenochaete laeta* Berkeley in Cooke, Grevillea **8** : 146. 1880; Sacc. Syll. Fung. **6** : 591. 1888; Massee, Linn. Soc. Bot. Jour. **27** : 99. 1890.—*Stereum pulchrum* (Schweinitz) Cooke in Sacc. Syll. Fung. **6** : 561. 1888.

Illustrations: Hooker, Bot. Misc. **2** : *pl. 85.*

Type: type distribution in Weigelt Exs., under the name *Thelephora badia* Hook.?—a specimen in Mo. Bot. Gard. Herb., 5205.

Fig. 8
H. luteo-badia.
Section × 68. From type.
See *pl. 17, f. 11.*

Fructifications dimidiate and imbricated or effuso-reflexed, lobed, very thin, coriaceous, pliant when dry, velvety when young, becoming somewhat glabrous and minutely fibrillose when older, concentrically sulcate, and sometimes zonate or radiately rugose, drying Argus-brown; hymenium even, dry-

ing buckthorn-brown; in structure 200–300 μ thick, with a broad, compact intermediate layer of longitudinally arranged, colored hyphae 2–2½ μ in diameter, which is connected with the velvety covering of the upper surface of the pileus by a narrow, dark zone; setae very few, tapering from the base, 30×5–6 μ, emerging 10–20 μ above the hymenium; spores hyaline, even, 4–4½×2½ μ.

Fructifications 1½–2½ cm. long, 2–4 cm. broad; resupinate portion of reflexed specimens may be up to 3 x 2 cm. in specimens seen so far.

On rotting trunks of frondose species. Porto Rico to Venezuela and Guiana. May. Probably common.

H. luteo-badia is a beautiful tropical species which is well characterized by its name, for the contrast in color between the buckthorn-brown or tawny olive hymenium and the Argus-brown (chestnut color) upper surface of the pileus is a constant and distinguishing character; setae are as few and far apart in the hymenium as they are in *H. Curtisii;* the absence of a dark subhymenial zone bordering the hyphal layer is an additional character which separates *H. luteo-badia* from many other species of *Hymenochaete.*

Specimens examined:

Porto Rico: Ponce, *F. S. Earle, 114, 159,* comm. by N. Y. Bot. Gard. Herb.

Trinidad: Sangre Grande, *R. Thaxter,* comm. by W. G. Farlow, 29.

Venezuela: *Fendler 174* (in Curtis Herb.); Margarita, *A. F. Blakeslee,* two collections, comm. by W. G. Farlow.

British Guiana: *Sir R. Schomburgh,* comm. by G. Bresadola; also specimen under name *Thelephora laeta,* ex. Hooker Herb. (in Herb. Berkeley in Kew Herb.).

Dutch Guiana: Surinam, *Weigelt,* distributed under the name *Thelephora badia* Hook.?, the type distribution of both *Thelephora luteo-badia* and *Thelephora Kunzei* (in Mo. Bot. Gard. Herb., 5250); specimen from Herb. Schweinitz under the herbarium name *Thelephora pulchra,* type of both *Stereum laetum* and *Stereum pulchrum* (in Curtis Herb.).

11. H. tabacina Sowerby ex Léveillé, Ann. Sci. Nat. Bot. III. 5 : 152. 1846; Cooke, Grevillea **8** : 145. 1880; Sacc. Syll. Fung. **6** : 590. 1888; Massee, Linn. Soc. Bot. Jour. **27** : 112. 1890.

Helvella nicotiana Bolton, Hist. Funguses, 174. *pl. 174.* 1789. —*Auricularia tabacina* Sowerby, British Fungi, *pl. 25.* 1797.—*Thelephora tabacina* (Sow.) Fries, Syst. Myc. **1** : 437. 1821; Elenchus Fung. **1** : 173. 1828.—*Stereum tabacinum* (Sow.) Fries, Epicr. 550. 1838; Hym. Eur. 641. 1874.—*Thelephora avellana* Fries, Syst. Myc. **1** : 442. 1821 (in part); Elenchus Fung. **1** : 188. 1828 (in part).—*Stereum avellanum* Fries, Epicr. 551. 1838 (in part); Hym. Eur. 642. 1874 (in part). —*Hymenochaete avellana* (Fr.) Cooke, Grevillea **8** : 146. 1880; Sacc. Syll. Fung. **6** : 592. 1888; Massee, Linn. Soc. Bot. Jour. **27** : 103. 1890.—*Thelephora imbricatula* Schweinitz, Am. Phil. Soc. Trans. N. S. **4** : 166. 1832.—*Hymenochaete imbricatula* (Schw.) Léveillé, Ann. Sci. Nat. Bot. III. **5** : 152. 1846; Cooke, Grevillea **8** : 146. 1880; Massee, Linn. Soc. Bot. Jour. **27** : 103. 1890.—*H. imbricata* Sacc. Syll. Fung. **6** : 593. 1888.

Illustrations: Bolton, Hist. Funguses, *pl. 174;* Sowerby, British Fungi, *pl. 25*—type illustration.

Fructifications coriaceous, effuso-reflexed, often imbricated, sometimes wholly resupinate, thin, sericeous, antique brown, at length becoming glabrous and deep brownish drab, the margin and intermediate layer orange-yellow; hymenium snuff-brown to sepia, often deeply cracked where resupinate, with a series of radial anastomosing cracks for each centimeter of area; in structure 340–600 μ thick, with the setigerous layer 100 μ thick, and with the intermediate layer bordered on each side by a narrow, dark, dense zone; hyphae $2\frac{1}{2}$–3 μ in diameter, orange-yellow, longitudinally arranged in the intermediate layer; setae 60–90×6–12 μ, emerging up

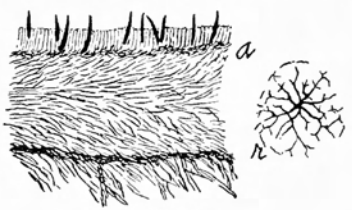

Fig. 9
H. tabacina.
Section, *a*, × 68; system of radiating cracks in hymenium, *r*, × 4½. See *pl. 17, f. 16.*

to 50 μ, originating from all parts of the setigerous layer although chiefly from the dark, subhymenial zone; spores hyaline, even, curved, 5–6×1½–2 μ, as seen in preparation of sections.

Reflexed portion 3–7 mm. long, 10–15 mm. broad, often laterally confluent; resupinate portions up to 3×30 cm. and more.

On dead limbs, usually of frondose species. Canada to Mexico, Maine to the Pacific coast, Alaska to California. Common in the north, rare further south. Throughout the year.

H. tabacina is the commonest species of its genus in the northern United States and may be recognized by its reflexed fructifications tobacco-colored with bright golden yellow margin and intermediate layer, and by having the hymenium deeply cracked in resupinate portions into radiating systems, one system for about each centimeter of area. The specimen under the name *Stereum avellanum* from Fries in Kew Herb. is the old glabrous, somewhat reddish stage of *H. tabacina;* this specimen has led to the transfer of *Stereum avellanum* to *Hymenochaete* by British authors and Saccardo. An older specimen of *Thelephora avellana* in Herb. Fries collected by E. Fries at Femsjö is not distinct from *Stereum glaucescens* but is unfortunately on coniferous wood, while *T. avellana* was published as occurring on *Corylus,* a frequent substratum in Europe for *H. tabacina.* The type of *Thelephora imbricatula* in Herb. Schweinitz is a mixture of *Hymenochaete tabacina,* mounted on the right of the card, and of *H. corrugata,* mounted at the left. Both these species are present in the sample of *T. imbricatula* in Curtis Herb. but their order has been reversed in mounting. The portion of the original description pertaining to characters of reflexed portions of the fructifications is obviously based upon the *H. tabacina* portion of the type. Since Léveillé's transfer of *T. imbricatula* to *Hymenochaete* was probably based upon an authentic specimen from Schweinitz in Museum of Paris Herb., in 1846, this specimen will probably show whether any of *H. corrugata*

was mixed in the type of *H. imbricatula* as distributed by Schweinitz.

Specimens examined:

Exsiccati: Bartholomew, Fungi Col., 3134; Berkeley, Brit. Fungi, 248; Ellis, N. Am. Fungi, 13; Ell. & Ev., Fungi Col., 102; Krieger, Fungi Sax., 270; Libert, Pl. Crypt. Arduennae, 121; Oudemans, Fungi Neerlandici Exs., 240; Shear, N. Y. Fungi, 314; de Thümen, Myc. Univ., 211, 211b.

Finland: Mustiala, *P. A. Karsten,* in de Thümen, Myc. Univ., 211.

Sweden: *L. Romell, 37, 38;* Stockholm, *L. Romell, 342.*

Germany: Saxony, in Krieger, Fungi Sax., 270.

Austria-Hungary: Trient Alps, *J. Bresadola.*

Holland: in Oudemans, Fungi Neerlandici Exs., 240.

England: in Berkeley, Brit. Fungi, 248.

France: *F. Fautrey* (in Lloyd Herb., 3316).

Belgium: in Libert, Pl. Crypt. Arduennae, 121.

Newfoundland: *A. C. Waghorne* (in Mo. Bot. Gard. Herb., 5179, 5180); Chappel, *A. C. Waghorne, 12* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 5178).

Quebec: Gaspé, *J. Macoun, 244;* Montreal, *R. J. Blair,* comm. by L. O. Overholts, 3814 (in Mo. Bot. Gard. Herb., 54993).

Ontario: Bond Lake, *J. H. Faull,* Univ. of Toronto Herb., 351 (in Mo. Bot. Gard. Herb., 44881); London, *J. Dearness;* Ottawa, *J. Macoun, 22, 229;* Port Credit, *J. H. Faull,* Univ. of Toronto Herb., 350, 351 (in Mo. Bot. Gard. Herb., 44876, 44866); Toronto, *Thos. Langton,* Univ. of Toronto Herb., 502 (in Mo. Bot. Gard. Herb., 44843); Wilcox Lake, *G. H. Graham,* Univ. of Toronto Herb., 686 (in Mo. Bot. Gard. Herb., 44940).

Maine: Orono, *P. L. Ricker* (in Seymour Herb.); Piscataquis County, *W. A. Murrill, 1943, 2007, 2075, 2110, 2175* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55522–6); Penobscot County, *W. A. Murrill, 1802* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55527); Pittston Farm, *E. R. Hodson,* comm. by P. L. Ricker, 202; Portage, *L. W. Riddle, 5.*

New Hampshire: Chocorua, *W. G. Farlow,* two collections; Gilmanton, *J. Blake,* comm. by P. L. Ricker; Mt. Wonalancet, *H. von Schrenk* (in Mo. Bot. Gard. Herb., 42846); North Woodstock, comm. by Univ. of Wisconsin Herb., 11; Shelburne, *W. G. Farlow* (in Mo. Bot. Gard. Herb., 4782), and *H. von Schrenk* (in Mo. Bot. Gard. Herb., 5172).

Vermont: Abby Pond, Ripton, *E. A. Burt;* Little Notch, *E. A. Burt;* Lost Pleiad Pond, *E. A. Burt;* North Ferrisburg, *E. A. Burt;* Ripton, *E. A. Burt.*

Massachusetts: Cambridge, *G. R. Lyman;* Fresh Pond, *G. R. Lyman;* Magnolia, *W. G. Farlow;* Sharon, *A. P. D. Piguet,* comm. by W. G. Farlow, 1 (in Mo. Bot. Gard. Herb., 55006).

Connecticut: Central Village, *J. L. Sheldon,* comm. by N. Y. Bot. Gard. Herb.; Norwich, *W. A. Setchell.*

New York: *Torrey,* part of type of *Thelephora imbricatula* Schw. (on right of card in Herb. Schweinitz and on left of card in Curtis Herb.); Adirondacks, *G. F. Atkinson, b;* Alcove, *C. L. Shear, 1101, 1308,* and in Shear, N. Y. Fungi, 314; Altamont, *E. A. Burt;* Brookton, *H. Fitzpatrick, 1054* (in Mo. Bot. Gard. Herb., 54773); East Galway, *E. A. Burt,* two collections; Fort Ann, *S. H. Burnham, 18* (in Mo. Bot. Gard. Herb., 54422); Freeville, *G. F. Atkinson, 2584;* Riverside Park, New York City, *H. J. Whittemore, 18* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55511); Vaughns, *S. H. Burnham, 10* (in Mo. Bot. Gard. Herb., 44001).

New Jersey: Forked River, *W. H. Ballou, 3;* Newfield, *J. B. Ellis,* in Ellis, N. Am. Fungi, 13, in Ell. & Ev., Fungi Col., 102, and in de Thümen, Myc. Univ., 211b.

Pennsylvania: State College, *A. S. Rhoads & C. R. Orton, 12* (in Mo. Bot. Gard. Herb., 44092); Trexlertown, *W. Herbst,* comm. by Lloyd Herb., 3593; Wright's Gap, *A. S. Rhoads,* comm. by L. O. Overholts, 3409 (in Mo. Bot. Gard. Herb., 7152).

Delaware: Wilmington, *A. Commons, 1427* (in N. Y. Bot. Gard. Herb.).

North Carolina: Blowing Rock, *G. F. Atkinson, 4031, 4331.*

Michigan: Ann Arbor, *L. N. Johnson, 1654* (in N. Y. Bot. Gard. Herb.); Glen Lake, *C. G. Lloyd, 02554, 02555;* Isle Royal, *Allen & Stuntz, 41, 43,* both comm. by Univ. of Wisconsin Herb.; Vermillion, *A. H. W. Povah, 141, 138, 311, 193, 147, 358, 351, 188, 213, 149, 192, 197, 70, 328* (in Mo. Bot. Gard. Herb., 15588, 17200, 16526, 20697, 21065, 21552, 22080, 20470, 20615, 20650, 20674, 22122, 22322, and 22350 respectively).

Wisconsin: Madison, *V. B. Walker, 8* (in Mo. Bot. Gard. Herb., 11963).

Minnesota: Lake Itaska, comm. by E. L. Jensen, 7 (in Mo. Bot. Gard. Herb., 10372).

Missouri: Cox's Switch, *H. von Schrenk* (in Mo. Bot. Gard. Herb., 42864).

Colorado: Tolland, 8000–10000 ft. altitude, *F. J. Seaver & E. Bethel* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 42761).

Montana: comm. by E. L. Jensen, 6 (in Mo. Bot. Gard. Herb., 10362); Evaro, *J. R. Weir, 430, 417, 418* (in Mo. Bot. Gard. Herb., 3469, 14771, 14769); Missoula, *J. R. Weir, 433, 429* (in Mo. Bot. Gard. Herb., 3917, 13019).

Idaho: Priest River, *J. R. Weir, 94, 89, 100, 101* (in Mo. Bot. Gard. Herb., 8153, 12554, 15945, 15835), and *18.*

Alaska: Sitka, *W. Trelease, 583a* (in Mo. Bot. Gard. Herb., 5168).

British Columbia: Hastings, *J. Macoun, 63;* Kootenai Mts., near Salmo, *J. R. Weir, 514* (in Mo. Bot. Gard. Herb., 1740); Sidney, *J. Macoun, 38, 68, 76* (in Mo. Bot. Gard. Herb., 6688, 55366, 55367).

Washington: Bingen, *W. N. Suksdorf, 686, 691, 718, 743, 746, 873;* Bainbridge Island, *E. Bartholomew,* in Bartholomew, Fungi Col., 3134; Kalama, *C. J. Humphrey, 6163, 6201;* Seattle, *W. A. Murrill, 123,* and *an unnumbered specimen* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55530, 55531).

Oregon: Blue Mts., *C. L. Shear, 789, 796;* Corvallis, *C. E. Owens, 2082, 2138* (in Mo. Bot. Gard. Herb., 44248, 44698); Philomath, *G. B. Posey,* comm. by C. E. Owens, 2058 (in

Mo. Bot. Gard. Herb., 43879); Wallowa Lake, *C. L. Shear, 790, 792, 794.*

California: *R. A. Harper, 129* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55532); Ferndale, *S. C. Edwards* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55533); Mt. Tamalpais, Marion Co., *W. A. Setchell & C. C. Dobie, 1026* (in Mo. Bot. Gard. Herb., 44240); Muir Woods, *R. A. Harper* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55534); Palo Alto, *W. A. Murrill & L. S. Abrams, 1290* (in N. Y. Bot. Gard. Herb.); San Mateo Mts., *E. B. Copeland,* comm. by C. F. Baker, 1800, and (in Mo. Bot. Gard. Herb., 5173).

Mexico: Jalapa, 5000 ft. altitude, *W. A. & Edna L. Murrill, 118, 119* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 10925, 10747).

12. H. badio-ferruginea (Mont.) Léveillé, Ann. Sci. Nat. Bot. III. **5**: 152. 1846; Cooke, Grevillea **8**: 146. 1880; Sacc. Syll. Fung. **6**: 591. 1888; Massee, Linn. Soc. Bot. Jour. **27**: 101. 1890.

Stereum badio-ferrugineum Montagne, Ann. Sci. Nat. Bot. II. **20**: 367. 1843; Syll. Crypt. 178. 1856.

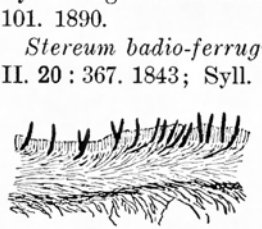

Fig. 10
H. badio-ferruginea.
Section × 68. From authentic specimen.
See *pl. 16, f. 4.*

Type: in Museum of Paris Herb., according to Léveillé, *loc. cit.;* authentic specimen of later collection from Montagne to Berkeley, in Kew Herb.

Fructifications imbricated, conchiform, umbonate-sessile or reflexed, thin, drying pliant, with the upper surface sericeous, lineate-radiate, Sayal-brown when young, becoming variegated with concentric, glabrous, bay or chestnut-brown zones; hymenium snuff-brown, sometimes minutely cracked; in structure 200–300 μ thick, with a dark, dense, subhymenial zone and with the hyphal layer composed of a broad intermediate layer of longitudinally arranged, golden-yellow hyphae $3\frac{1}{2}$ μ in diameter, connected with the loosely arranged

hyphae of the upper surface of the pileus by a narrow, dark, dense zone; setae cylindric below, acute, 50–75×8–10 μ, emerging up to 50 μ, starting from various parts of the dark subhymenial zone, abundant but not crowded; spores hyaline, even, somewhat curved, 4–6×1–2 μ, as seen in preparations of sections.

Fructifications with pilei 4–7 mm. long, 4–10 mm. broad, sometimes laterally confluent; resupinate portions, when present, ½–2×2½–7½ cm.

On erect rotting stumps of frondose species—rarely on prostrate logs. Canada to Carolina. June to January. Occasional.

This species is so closely related to *H. tabacina* that I have been doubtful whether it is not a form of the latter somewhat modified in form of fructifications through growing on a vertical surface. *H. badio-ferruginea* may be separated from *H. tabacina* by growing upon a vertical surface and by the small imbricated, conchiform pilei which are thinner than those of *H. tabacina,* and by the hymenium either not at all cracked or with narrow cracks which do not form systems radiating from several centers in the resupinate portion—each system of cracks from its own center. The type of *H. badio-ferruginea* was collected in New York by Menand. All European specimens of *H. tabacina* which I have seen are distinct also from *H. badio-ferruginea* in the characters enumerated above.

Specimens examined:

Canada: Bushwood, *J. Macoun, 115.*

New Brunswick: Tobique River, *G. N. Hay.*

Maine: Piscataquis County, *W. A. Murrill, 1941, 2232, 2246, 2248* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55515–55518); Penobscot County, *W. A. Murrill, 1807* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55506).

New Hampshire: *P. Wilson* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55519); Camp, Ellis R., *U. & C.,* from Underwood Coll., 8 (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55502); White Mts., *U. & C., 19,*

32, from Underwood Coll. (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55520, 55521).

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

New York: Adirondacks, *G. F. Atkinson, a;* East Galway, *E. A. Burt,* two collections; Floodwood, *E. A. Burt.*

New Jersey: Lakewood, *E. A. Daniels,* comm. by H. Webster.

Carolina: specimen determined by Montagne (in Kew Herb.).

13. H. rubiginosa Dickson ex Léveillé, Ann. Sci. Nat. Bot. III. **5** : 151. 1846; Cooke, Grevillea **8** : 145. 1880; Sacc. Syll. Fung. **6** : 589. 1888; Massee, Linn. Soc. Bot. Jour. **27** : 97. 1890; Brown, Mycologia **7** : 1. *pl. 149–151.* 1915.

Helvella rubiginosa Dickson, Fasc. Pl. Crypt. Brit. **1** : 20. 1785; Sowerby, Brit. Fungi, *pl. 26.* 1796.—*Thelephora rubiginosa* Schrader, Spic. Fl. Germ. 185. 1794; Persoon, Syn. Fung. 567. 1801; Myc. Eur. **1** : 120. 1822; Fries, Syst. Myc. **1** : 436. 1821.—*Stereum rubiginosum* Fries, Epicr. 550. 1838; Hym. Eur. 641. 1874.—*Auricularia ferruginea* Bulliard, Herb. de la France **2** : 281. *pl. 378.* 1787; Sowerby, Brit. Fungi, *pl. 26.* 1796.—*Stereum ferrugineum* Bulliard ex Fries, Epicr. 550. 1838; Hym. Eur. 640. 1874; Sacc. Syll. Fung. **6** : 565. 1888. —*Hymenochaete ferruginea* (Bulliard) Massee, Linn. Soc. Bot. Jour. **27** : 103. 1890; Bresadola, I. R. Accad. Agiati Atti III. **3** : 109. 1897.

Illustrations: Bulliard, Herb. de la France, *pl. 378;* Fl. Danica, *pl. 1619. f. 2;* Sowerby, Brit. Fungi, *pl. 26;* Rabenhorst, Krypt.-Fl. **1** : 320. *f. 1;* Brown, Mycologia **7** : *pl. 149–151.*

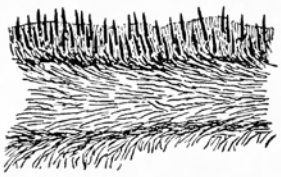

Fig. 11
H. rubiginosa.
Section × 68. See *pl. 17, f. 14.*

Fructifications coriaceous-rigid, effused, reflexed, or sometimes wholly resupinate, separable, somewhat fasciate above, concentrically sulcate, velvety, Brussels-brown, finally glabrous, fuscous-black, the margin ochraceous-tawny; hymenium conspicuously setulose under a lens, somewhat colliculose, bister; in structure 500–700 μ thick, with the broad, dense, dark, setigerous layer 160 μ thick and with the intermediate layer

composed of longitudinally arranged, colored hyphae $2\frac{1}{2}$ μ in diameter and bordered above by a narrow, dense, dark zone; setae very numerous, slightly curved, tapering upward to a very sharp point, 50–60×5–6 μ, emerging up to 45 μ, starting from all parts of the setigerous layer; spores hyaline, even, 4–6×2–3 μ.

Fructifications with reflexed portion 1–$2\frac{1}{2}$ cm. long, 1–3 cm. broad and sometimes larger by lateral confluence; resupinate portion 7–8×1–3 cm.

On decaying logs and stumps of oak and other frondose species. Canada to Mexico, westward to Oregon and California, and in Porto Rico. July to February, persisting to June. Common.

H. rubiginosa may be recognized by its rigid pileus, velvety, concentrically sulcate, and Brussels-brown (rubiginous) in color, by the colliculose, bister hymenium whose dark red component color and setae show to advantage in reflected light, and by the brighter ochraceous margin. Even resupinate specimens may be recognized at sight by being separable from the substratum, and by the form and color of the hymenium and the contrasting bright margin. The structure in section is equally constant and distinctive. This species produces a pocketed heart rot in oak wood.

Specimens examined:

Exsiccati: Bartholomew, Fungi Col., 3133; Berkeley, Brit. Fungi, 247; Ellis, N. Am. Fungi, 327; Kunze, Fungi Sel., 203; Rabenhorst, Herb. Myc., 212.

England: in Berkeley, Brit. Fungi, 247; Kenilworth, *W. A. Murrill* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55542).

Sweden: Upsala, *E. Fries,* det. by Fries as *Stereum ferrugineum,* comm. by L. Romell, 27; Femsjö, *L. Romell, 35;* Halland, *L. Romell, 36;* Lapland, *L. Romell, 396, 397.*

Germany: *J. Kunze,* in Kunze, Fungi Sel., 203 (in Mo. Bot. Gard. Herb., 44098); from Persoon, under the name *Thelephora rubiginosa* (in Kew Herb.); Dresden, in Rabenhorst, Herb. Myc., 212.

Austria-Hungary: Löcse, *V. Greschick,* comm. by Bresadola, under the name *Hymenochaete ferruginea.*

Canada: *J. Macoun, 92;* Lower St. Lawrence Valley, *J. Macoun, 63;* London, Ontario, *J. Dearness, 981* (in N. Y. Bot. Gard. Herb.).

Maine: Orono (in N. Y. Bot. Gard. Herb.).

Vermont: Lake Dunmore, *E. A. Burt,* two collections; Middlebury, *E. A. Burt,* two collections.

Massachusetts: Webster, *R. G. Leavitt.*

Connecticut: *V. S. White* (in N. Y. Bot. Gard. Herb.); Central Village, *J. L. Sheldon, 25,* comm. by N. Y. Bot. Gard. Herb.; Redding, *F. S. Earle, 455,* and *Underwood & Earle, 498* (both in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55540, 55541).

New York: Alcove, *C. L. Shear, 241;* East Galway, *E. A. Burt,* five collections; Ithaca, *G. F. Atkinson, 22942, 22942a,* and *Van Hook,* comm. by G. F. Atkinson, A, and *H. P. Brown* (in Mo. Bot. Gard. Herb., 44099); Karner, *H. D. House* (in N. Y. State Mus. Herb., and in Mo. Bot. Gard. Herb., 54355); New Berlin, *W. H. Long, 19070* (in Mo. Bot. Gard. Herb., 44163); New York Botanic Garden, *Class in Mycology* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55543).

New Jersey: Fort Lee, *W. A. Murrill* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55545); Hackensack Swamp, *W. H. Ballou, 1.*

Pennsylvania: Bear Meadows, *A. S. Rhoads, 10* (in Mo. Bot. Gard. Herb., 44087); Kittanning, *D. R. Sumstine;* Ohio Pyle, *W. A. Murrill, 1087* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55546); Sayre, *W. C. Barbour, 1386* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55547); Spruce Creek, *J. H. Faull,* Univ. of Toronto Herb., 348 (in Mo. Bot. Gard. Herb., 44880); Trexlertown, *C. G. Lloyd, 0019, 0256;* West Chester, *Haines, Everhart & Jefferis,* in Ellis, N. Am. Fungi, 327.

Maryland: Takoma Park, *C. L. Shear, 1274.*

Virginia: Blacksburg, *Miss V. W. Murrill, 19* (in N. Y. Bot.

Gard. Herb., and in Mo. Bot. Gard. Herb., 55548); Woodstock, *C. L. Shear, 1192.*

North Carolina: comm. by W. H. Long, 12930, 19123 (in Mo. Bot. Gard. Herb., 44162, 44165); Blowing Rock, *G. F. Atkinson, 4030, 4188, 4309, 4310, 4312, 4321;* Pink Bed Valley, Transylvania Co., *W. A. Murrill & H. D. House, 422* (in N. Y. Bot. Gard. Herb.).

Florida: *C. G. Lloyd, 4858.*

Alabama: Montgomery, *R. P. Burke, 149* (in Mo. Bot. Gard. Herb., 44905).

Louisiana: Bogalusa, *C. J. Humphrey, 5499* (in Mo. Bot. Gard. Herb., 13613); St. Martinville, *A. B. Langlois.*

Ohio: *C. G. Lloyd, 3910;* Cincinnati, *A. P. Morgan,* comm. by Lloyd Herb., 2636, and *C. G. Lloyd, 4527;* Linwood, *C. G. Lloyd* (in Lloyd Herb., 07374, and in Mo. Bot. Gard. Herb., 55554); Miami Valley, *A. P. Morgan* (in Mo. Bot. Gard. Herb., 5177).

West Virginia: Eglon, *C. G. Lloyd, 02714;* Morgantown, *J. L. Sheldon, 3537,* comm. by N. Y. Bot. Gard. Herb.

Tennessee: Elkmont, *C. H. Kauffman, 75* (in Mo. Bot. Gard. Herb., 21462).

Indiana: Crawfordsville, *D. Reddick, 1, 16;* Lafayette, *C. R. Orton, 6* (in Mo. Bot. Gard. Herb., 44083).

Illinois: River Forest, *E. T. & S. A. Harper, 630.*

Wisconsin: Blue Mounds, Univ. of Wisconsin Herb., 24; Madison (in Mo. Bot. Gard. Herb., 4996).

Missouri: Creve Coeur, *E. A. Burt* (in Mo. Bot. Gard. Herb., 10405), and *P. Spaulding* (in Mo. Bot. Gard. Herb., 44097); Upper Creve Coeur, *E. A. Burt* (in Mo. Bot. Gard. Herb., 44048).

Arkansas: Cass, *W. H. Long, 19806* (in Mo. Bot. Gard. Herb., 8966).

Nebraska: Saltillo, *C. L. Shear, 1093.*

Kansas: Emporia, *E. Bartholomew,* in Bartholomew, Fungi Col., 3133.

Arizona: Santa Catalina Mts., *G. G. Hedgcock & W. H. Long,* comm. by C. J. Humphrey, 2507 (in Mo. Bot. Gard. Herb., 42934).

Oregon: Corvallis, *C. E. Owens, 2137, 2148* (in Mo. Bot. Gard. Herb., 44696, 9187).

California: Palo Alto, *W. A. Murrill & L. S. Abrams, 1161* (in N. Y. Bot. Gard. Herb.).

Mexico: Guernavaca, *W. A. & Edna L. Murrill, 406* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 54533).

Porto Rico: El Duque, *J. A. Stevenson & J. R. Johnston, 1487* (in Mo. Bot. Gard. Herb., 6597); Rio Piedras, *J. A. Stevenson & R. C. Rose,* comm. by J. A. Stevenson, 6514 (in Mo. Bot. Gard. Herb., 55088).

14. H. reflexa Burt, n. sp.

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

Fructifications effused, broadly reflexed, thin, rigid, fibrillose, Prout's brown, finally glabrous, shallowly concentrically sulcate and zonate, with obscure blackish zones in the furrows; hymenium even, not cracked, Sudan-brown; in structure 500–600 μ thick, composed of a zonate setigerous layer 300–400 μ thick and of an intermediate layer bordered on the upper side by a dense, but not dark, zone which connects with the more loosely arranged hyphae of the upper surface of the pileus; setigerous layer very compact, composed of crowded, erect hyphae, between which are scattered, slender setae, slightly curved, sharp-pointed, 35-40$\times$ 4½–5 μ, emerging up to 30 μ, present in all parts of the layer; hyphae of intermediate layer densely, longitudinally arranged, colored, 2½ μ in diameter; no spores found.

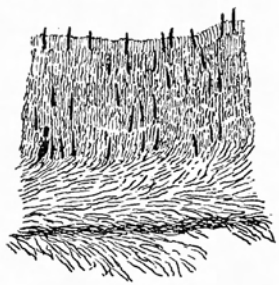

Fig. 12
H. reflexa.
Section × 68. From type.
See *pl. 17, f. 13.*

Fructification with reflexed portion 2 cm. long, about 8 cm. broad; resupinate strip 3 mm. across at base of reflexed portion is all of resupinate portion which was collected.

Under side of decaying wood. Jamaica. January. Rare.

H. reflexa bears some resemblance to *H. rubiginosa* in its rigid and dark-colored pileus; a similar resemblance to *H.*

rubiginosa was stated by Fries, Elenchus Fung. **1** : 174, in the comment of the original description of *Thelephora leprosa* collected in Brazil. If the specimen of *Thelephora leprosa* upon which Léveillé based his transfer of this species of *Hymenochaete* is still in the Museum of Paris Herbarium and is from the original collection, comparison with this specimen may show that *H. reflexa* should be regarded as a synonym of *T. leprosa.* The structure in section of *H. reflexa* is very like that of *H. unicolor,* but the hymenium is of different color and all the collections of *H. unicolor* have the margin closely adnate.

Specimens examined:

Jamaica: Troy and Tyre, *W. A. Murrill & W. Harris, 989,* type, comm. by N. Y. Bot. Gard. Herb.

15. H. cubensis Burt, n. sp.

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

Fructifications imbricated, flabelliform, dimidiate, umbonate-sessile and attached along one side, or effused and reflexed, thin, coriaceous, pliant when dry, minutely tomentose, concentrically sulcate, antique brown when young, becoming snuff-brown to Rood's brown; hymenium even, antique brown; in structure 300–400 μ thick, with a setigerous layer 80–100 μ broad and a narrow intermediate layer which is connected by a narrow, dark, dense zone with the loosely arranged hyphae of the upper surface of the pileus; setae not abundant, 35–45$\times$4½–6 μ, emerging up to 30μ, slender, somewhat falcate, sharp-pointed, occurring in all parts of the setigerous layer which contains many colored, amorphous grains also; hyphae of intermediate layer 2½–3 μ in diameter, colored; spores hyaline, even, 4–4½$\times$2 μ.

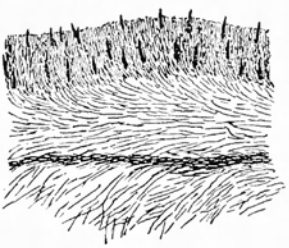

Fig. 13
H. cubensis.
Section × 68. From type.
See *pl. 17, f. 8.*

Fructifications 1 cm. from umbo to margin, or when dimidiate 1–2 cm. broad, 1–2 cm. long, and sometimes larger by

THE THELEPHORACEAE OF NORTH AMERICA. X[1]

HYMENOCHAETE

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HYMENOCHAETE

Hymenochaete Léveillé, Ann. Sci. Nat. Bot. III. **5** : 150. 1846; Berk. & Curtis, Linn. Soc. Bot. Jour. **10** : 333. 1868; Cooke, Grevillea **8** : 145. 1880; Sacc. Syll. Fung. **6** : 588. 1888; Massee, Linn. Soc. Bot. Jour. **27** : 95. 1890; Engl. & Prantl, Nat. Pflanzenfam. (**1** : 1**) : 121. 1898.

Fructifications coriaceous to hard, of varied form from stipitate to resupinate; hymenium even or rarely granular, containing slender, somewhat conical, colored setae between the basidia; basidia simple; spores hyaline, even.

There is no type species, for this genus is a fine example of basing the generic conception upon a group of thelephoraceous species, some stipitate, some dimidiate, some reflexed, and some resupinate, which agree in having setae in the hymenium.

In addition to the distinctive morphological character of elongated, conical setae in the hymenium, there is also a chemical substance in the tissue of all the species of *Hymenochaete* which I have studied, that causes an immediate darkening of sections when dilute potassium hydrate is brought in contact with them. This darkening is so great as to make the sections too opaque for study if more than a mere trace of this usually useful reagent is employed to swell the sections. One has to use instead lactic acid to have the sections remain clear enough to show their fine structural details. The greatly elongated, colored cystidia and conducting organs which are present in the deeper tissue and curve into, or even protrude above, the hymenial surface in some species of *Stereum*, as, for example, *S. umbrinum*, *S. abietinum*, *S. glaucescens*, etc.,

[1] Issued December 23, 1918.

H. ungulata is unique in our species of this genus by its small, hoof-shaped fructifications with ashy white hymenium and crust-like, dull black upper surface. The fructifications are so hard that they turn the edge of the razor immediately in sectioning and have not afforded good preparations for showing the structure above the setigerous layer. *H. ungulata* probably belongs in the group with *H. corticolor*.

Specimens examined:

Mexico: Jalapa, *W. A. & Edna L. Murrill, 176,* type (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 44970).

17. H. corticolor Berk. & Ravenel, Grevillea **1** : 165. 1873; Cooke, Grevillea **8** : 147. 1880; Sacc. Syll. Fung. **6** : 595. 1888; Massee, Linn. Soc. Bot. Jour. **27** : 111. 1890.

Type: type distribution in Ravenel, Fungi Car. **3** : 30.

Fructifications hard, woody, either wholly resupinate, adnate, and following the inequalities of the substratum, or with the upper edge thickened, barely reflexed, black, glabrous; hymenium drab, even; in structure 400–1000 μ thick, lacking an intermediate layer, with the setigerous layer constituting the whole thickness of the fructification and composed of densely arranged, suberect, interwoven, pale hyphae, much crystalline matter, and scattered setae; setae 60–75×9 μ, emerging up to 45 μ, sharp-pointed, distributed in all parts of the fructification; spores hyaline, even, flattened on one side, 4½×3½ μ.

Fig. 14
H. corticolor.
Section × 44. From type.
See *pl. 16, f. 7.*

Resupinate over areas 1–3×1½–5 cm., with reflexed margin 1–1½ mm. broad.

On bark, often in its crevices, of living trunks of oak, elm, *Magnolia,* and other frondose species. New Jersey to Florida, and in Cuba, Jamaica, and Grenada. Autumn to February.

The absence of an intermediate layer is likely to place the usual collections of resupinate *H. corticolor* in the group of species with *H. corrugata, H. cervina, H. Pellicula, H. tenuis,* etc., from all of which *H. corticolor* is distinguishable at sight by its great thickness, drab hymenium, black upper surface of reflexed edge, and occurrence on the bark of living tree trunks. This species attains its best development in South Carolina and Florida. The black upper surface of the reflexed edge is a good character for separation from *H. unicolor.*

Specimens examined:

Exsiccati: Ellis, N. Am. Fungi, 408; Ravenel, Fungi Car. **3**: 30; Fungi Am., 121.

New Jersey: Newfield, *J. B. Ellis,* in Ellis, N. Am. Fungi, 408.

Maryland: Takoma Park, *C. L. Shear, 1003, 1096.*

South Carolina: *H. W. Ravenel,* Curtis Herb., 1553 (in Kew Herb.), and in Ravenel, Fungi Car. **3**: 30, type distribution.

Florida: Cocoanut Grove, *R. Thaxter, 79* (in Farlow Herb., and in Mo. Bot. Gard. Herb., 43984); Daytona, *R. Thaxter, 13* (in Farlow Herb., and in Mo. Bot. Gard. Herb., 43933); Gainesville, *N. L. T. Nelson* (in Lloyd Herb., and in Mo. Bot. Gard. Herb., 55455), and *H. W. Ravenel,* in Ravenel, Fungi Am., 121.

Cuba: San Diego de los Baños, *Earle & Murrill, 198,* comm. by N. Y. Bot. Gard. Herb.

Jamaica: Cinchona, *W. A. & Edna L. Murrill, 419,* comm. by N. Y. Bot. Gard. Herb.

Grenada: Grand Etang, *R. Thaxter,* comm. by W. G. Farlow, 13.

18. H. arida Karsten in Sacc. Syll. Fung. **9**: 228. 1891; Bresadola, Ann. Myc. **1**: 93. 1903.

Hymenochaetella arida Karsten, Finska Vet.-Soc. Bidrag Natur och Folk **48**: 428. 1889.—*H. laxa* Karsten, Finska Vet.-Soc. Bidrag Natur och Folk **48**: 429. 1889.—*Hymenochaete laxa* Karsten in Sacc. Syll. Fung. **9**: 228. 1891.—*Corticium simulans* Berk. & Rav. in Cooke, Grevillea **6**: 132. 1878 (without description but with reference to Ravenel, Fungi Am., 10); Ravenel, Fungi Car. **5**: 25 (without description); de

Thümen, Myc. Univ., 512 (without description).—Probably not *Corticium simulans* Berk. & Broome, Linn. Soc. Bot. Jour. **14**: 72. 1873.—*Hymenochaete simulans* (Berk. & Rav.) Peck, N. Y. State Mus. Rept. **49**: 34. 1897 (without description); v. Höhn. & Litsch. K. Akad. Wiss. Wien Sitzungsber. **116**: 775. 1907.

Type: authentic specimen from Karsten in Burt Herb.

Fructifications resupinate, effused, scattered, orbicular at first, then laterally confluent, thin, dry, adnate, not cracked, drying clay-color to antique brown, the margin thinning out; in structure 100–140 μ thick, composed of loosely interwoven, suberect hyphae 3–4 μ in diameter, colored like the fructification, stiff, not nodose-septate, forming a homogeneous layer, without a dense zone from substratum to hymenium, and bearing scattered setae in the upper portion of the layer; setae 30–75×6–8 μ, emerging up to 35 μ, not numerous, tapering upward; spores in spore collection from Swedish specimen white, even, allantoid, 6–7×2 μ as seen in side view, 2½–3 μ broad in front view, and 6–7×3½–4 μ, flattened on one side in American specimens.

Fig. 15
H. arida.
Section ×68. From authentic specimen.

Fructifications at first 2–3×2 mm., later laterally confluent over areas 9×1–1½ cm.

On bark of dead branches of *Corylus, Ostrya virginica,* and *Vaccinium arboreum.* Finland, Sweden, Vermont to South Carolina, and in Michigan. October to April.

The fructifications of *H. arida* are at first small, scattered, and suborbicular and later become confluent and elongated so as to resemble closely in aspect and color *Coniophora arida.* The spores of American collections are about twice the breadth of those of European specimens cited, but the agreement between the European and American specimens is so close in general aspect and in the very simple structure of the fructification in section that I believe the American and European specimens are of the same species. The distinguishing characters of *H. arida* are its resemblance in aspect to *Coniophora arida,* structure consisting of a single, homo-

geneous layer of loosely interwoven, suberect hyphae, with setae distributed in outer half of the layer, rather large spores, and the occurrence in the United States upon bark of *Ostrya* and *Vaccinium arboreum*. Von Höhnel and Litschauer in their notes on types in Karsten's herbarium[1] referred *Hymenochaete arida* and *H. laxa* to *H. unicolor* and *H. cinnamomea* respectively — species with which they have nothing in common except color.

Specimens examined:

Exsiccati: Ravenel, Fungi Car. **5** : 25; Fungi Am., 10; de Thümen, Myc. Univ., 512.—in each under the name *Corticium simulans* B. & Rav.

Finland: Mustiala, *P. A. Karsten,* authentic specimen and another specimen communicated by Bresadola; Runsala, *P. A. Karsten,* authentic specimen of *Hymenochaetella laxa.*

Sweden: Upsala, *C. G. Lloyd, 08425* (in Lloyd Herb., and in Mo. Bot. Gard. Herb., 55472).

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

New York: Fort Ann, *S. H. Burnham, 41* (in Mo. Bot. Gard. Herb., 54456).

South Carolina: Aiken, *H. W. Ravenel,* in Ravenel, Fungi Car. **5** : 25, Fungi Am., 10, and in de Thümen, Myc. Univ., 512.

Michigan: Ann Arbor, *C. H. Kauffman, 32.*

19. H. unicolor Berk. & Curtis, Linn. Soc. Bot. Jour. **10** : 335. 1868; Cooke, Grevillea **8** : 148. 1880; Sacc. Syll. Fung. **6** : 597. 1888; Massee, Linn. Soc. Bot. Jour. **27** : 108. 1890; Lloyd, Myc. Notes 41 : 572. *text f. 780, 781.* 1916.

H. fuliginosa Berk. & Curtis, Linn. Soc. Bot. Jour. **10** : 335. 1868; not *H. fuliginosa* (Pers.) Lév.

Type: in Kew Herb.

Fructification resupinate, long and broadly effused, adnate, dense, cracked, brittle, scaling off from the wood, drying antique brown; in structure 500–700 μ thick, composed of a very thick, somewhat zonate, setigerous layer and of a thin hyphal layer which is often not sharply distinguishable from the setigerous layer; hyphae 2½–3 μ in diameter; setae scat-

[1] K. Akad. Wiss. Wien Sitzungsber. **115** : 1577, 1578. 1906.

tered in all parts of the setigerous layer, sometimes slightly falcate, 50–60×5–6 μ, emerging up to 40 μ, tapering from the base to a slender and sharp apex; basidia with 4 sterigmata; spores in spore collection white, even, 5–5½×3½–4 μ; causing pocketed rot in decorticated hard wood.

Covering decorticated poles 20 feet long.

On dead frondose wood. Cuba, Venezuela, and Brazil. December to April.

Fig. 16
H. unicolor.
Section, *a*, × 44; seta, *b*, and spores, *s*, × 850.

H. unicolor has the coloration and general aspect of *H. cinnamomea* and *H. spreta* but is usually rimose in contrast with the former and with a more velvety hymenium than the latter and is of a very dense structure with its hyphae arranged parallel with the rather uniformly distributed setae, while *H. cinnamomea* and *H. spreta* are stratose, with alternating layers of loosely interwoven hyphae separating the two or more hymenial layers. The dry rot produced in the wood by *H. unicolor* is a pocketed rot, as shown by the fine collection by Lloyd and well shown in his fig. 781, cited above, while the rot produced by *H. spreta* is a soft, fibrous sap rot which attacks the sap-wood uniformly from the outer surface. The specimen referred by Berkeley and Curtis to *H. fuliginosa*, collected in Cuba, *C. Wright, 188,* differs so slightly from the type of *H. unicolor* that it will probably be included in *H. unicolor* when better known by other collections.

Specimens examined:

Cuba: *C. Wright, 541,* type (in Kew Herb.) and *an unnumbered collection of 1857,* under the name of *H. cinnamomea* (in Curtis Herb.), and *188,* under the name *Hymenochaete fuliginosa* (in Kew Herb.); *C. G. Lloyd, 142, 171* (in Lloyd Herb., and in Mo. Bot. Gard. Herb., 55458, 55473); Ceballos, *C. J. Humphrey, 2585, 2590, 2696, 2829, 2964* (in Mo. Bot. Gard. Herb., 16043, 16052, 1778, 14838, 1766).

Jamaica: Troy and Tyre, *W. A. Murrill & W. Harris, 991,* comm. by N. Y. Bot. Gard. Herb.

Venezuela: Margarita, *A. F. Blakeslee,* comm. by W. G. Farlow.

Brazil: Blumenau, *A. Möller,* comm. by J. Bresadola, under the name *Hymenochaete fuliginosa,* as listed in Hedwigia **35** : 289. 1896.

20. **H. agglutinans** Ellis, Torr. Bot. Club Bul. **5** : 46. 1874; Sacc. Syll. Fung. **6** : 602. 1888; Massee, Linn. Soc. Bot. Jour. **27** : 106. 1890; Graves, Mycologia **6** : 279. *pl. 145.* 1914.

Hymenochaete ambiens Berk. & Curtis in Cooke, Grevillea **8** : 147. 1880; Sacc. Syll. Fung. **6** : 596. 1888; Massee, Linn. Soc. Bot. Jour. **27** : 106. 1890.

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

Fructifications resupinate, effused, adnate, orbicular, at first of loose texture and cream-buff, then thick, very compact, concentrically sulcate, and antique brown, with the margin thick, determinate, and cream-buff, finally becoming black during the winter, infecting living limbs where they rub together and finally uniting them firmly; in structure 1–2 mm. thick, composed of a single homogeneous hyphal layer of densely interwoven, thick-walled hyphae concolorous with the fructification and bearing at the outer surface of this layer an opaque subhymenium upon which the setae stand; setae 70–90×9 μ, protruding 60 μ, few, scattered, starting from the subhymenium; basidia and spores not found.

Fructifications 3–7 cm. in diameter, 1–2 mm. thick.

Infecting living branches of *Alnus, Benzoin, Acer,* etc., where they rub together. August to April. New Hampshire to Florida, westward to Idaho, and in Cuba. Frequent.

This species is easily recognized by its remarkable habit of joining together branches which have rubbed together and formed areas for infection. From these areas the fructification spreads so as to often encircle one or both limbs, at the same time killing the portions of the limbs beyond the fructification, as described by Graves in his article cited above.

Specimens examined:

Exsiccati: Ellis, N. Am. Fungi, 939; Ell. & Ev., Fungi Col., 807; de Thümen, Myc. Univ., 309.

New Hampshire: Chocorua, *W. G. Farlow.*

Vermont: Lost Pleiad Pond, Ripton, *E. A. Burt;* Middlebury, *E. A. Burt.*

Massachusetts: Cherry Brook, Weston, *A. B. Seymour, T 4* (in Mo. Bot. Gard. Herb., 43888); Magnolia, *W. G. Farlow;* Sharon, *A. P. D. Piguet,* comm. by W. G. Farlow (in Mo. Bot. Gard. Herb., 55475); Waltham, *A. B. Seymour, T 5* (in Mo. Bot. Gard. Herb., 43889).

Connecticut: Storrs, *A. E. Moss,* comm. by P. W. Graff, 39 (in Mo. Bot. Gard. Herb., 44791).

New York: Albany, *C. G. Lloyd, 07112* (in Lloyd Herb.); Alcove, *C. L. Shear, 999;* Brooklyn, *F. H. Ames* (in Lloyd Herb., 438); Chappaqua, *Mrs. C. E. Ryder & Mrs. W. A. Murrill* (in N. Y. Bot. Gard. Herb.); Ithaca, *G. F. Atkinson, 2022;* Scarsdale, *Mrs. Livingston & Miss Crane,* comm. by N. Y. Bot. Gard. Herb.

New Jersey: *C. F. Austin, 57* (in Curtis Herb. as an undetermined *Corticium* and in Kew Herb. as the type of *Hymenochaete ambiens* Berk. & Curtis); Newfield, *J. B. Ellis,* in Ellis, N. Am. Fungi, 939, in Ell. & Ev., Fungi Col., 807, and in de Thümen, Myc. Univ., 309.

Pennsylvania: Trexlertown, *W. Herbst, 1.*

North Carolina: Biltmore Estate, *W. A. Murrill* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55477).

Florida: Sorrento, *R. Thaxter, 74* (in Farlow Herb., and in Mo. Bot. Gard. Herb., 43896).

Ohio: Linwood, *C. G. Lloyd, 1879.*

Wisconsin: Madeline Island, near Bayfield, *V. B. Walker, 4* (in Mo. Bot. Gard. Herb., 6631).

Idaho: Priest River, *J. R. Weir, 345* (in Mo. Bot. Gard. Herb., 6853).

Cuba: Alto Cedro, Santiago, *F. S. Earle, 346,* from Herb. de Cuba Estacion Central Agronomica.

21. H. cinnamomea (Pers.) Bresadola, I. R. Accad. Agiati Atti III. **3**: 110. 1897.

Thelephora cinnamomea Persoon, Myc. Eur. **1**: 141. 1822; Fries, Elenchus Fung. **1**: 201. 1828.—*Corticium cinnamomeum*

(Pers.) Fries, Epicr. 561. 1838; Hym. Eur. 650. 1874.—*Hymenochaetella rudis* Karsten, Hedwigia **35**: 173. 1896.—*Hymenochaete rudis* Karsten in Sacc. Syll. Fung. **14**: 218. 1899.

Type: specimen determined by Fries in Herb. Fries.

Fructification resupinate, widely effused, adnate, velvety, not cracked, drying antique brown to Brussels-brown, the margin tomentose-fibrillose; in structure becoming 500–1000 μ thick, stratose, ranging up to 6 strata, each composed of a setigerous layer 30–45 μ broad and of a hyphal layer of equal or greater breadth, with hyphae colored like the fructification, loosely interwoven, 3 μ in diameter; setae 60–90×5–6 μ, protruding up to 60 μ, tapering upward from the base, originating in all parts of the setigerous layers; spores hyaline, even, 4½–6×2–2½ μ as seen in sectional preparations, stated by Bresadola to be 6–9×2½ μ as obtained from spore collections.

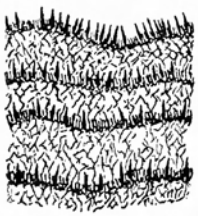


Fig. 17
H. cinnamomea.
Section × 44. From specimen in Herb. Fries.

Fructifications 3–7×1½–2½ cm.

On bark and decaying wood of both frondose and coniferous species but usually on the former. New York to California and British Columbia. June to April. Rare.

H. cinnamomea closely resembles in color and general aspect *Hypochnus ferrugineus* but is thicker and with a more compact hymenium. I base my idea of *H. cinnamomea* on the specimen from Norway determined by Fries and the fine specimens of identical structure collected in Lapland by Romell, in Finland by Karsten, and in Ardennes by Libert. The specimen from Hungary, received from Bresadola, has the same aspect, velvety, not cracked, and a thin surface setigerous layer but varies toward *H. spreta* by having its deeper setigerous layers more than 45 μ broad and exceeding the adjoining hyphal layers. This specimen from Bresadola formerly led me to regard *H. spreta* as a synonym of *H. cinnamomea* and to refer to *H. cinnamomea* for my correspond-

ents many specimens which will be found cited under *H. spreta*. *H. cinnamomea* appears clearly distinct from *H. spreta* by its velvety surface, not contracting greatly in thick specimens nor cracking to the substratum so as to form small, isolated, rectangular masses, by setigerous layers 30–45 μ broad and usually narrower than the adjoining hyphal layers, and spores up to 4½–9 μ long. Several of the American specimens cited below are first-stratum stages.

Specimens examined:

Exsiccati: Libert, Pl. Crypt. Arduennae, 122.

Norway: Christiania, *M. N. Blytt* (in Herb. Fries, det. by E. Fries).

Sweden: *L. Romell, 85,* first-stratum stage; Lapland, *L. Romell, 398, 399.*

Finland: Mustiala, *P. A. Karsten,* authentic specimen of *Hymenochaetella rudis.*

Hungary: *Kmet,* det. and comm. by J. Bresadola.

Belgium: in Libert, Pl. Crypt. Arduennae, 122.

New York: Staten Island, *W. H. Ballou* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55544).

Ohio: Cincinnati, *C. G. Lloyd, 4507.*

Illinois: Riverside, *E. T. & S. A. Harper, 657.*

Nebraska: Woodlawn, *C. L. Shear, 1026,* first-stratum stage.

Kansas: Rooks Co., *E. Bartholomew,* first-stratum stage.

California: Santa Barbara, *O. M. Oleson, 17,* first-stratum stage.

British Columbia: Sidney, *J. Macoun, 37, 99, 111* (in Mo. Bot. Gard. Herb., 6687, 55364, 55365). Nos. 37 and 111 are in the first-stratum stage.

22. H. digitata Burt, n. sp.

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

Fructification resupinate, long and broadly effused, adnate, drying between Brussels-brown and antique brown, with hymenium somewhat granular, the margin determinate, very thin; in structure stratose, 800 μ thick, composed of about 15 narrow, loosely interwoven, hyphal layers alternating with the same number of very dense, dark and opaque setigerous layers

of about equal breadth and equal to the loosely interwoven layers; hyphae about 2 μ in diameter, concolorous with the fructification; setae 50–60×6 μ, emerging up to 50 μ, tapering from base to a sharp point, colored like the fructification; paraphyses colored like other organs, filiform, divided at the apex into about three short, finger-like branches or prongs; basidia and spores not found.

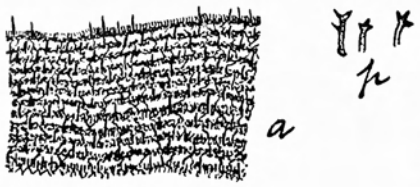


Fig. 18
H. digitata.
Section, *a*, ×44; paraphyses, *p*, ×500. From type.

Fructification 13×5 cm., broken off along three sides—probably large.

On bark of rotten logs in forests. Panama. March.

H. digitata belongs in the group of species with stratose fructifications, of which *H. spreta* is the best known. *H. digitata* should be easily recognized by its bright ferruginous brown color, fructification composed of very many and very narrow strata, and paraphyses with digitately, or sometimes pinnately, branched tips. Setae occur not only in the hymenial surface but also rather sparingly in the other setigerous layers throughout the fructification.

Specimens examined:

Panama: El Boquete, Chiriqui, *W. R. Maxon, 5559,* type, Smithsonian Survey of Panama Canal Zone (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55469).

23. **H. spreta** Peck, N. Y. State Mus. Rept. **30**: 47. 1879; Sacc. Syll. Fung. **6**: 595. 1888.

Hymenochaete laevigata Massee, Linn. Soc. Bot. Jour. **27**: 107. 1890.

Type: in N. Y. State Mus. Herb.

Fructifications resupinate, long and widely effused, adnate, rimose, drying Argus-brown to snuff-brown, the margin thinning out, velvety when young; in structure 300–500 μ thick,

stratose, composed of 1–3, or rarely up to 5, pairs of setigerous and hyphal layers, with the setigerous layers very dense, about 45–200 μ thick, exceeding the alternating hyphal layers which are composed of loosely interwoven, thick-walled, colored, even hyphae 3 μ in diameter; setae numerous, slender, subfalcate, 60–75$\times$6 μ, originating at all levels in each setigerous layer, protruding up to 50 μ; spores hyaline, even, 4½$\times$2½ μ.

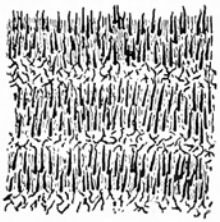


Fig. 19
H. spreta.
Section ×44. From type.

Fructifications 4–25$\times$2–10 cm.

Usually on decaying wood of frondose species, rarely on coniferous wood. Canada to Alabama and westward to Washington, California, and British Columbia. April to January. Common.

The stratose structure of well-developed fructifications of *H. spreta* locates this species in a small group of three species, of which the others are *H. digitata* and *H. cinnamomea,* from both of which thick fructifications of *H. spreta* may be separated readily by being deeply cracked and having setigerous layers from 45–150 μ, or rarely more, in thickness, very compact, and exceeding in thickness the adjoining, loosely interwoven hyphal layers. Fructifications of *H. spreta* in its first-stratum stage, consisting of but one hyphal layer and one setigerous layer, are frequently not cracked but have the setigerous layer 45 μ or more thick and thicker than the hyphal layer.

Specimens examined:

Exsiccati: Ell. & Ev., N. Am. Fungi, 1936, 3304 — the latter under the name *Hymenochaete unicolor;* Ell. & Ev., Fungi Col., 806, under the name *H. unicolor.*

Canada: Comox, Van Island, *J. Macoun, 18.*

Prince Edward's Island: *J. Macoun, 344.*

Ontario: London, *J. Dearness;* Ottawa, *J. Macoun, 6.*

New Hampshire: Chocorua, *W. G. Farlow,* two collections, one of which (in Mo. Bot. Gard. Herb., 55258).

Vermont: Middlebury, *C. G. Lloyd, 10671* (in Lloyd Herb.,

and in Mo. Bot. Gard. Herb., 55483), and *E. A. Burt,* four collections.

New York: Alcove, *C. L. Shear, 1310;* East Galway, *E. A. Burt;* Hudson Falls, *S. H. Burnham, 45* (in Mo. Bot. Gard. Herb., 54458); Ithaca, *G. F. Atkinson, 8656;* Karner, *H. D. House* (in N. Y. State Mus. Herb., 14.159, and in Mo. Bot. Gard. Herb., 44710); New York, *W. H. Ballou* (in Lloyd Herb., 12121, and in Mo. Bot. Gard. Herb., 55457).

New Jersey: Newfield, *J. B. Ellis* (in N. Y. Bot. Gard. Herb. and in Mo. Bot. Gard. Herb.).

Pennsylvania: Bethlehem, *Schweinitz* (in Herb. Schweinitz, under the name *Thelephora laevigata* and the type of *Hymenochaete laevigata* Massee).

District of Columbia: Takoma Park, *C. L. Shear, 1346.*

Georgia: Ribbon Brook, Tallulah Falls, *A. B. Seymour,* comm. by W. G. Farlow, EE (in Mo. Bot. Gard. Herb., 44603).

Florida: Cocoanut Grove, *R. Thaxter, 55* (in Farlow Herb., and in Mo. Bot. Gard. Herb., 43491); Nixon-Lewis Hammock, Dade Co., *J. K. Small & C. A. Mosier, 5396* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55485).

Alabama: Auburn, *F. S. Earle* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55486).

West Virginia: Eglon, *C. G. Lloyd, 1450, 1565* (in Lloyd Herb., and in Mo. Bot. Gard. Herb., 55484 and 55488); Nuttallburg, *L. W. Nuttall,* in Ell. & Ev., N. Am. Fungi, 3304, and in Fungi Col., 806.

Ohio: Cincinnati, *A. P. Morgan,* comm. by C. G. Lloyd, 2610, and *C. G. Lloyd, 3578.*

Indiana: Crawfordsville, *D. Reddick, 15;* Millers, *E. T. & S. A. Harper, 934.*

Kentucky: Crittenden, *C. G. Lloyd, 07159, 10836* (in Lloyd Herb., and in Mo. Bot. Gard. Herb., 55468 and 55487).

Montana: Evaro, *J. R. Weir, 422* (in Mo. Bot. Gard. Herb., 14766).

Idaho: Priest River, *J. R. Weir, 2.*

Washington: Bingen, *W. N. Suksdorf, 849;* Sedro-Woolley, *C. J. Humphrey, 7487* (in Mo. Bot. Gard. Herb., 10968);

Stanwood, *C. J. Humphrey, 6395, 7395* (in Mo. Bot. Gard. Herb., 42935 and 11042).

California: Palo Alto, *W. A. Murrill & L. S. Abrams, 1240* (in N. Y. Bot. Gard. Herb.).

British Columbia: *J. Macoun*, in Ell. & Ev., N. Am. Fungi, 1936; Kootenai Mts., near Salmo, *J. R. Weir, 494* (in Mo. Bot. Gard. Herb., 21796); Sidney, *J. Macoun, 79*, and *an unnumbered collection* (in Mo. Bot. Gard. Herb., 9967, 6687).

24. H. epichlora (Berk. & Curtis) Cooke, Grevillea **8** : 147. 1880; Sacc. Syll. Fung. **6** : 596. 1888.

Corticium epichlorum Berk. & Curtis, Grevillea **1** : 178. 1873; Massee, Linn. Soc. Bot. Jour. **27** : 119. 1890.—*Hymenochaete asperata* Ell. & Ev. Torr. Bot. Club Bul. **27** : 50. 1890; Sacc. Syll. Fung. **16** : 188. 1902.

Type: type distribution in Ravenel, Fungi Car. **5** : 24.

Fructification resupinate, broadly effused, thin, adnate, cracked, drying Isabella-color to tawny olive, with a thin olive-ocher subiculum forming a slight margin; in structure 75–120 μ thick, with the hyphal layer composed of loosely arranged, ascending, thin-walled hyphae 2½ μ in diameter, colored like the fructification, in some places forming a narrow, dense zone next to the substratum; setae scattered, 36–45$\times$ 4½–5 μ, protruding up to 30 μ, starting from different levels of the hymenium and subhymenium, tapering upward to a slender point; spores in spore collection white, even, 3–4½$\times$ 2–2½ μ, flattened on one side.

Fig. 20
H. epichlora.
Section × 68. From type.

Fructifications 5–10$\times$1–3 cm. and broken off at both ends —probably large.

On bark of dead *Symplocos, Vitis,* and other frondose woods. Alabama to Louisiana and in Mexico. August to November.

H. epichlora has some resemblance in aspect to *H. corrugata* on account of its cracked hymenial surface but it is dis-

tinguished from the latter species by the somewhat sulphur-yellow margin and subiculum which forms a broad hyphal layer destitute of setae between the subhymenium and the substratum; the spores of *H. epichlora* are shorter than those of *H. corrugata* and the setae are fewer and smaller.

Specimens examined:

Exsiccati: Ravenel, Fungi Car. **5** : 24, type distribution.

Alabama: *Peters, 6118* (in Kew Herb.), and in Ravenel, Fungi Car. **5** : 24.

Louisiana: Abita Springs, *A. B. Langlois, 2647 to Ellis,* type of *Hymenochaete asperata* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55491); Baton Rouge, *Edgerton & Humphrey,* comm. by C. J. Humphrey, 5727; St. Martinville, *A. B. Langlois, al, am.*

Mexico: Jalapa, *W. A. & Edna L. Murrill, 338, 344, 345* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 54480, 54460, and 54461).

25. H. dura Berk. & Curtis, Linn. Soc. Bot. Jour. **10** : 334. 1868; Cooke, Grevillea **8** : 147. 1880; Sacc. Syll. Fung. **6** : 596. 1888; Massee, Linn. Soc. Bot. Jour. **27** : 105. 1890.

Fig. 21
H. dura.
Section ×68. From type.

Type: in Kew Herb. and Curtis Herb.

Fructifications resupinate, orbicular, rigid when dry, spongy when moistened, drying between wood-brown and Saccardo's umber, the margin thick, obtuse, paler than the hymenium; in structure 600–700 μ thick, with the intermediate layer bordered on each side by a narrow, dense, dark zone, that on the under side connecting the intermediate layer with a dense hyphal layer 100 μ broad, situated on the substratum; hyphae of intermediate layer baryta-yellow, 2 μ in diameter, longitudinally arranged, somewhat loosely interwoven; setae 30–36 $\times$5–6 μ, scattered between the hair-like paraphyses which they exceed but slightly, terminating in slender, curved, very

sharp-pointed tips, confined to the hymenium; spores hyaline, even, 5×3 μ.

Fructifications 1–3 cm. in diameter.

On dead, erect trees. Cuba. February. Rare.

In the original description, *H. dura* was said to be allied to *H. unicolor*, but if so, it is in aspect only, for when seen in section it is wholly different in structure from the latter, having a narrow setigerous layer and a broad, intermediate layer which is connected by a conspicuous dark zone with a well-developed hyphal layer next to the substratum. This structure in section places *H. dura* in the group with *H. tabacina*, from which, and from the other species of this group, it is distinct by its hairy hymenium and small, scattered setae.

Specimens examined:

Cuba: *C. Wright, 241,* type (in Kew Herb. and in Curtis Herb.).

26. H. leonina Berk. & Curtis, Linn. Soc. Bot. Jour. **10**: 334. 1868; Cooke, Grevillea **8**: 148. 1880; Sacc. Syll. Fung. **6**: 597. 1888; Massee, Linn. Soc. Bot. Jour. **27**: 107. 1890.

Type: in Kew Herb. and Curtis Herb.

Fructifications resupinate, widely effused, thick, coriaceous, separable from substratum when moist, not cracked, drying tawny olive to Brussels-brown, the margin tomentose; in structure 200–700 μ thick, composed of (1) a compact setigerous layer 50–75 μ thick, with the setae starting at different levels within it, and of (2) a broad, supporting hyphal layer 100–600 μ thick, composed of loosely interwoven, rather longitudinally arranged hyphae 3 μ in diameter, stiff, colored like the fructification; in fully developed, thick fructifications the hyphal layer is divided parallel with the substratum by a narrow, dark zone; setae 60–80×7–9 μ, emerging up to 50 μ, conical, tapering from the base to the apex; spores hyaline, even, 5–6×3–3½ μ.

Fig. 22
H. leonina.
Section × 44. From type.

Probably large; small fructifications laterally confluent for 10 cm., 1–2 cm. broad; large fructifications 7 cm. in diameter and broken off on three sides.

On frondose limbs. Arkansas to Mexico, and in Cuba. August to March.

H. leonina has been resupinate in all collections which seem referable here by structure. The species is well marked by its usual tawny olive color, coriaceous structure which enables it to be dissected away from the substratum when moist, by the distribution of the setae in the hymenium and the dark, dense subhymenium, and by the broad, bright-colored hyphal layer which is finally divided in the middle by a narrow, dark zone.

Specimens examined:

Arkansas: Fordyce, *C. J. Humphrey, 5837.*

Louisiana: Baton Rouge, *C. J. Humphrey, 5691* (in Mo. Bot. Gard. Herb., 20707); St. Martinville, *A. B. Langlois, 2091, ai.*

Mexico: Vera Cruz, Sanborn, *C. R. Orcutt, 2920* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 37362).

Cuba: *C. Wright, 532,* type (in Kew Herb. and in Curtis Herb.); *C. G. Lloyd, 143* (in Lloyd Herb., and in Mo. Bot. Gard. Herb., 55474); Alto Cedro, *Earle & Murrill, 505,* comm. by N. Y. Bot. Gard. Herb.; Baracoa, *Underwood & Earle, 780,* comm. by N. Y. Bot. Gard. Herb.; Pinar del Rio Province, *Earle & Murrill, 197,* comm. by N. Y. Bot. Gard. Herb.

27. **H. fulva** Burt, n. sp.

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

Fructifications resupinate, effused, thin, adnate, not cracking in drying, between Saccardo's umber and cinnamon-brown, the margin entire, determinate; in structure 120–260 μ thick, with the intermediate layer bordered on each side by a dark, dense zone—that on the under side directly adnate to the substratum and that on the other being subhymenial in position, 40–105 μ thick, bearing at first few setae but thickening with age and at length having many setae starting in all its parts; hyphae of intermediate layer colored, loosely interwoven, $2\frac{1}{2}$–3 μ in diameter; setae 75–90$\times$$7\frac{1}{2}$–9 μ, emerg-

ing up to 60 μ, not crowded, starting in the dark subhymenial zone and rising through the hymenium, tapering upward from the base; cystidia 12–30×6–18 μ, largest when

Fig. 23
H. fulva.
Section on left, × 68, from type; section *a*, × 68, seta, *b*, and cystidia, *c*, × 375, from Langlois, aj.

seated on the dark, subhymenial zone; spores borne 4 to a basidium, hyaline, even, 4½–5×2½–3 μ.

Fructifications 1×1–1½ cm., becoming laterally confluent for 7 cm. or more.

On rotting fallen limbs of frondose species. In Louisiana and Jamaica—at 4500–5200 ft. altitude in the latter. December.

H. fulva may be recognized among resupinate species by its fulvous color, not cracking, presence of an intermediate layer bordered on each side by a dark zone, with that on the under side seated directly on the substratum, and by the cystidia.

Specimens examined:

Louisiana: St. Martinville, *A. B. Langlois, aj,* and a specimen comm. by Lloyd Herb., 2422 in part.

Jamaica: Cinchona, *W. A. & Edna L. Murrill, 645,* type, comm. by N. Y. Bot. Gard. Herb.; Blue Hole, *W. A. Murrill, 182½,* comm. by N. Y. Bot. Gard. Herb.

28. H. pinnatifida Burt, n. sp.

Type: in Lloyd Herb. and Burt Herb.

Fructifications resupinate, effused, adnate, scattered, sometimes confluent, somewhat orbicular, drying between Verona-brown and cinnamon-drab, slightly glaucous, the margin antique brown, narrow, rather thick, somewhat velvety; in structure 120–240 μ thick, composed of a setigerous layer 40–80 μ broad and of a loosely interwoven intermediate layer which is

bordered on each side by a narrow, dense, dark zone; hyphae 3–3½ μ in diameter, colored, thick-walled; setae 40–70×6–7 μ, emerging up to 30 μ, tapering from the base, abundant but not crowded; colored paraphyses 1–2 μ in diameter, with pinnatifid tips, are conspicuous in the hymenium; spores hyaline, even, flattened on one side, 4–5×1½ μ, borne 4 to a basidium as seen in preparations of sections.

Fig. 24
H. pinnatifida.
Section, *a*, × 68; paraphyses, *p*, × 640.
See *pl. 17, f. 12.*

Fructifications about 1–3 cm. in diameter.

On bark of fallen frondose limbs. Georgia to Louisiana, in Mexico, Cuba, and Jamaica. August to April. Apparently common.

H. pinnatifida has some resemblance to resupinate *H. rubiginosa,* but the setae of the former are less conspicuous with the aid of a lens; the presence of colored paraphyses with pinnatifid tips distinguishes *H. pinnatifida* from all other nonstratose species.

Specimens examined:

Exsiccati: Ell. & Ev., N. Am. Fungi, 1713, under the name *Hymenochaete insularis;* Ravenel, Fungi Am., 122, under the name *Hymenochaete rubiginosa.*

Georgia: Atlanta, *E. Bartholomew, 5675* (in Mo. Bot. Gard. Herb., 44260).

Florida: *G. C. Fisher* (in Lloyd Herb., 08238); *W. W. Calkins, 82, 93* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55489, 55490), and in Ell. & Ev., N. Am. Fungi, 1713; Gainesville, *H. W. Ravenel,* in Ravenel, Fungi Am., 122; Jacksonville, *W. W. Calkins* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb.); New Smyrna, *C. G. Lloyd, 2139,* type, and *2140.*

Alabama: Auburn, *F. S. Earle, 114* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55492).

Mississippi: Jackson, *E. Bartholomew, 5798* (in Mo. Bot. Gard. Herb., 44268).

Louisiana: Abita Springs, *A. B. Langlois, 2647 to Burt;* Bogalusa, *C. J. Humphrey, 5491;* St. Martinville, *A. B. Langlois, 1621, cb, cd, D,* and a specimen from Lloyd Herb., 2422 in part; definite locality not stated, *A. B. Langlois, 136* (in U. S. Dept. Agr. Herb., in Farlow Herb., and in Mo. Bot. Gard. Herb., 44047).

Mexico: *Botteri, 31* (in Curtis Herb., under the name *Hymenochaete rubiginosa*).

Cuba: Managua, *Earle & Murrill, 6, 31,* comm. by N. Y. Bot. Gard. Herb.

Jamaica: Mandeville, *A. E. Wight,* comm. by W. G. Farlow.

29. H. multisetae Burt, n. sp.

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

Fructifications resupinate, effused, adnate, thin, cinnamon-brown to Prout's brown, finally somewhat cracked, the margin determinate; in structure 35–100 μ thick, lacking an intermediate layer, with the setigerous layer dense and opaque; setae very abundant and crowded, small, 27–45×4½–5 μ, emerging up to 30 μ, starting from all parts of the setigerous layer, tapering upward; spores hyaline, even, 3–4×1–2 μ, but few found.

Fig. 25
H. multisetae.
Section × 68. From type.

Fructifications 2–10×1–2 cm., sometimes encircling small limbs.

On fallen hardwood limbs in wet wooded region. Cuba and Jamaica. December and January.

H. multisetae belongs in the same group of species as *H. opaca,* which it resembles in aspect. It may be distinguished from the latter by its thinner fructifications and smaller setae.

Specimens examined:

Cuba: Ceballos, *C. J. Humphrey, 2808,* type (in Mo. Bot. Gard. Herb., 1786).

Jamaica: Chester Vale, *W. A. & Edna L. Murrill, 325, 346,* comm. by N. Y. Bot. Gard. Herb.; Moneague, *W. A. Murrill, 1186,* comm. by N. Y. Bot. Gard. Herb.; Troy and Tyre,

W. A. Murrill & W. Harris, 926, comm. by N. Y. Bot. Gard. Herb.

30. H. anomala Burt, n. sp.

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

Fructification resupinate, adnate, thin, vinaceous-buff, cracked, the margin determinate; in structure 75–125 μ thick, lacking a hyphal layer, composed of scattered setae, cystidia, suberect, colorless, incrusted hyphae, and crystalline matter; setae 20–50×4½ μ, emerging up to 20 μ but usually not emerging, flexuous, tapering upward, starting from all parts of the setigerous layer; cystidia colorless, incrusted, 16–20×6 μ, not emergent; spores hyaline, even, 4×2½ μ.

Fig. 26
H. anomala.
Section, *a*, × 120; seta, *b*, and cystidia, *c*, × 375. From type.

Fructification 2½ cm. ×5 mm., broken off at one end.

On prostrate decorticated limbs in dry thickets. Cuba. March. Rare.

H. anomala is noteworthy by its pale color, small fructification, setae only rarely protruding, and incrusted hyphae and cystidia. It differs from *H. cervina* in paler color outside and within, and in having cystidia.

Specimens examined:

Cuba: Managua, *Earle & Murrill, 36,* type, comm. by N. Y. Bot. Gard. Herb.

31. H. corrugata (Fr.) Léveillé, Ann. Sci. Nat. Bot. III. **5** : 152. 1846; Cooke, Grevillea **8** : 147. 1880; Sacc. Syll. Fung. **6** : 595. 1888; Massee, Linn. Soc. Bot. Jour. **27** : 110. 1890.

Thelephora corrugata Fries, Obs. Myc. **1** : 154. 1815; Elenchus Fung. **1** : 224. 1828; Persoon, Myc. Eur. **1** : 134. 1822.—*Corticium corrugatum* Fries, Epicr. 565. 1838; Hym. Eur. 656. 1874. —*Hymenochaete insularis* Berkeley, Grevillea **1** : 165. 1873; Cooke, Grevillea **8** : 148. 1880; Sacc. Syll. Fung. **6** : 598. 1888; Massee, Linn. Soc. Bot. Jour. **27** : 107. 1890.

Type: authentic specimen from Fries reported in Kew Herb. by Massee, *loc. cit.*

Fructifications resupinate, widely effused, closely adnate, cracked into small 4–6-sided areas, sometimes grumous, drying from cinnamon-brown to bister and Rood's brown and sometimes weathered to mouse-gray, the margin thinning out and sometimes paler; in structure 150–500 μ thick, composed of densely interwoven hyphae 3 μ in diameter, colored like the fructification, and of very numerous setae 60–70×8–12 μ, emerging up to 50 μ, somewhat cylindric below, tapering above, distributed throughout the fructification; spores white in collection on slide, even, allantoid, $4\frac{1}{2}$–7×$1\frac{1}{2}$–2 μ.

Fig. 27
H. corrugata.
Section of young fructification, *a*, and of older fructification, *b*, × 68.

Very variable in size, ranging from $2\frac{1}{2}$×1 cm. to 20×7 cm., sometimes much larger.

Very common on dead fallen limbs and trunks of frondose species, such as beech, maple, birch, and alder, rarely on coniferous wood. Canada to Texas and westward to Ohio and Kentucky, and in Jamaica. July to April.

The distinguishing characters of *H. corrugata* are its closely adnate fructification, which cracks into small, polygonal areas about 1–3 to a mm. and sometimes scales off, distribution of the rather stout setae throughout the whole very dense fructification from substratum to hymenium, and white, allantoid spores about $4\frac{1}{2}$–7×$1\frac{1}{2}$–2 μ. American collections of *H. corrugata* have a broader range in color than the European collections cited below. *H. insularis* Berk. is based upon a specimen Rood's brown in color, with whitish margin, orbicular form, and thickness of 160 μ. I have tried to regard *H. insularis* as a distinct species but it intergrades too completely in all its characters with typical *H. corrugata*. *H. episphaeria* (Schw.) is very near *H. corrugata* but is less cracked, extremely thin, and has most of its setae starting conspicuously on a dark delimiting zone next to the substratum.

Specimens examined:

Exsiccati: Bartholomew, Fungi Col., 4425, 4931; Berkeley, Brit. Fungi, 249, 298; Ellis, N. Am. Fungi, 14; Ell. & Ev., Fungi Col., 8; Krieger, Fungi Sax., 717, 1422, the latter under the name *Hymenochaete cinnamomea;* Krypt. Exs. Vind., 714; Ravenel, Fungi Am., 123, under the name *Hymenochaete crocata,* 124; Fungi Car. **5** : 26; Shear, N. Y. Fungi, 53; de Thümen, Myc. Univ., 9.

England: Berkeley, Brit. Fungi, 249, 298.

France: (in Lloyd Herb., 3346).

Germany: Saxony, *W. Krieger,* in Krieger, Fungi Sax., 717, 1422.

Austria-Hungary: Rosenau, *P. Strasser,* Krypt. Exs. Vind., 714.

Canada: *J. Macoun, 17, 19, 25;* Lower St. Lawrence Valley, *J. Macoun, 63.*

Ontario: Casselman, *J. Macoun, 362, 365;* London, *J. Dearness,* in Bartholomew, Fungi Col., 4425, and (in Lloyd Herb., 12001); Temagami, *C. G. Lloyd,* 07564 (in Lloyd Herb.).

Quebec: Hull, *J. Macoun, 242.*

Maine: Costigan, *W. A. Murrill, 1761* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55459); Orono, *F. L. Harvey,* comm. by P. L. Ricker, 1, 2.

New Hampshire: *P. Wilson* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55471); Chocorua, *W. G. Farlow.*

Vermont: Middlebury, *E. A. Burt,* two collections; Smugglers' Notch, *E. A. Burt;* Ripton, *E. A. Burt.*

Massachusetts: Magnolia, *W. G. Farlow,* two collections; Sharon, *W. G. Farlow* (in Mo. Bot. Gard. Herb., 6960), *A. P. D. Piguet,* two collections, comm. by W. G. Farlow (in Mo. Bot. Gard. Herb., 44046, 55228); Wellesley, *L. W. Riddle, 15.*

New York: Adirondack Mts., *C. H. Peck, T 27* (in N. Y. State Mus. Herb., and in Mo. Bot. Gard. Herb., 54650); Albany, *C. G. Lloyd, 07179* (in Lloyd Herb., and in Mo. Bot. Gard. Herb., 55482); Alcove, *C. L. Shear, 1003,* and in Shear, N. Y. Fungi, 53; Catskill Mts., *C. H. Peck, T 11* (in N. Y. State Mus. Herb., and in Mo. Bot. Gard. Herb., 54578); East Galway, *E. A. Burt;* Freeville, *G. F. Atkinson, 3279;*

Fort Ann, *S. H. Burnham, 39* (in Mo. Bot. Gard. Herb., 54423); Hudson Falls, *S. H. Burnham, 30* (in Mo. Bot. Gard. Herb., 54482); Ithaca, *G. F. Atkinson, 2815;* Karner, *H. D. House* (in N. Y. State Mus. Herb., and in Mo. Bot. Gard. Herb., 55196); Lake Placid, *W. A. & Edna L. Murrill, 152* (in N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55001); North Greenbush, *H. D. House,* two collections (in N. Y. State Mus. Herb., and in Mo. Bot. Gard. Herb., 54385/6); Orient, *R. Latham, 154* (in Mo. Bot. Gard. Herb., 44229).

New Jersey: Newfield, *J. B. Ellis,* in Ellis, N. Am. Fungi, 14, in Ell. & Ev., Fungi Col., 8, and in de Thümen, Myc. Univ., 9.

Pennsylvania: Charter Oak, *L. O. Overholts, 3773* (in Mo. Bot. Gard. Herb., 54991); Trexlertown, *W. Herbst, 79.*

Maryland: Takoma Park, *C. L. Shear, 1161.*

North Carolina: *M. A. Curtis, 4456,* type of *H. insularis* (in Kew Herb. and in Curtis Herb.).

South Carolina: Aiken, *H. W. Ravenel,* in Ravenel, Fungi Am., 123, 124.

Florida: New Smyrna, *C. G. Lloyd, 2120.*

Alabama: *Peters,* in Ravenel, Fungi Car. **5** : 26; Montgomery, *R. P. Burke, 53, 63* (in Mo. Bot. Gard. Herb., 16746, 18222).

Mississippi: Jackson, *E. Bartholomew, 5780* (in Mo. Bot. Gard. Herb., 9188), and in Bartholomew, Fungi Col., 4931.

Louisiana: St. Martinville, *A. B. Langlois, cc,* and *an unnumbered collection.*

Texas: Houston, *H. W. Ravenel, 261.*

West Virginia: Eglon, *C. G. Lloyd, 1411* (in Lloyd Herb., and in Mo. Bot. Gard. Herb., 55470); Paw Paw, *C. L. Shear, 1178.*

Michigan: Isle Royal, *Allen & Shuntz, 16,* comm. by Univ. of Wisconsin Herb.

Ohio: Cincinnati, *A. P. Morgan,* comm. by Lloyd Herb., 2593; College Hill, *Aiken,* comm. by Lloyd Herb., 2328.

Kentucky: Crittenden, *C. G. Lloyd, N;* Harlan, *C. H. Kauffman, 74* (in Mo. Bot. Gard. Herb., 21533).

Jamaica: Morce's Gap, *W. A. & Edna L. Murrill, 732,* comm. by N. Y. Bot. Gard. Herb.

32. H. episphaeria (Schw.) Massee, Linn. Soc. Bot. Jour. **27**: 111. 1890; Cooke, Grevillea **20**: 11. 1891; Sacc. Syll. Fung. **11**: 123. 1895.

Thelephora episphaeria Schweinitz in Fries, Elenchus Fung. **1**: 225, 1828; Am. Phil. Soc. Trans. N. S. **4**: 169. 1832.

Type: in Herb. Schweinitz, Kew Herb., and Curtis Herb.

Fructification resupinate, effused, closely adnate, conforming to the irregularities of the substratum, drying buckthorn-brown to tawny olive; in structure up to 90 μ thick, with hyphae rigid, interwoven, 2–2½ μ in diameter, giving their color to the fructification; setae 60–90×9–12 μ, emerging up to 15 μ, cylindric, obtuse, starting directly from the dark, opaque, delimiting zone next to the substratum, as differentiated in permanent preparations which were treated with KHO solution and stained with eosin; no spores found in type, but hyaline, even, allantoid, 4–5×1½–2 μ in collections referred here.

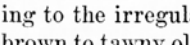


Fig. 28
H. episphaeria.
Section × 68. From type.

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

Under side of dead frondose limbs—type on *Alnus* and *Diatrype stigma*. Vermont to Pennsylvania and Illinois.

H. episphaeria resembles *H. arida* and *H. cinnamomea* in aspect, but is thinner, lacks a hyphal layer, and has its setae starting from the substratum, or very near it, and extending up through the hymenium.

Specimens examined:

Vermont: Middlebury, *C. G. Lloyd, 07221* (in Lloyd Herb., and in Mo. Bot. Gard. Herb., 55558).

Massachusetts: Weston, *A. B. Seymour, T 19* (in Mo. Bot. Gard. Herb., 18358).

New York: Albany, *C. G. Lloyd, 07120* (in Lloyd Herb., and in Mo. Bot. Gard. Herb., 55481).

Pennsylvania: Bethlehem, *Schweinitz,* type (in Herb. Schweinitz, in Kew Herb., and in Curtis Herb.); Trexlertown, *W. Herbst,* comm. by Lloyd Herb., 3612.

Ohio: Cincinnati, *A. P. & L. V. Morgan,* under the name *H. insularis,* comm. by U. S. Dept. Agr. Herb.

Illinois: River Forest, *E. T. & S. A. Harper, 742.*

33. H. cervina Berk. & Curtis, Linn. Soc. Bot. Jour. **10**: 334. 1868; Cooke, Grevillea **8**: 147. 1880; Sacc. Syll. Fung. **6**: 596. 1888; Massee, Linn. Soc. Bot. Jour. **27**: 114. 1890.

Type: in Kew Herb. and Curtis Herb.

Fructification resupinate, effused, adnate, very thin, usually cracked, drying Dresden-brown, the margin thinning out; in structure 80–200 μ thick, composed of densely interwoven, suberect hyphae, of crystalline masses, and of setae; hyphae 2½–3 μ in diameter, giving their color to the fructification; crystalline masses 12–15 μ in diameter; setae distributed in all parts of the section and some starting from the substratum, 60–90× 10–12 μ, emerging up to 40 μ, tapering from the base to a sharp apex; spores hyaline, even, 7–9×3½ μ.

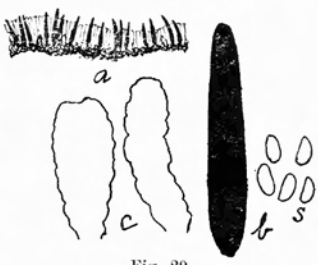


Fig. 29
H. cervina.
Section, *a*, × 68; seta, *b*, cystidia, *c*, and spores, *s*, × 640. From type.

Fructifications 5 cm. or more long, about 1–2 cm. broad.

On dead limbs and decorticated wood. Illinois, Louisiana, and Cuba.

By reason of its thin fructification, few hyphae, and abundant setae starting from substratum, *H. cervina* is near *H. episphaeria* in structure and general aspect, but may be distinguished from this species by larger spores and by the presence of cystidia which finally become crystalline masses. Berkeley's comment that specimens of *H. cervina* resemble *Hymenochaete Curtisii* is misleading and probably due to his having referred to *H. cervina* a collection of *Stereum umbrinum*, the Curtis Herb., 2308.

Specimens examined:

Louisiana: *A. B. Langlois, 267*, comm. by U. S. Dept. Agr. Herb.

Cuba: *C. Wright, 213*, type (in Kew Herb. and in Curtis

Herb.); Alto Cedro, *Underwood & Earle, 1527,* comm. by N. Y. Bot. Gard. Herb.

34. H. opaca Burt, n. sp.

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

Fructifications resupinate, effused, adnate, when young slightly velvety, very thin, and between bister and Vandyke-brown, finally becoming glabrous, somewhat thicker, Vandyke-brown and cracked, the margin thinning out; in structure 200–300 μ thick, lacking an intermediate layer, with the setigerous layer very dense and opaque and composed of suberect, interwoven, dark hyphae, and of setae; setae 50–90×8–10 μ, emerging up to 60 μ, starting from all parts of the setigerous layer; spores hyaline, even, 3½–5×1½–2 μ.

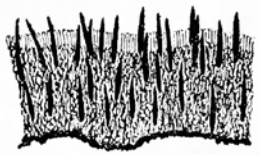


Fig. 30
H. opaca.
Section × 68. From type.

Fructifications 3–5×1–2 cm.

On bark of dead frondose limbs. Wet, wooded region, 2000–4000 ft. altitude. Jamaica. December and January.

H. opaca belongs in the group with *H. corrugata* and *H. tenuis,* from both of which it differs by its velvety surface when young, different color, darker hyphae, and denser and more opaque structure in sectional preparations.

Specimens examined:

Jamaica: Chester Vale, *W. A. & Edna L. Murrill, 297,* comm. by N. Y. Bot. Gard. Herb.; Cinchona, *W. A. & Edna L. Murrill, 538,* type, comm. by N. Y. Bot. Gard. Herb.; Troy and Tyre, *W. A. Murrill & W. Harris, 923, 937,* comm. by N. Y. Bot. Gard. Herb.

35. H. tenuis Peck, N. Y. State Mus. Rept. **40**: 57. 1887; Sacc. Syll. Fung. **6**: 599. 1888; Massee, Linn. Soc. Bot. Jour. **27**: 109. 1890.

Type: in N. Y. State Mus. Herb.

Fructifications resupinate, effused, becoming confluent, very thin, adnate, somewhat cracked, velvety, drying from raw umber to mummy-brown, the margin thinning out, indeter-

minate; in structure 30–75 μ thick, composed of a setigerous layer of densely interwoven hyphae $1\frac{1}{2}$ μ in diameter and of very numerous setae uniformly distributed from substratum to hymenium, 36–45×5–7 μ, protruding up to 30 μ, tapering upward, and terminating in slender, somewhat curved, very sharp tips; spores in spore collection white, even, flattened on one side, $4\frac{1}{2}$–$5\frac{1}{2}$×2–$2\frac{1}{2}$ μ.

Fig. 31
H. tenuis.
Section × 68. From type.

Fructifications $\frac{1}{2}$–$1\frac{1}{2}$×$\frac{1}{2}$ cm., finally confluent over areas up to 7×2–$2\frac{1}{2}$ cm.

On bark and decorticated wood of fallen limbs of *Thuja, Tsuga,* and *Sabal.* Vermont to Florida and in British Columbia. August to June. Rare.

H. tenuis belongs in the group of species with *H. corrugata* and *H. episphaeria,* from which it differs by occurrence on coniferous substratum, raw umber color, and smaller setae and the spores. The cracking of the fructification tends toward rectangular areas, as in *H. spreta,* rather than to 5- or 6-sided polygons, characteristic of *H. corrugata.*

Specimens examined:

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

New York: Altamont, *E. A. Burt;* Adirondack Mts., *C. H. Peck,* type (in N. Y. State Mus. Herb.).

Pennsylvania: Bellefonte, *L. O. Overholts, 3730* (in Mo. Bot. Gard. Herb., 55095).

Florida: Green Cove Springs, *Dr. Martin* (in Ellis Coll. of N. Y. Bot. Gard. Herb., and in Mo. Bot. Gard. Herb., 55004).

British Columbia: Kootenai Mts., near Salmo, *J. R. Weir, 499* (in Mo. Bot. Gard. Herb., 3916).

36. H. fuliginosa (Pers.) Bresadola,[1] Ann. Myc. **1**: 93. 1903.

Thelephora fuliginosa Persoon, Myc. Eur. **1**: 145. 1822.—*Stereum fuliginosum* (Pers.) Fries, Epicr. 554. 1838; Hym.

[1] Bresadola states, *loc. cit.*, that *H. fuliginosa* as understood by him is not *H. fuliginosa* (Pers.) Lév., although both give the same synonymy with the name. Léveillé's combination has priority if both authors refer to the same species and it precludes Bresadola's later use of this name for a different species: hence, if, as Bresadola states, *H. fuliginosa* sensu Léveillé is distinct from *H. fuliginosa* sensu Bresadola, then *Hymenochaete fusca* Karsten is the name which should stand instead of the combination by Bresadola.

Eur. 645. 1874.—*Hymenochaetella fusca* Karsten, Hedwigia **35** : 174. 1896.—*Hymenochaete fusca* Karsten in Sacc. Syll. Fung. **14** : 218. 1900.

Fructifications resupinate, broadly effused, adnate, thin, not cracked, somewhat colliculose, bister to warm sepia, conspicuously setulose under a lens, the margin determinate; in structure with setigerous layer 150–200 μ thick, sessile upon the substratum; setae abundant, 60–75×8–9 μ, emerging up to 45 μ, starting from all parts of the setigerous layer; spores of spore collection white, even, 4×2 μ.

Fig. 32
H. fuliginosa.
Section ×68. From Bresadola. See *pl. 17, f. 10.*

Covering areas up to 15×5 cm.

On decorticated, rotting wood of frondose species. Vermont, Maryland, Ohio, Kentucky, and in Cuba. June to October. Local.

H. fuliginosa has the aspect of a resupinate *H. rubiginosa,* but is not separable and lacks the conspicuous ochraceous-tawny margin of the latter; when sections are viewed with the microscope they show a setigerous layer like that of *H. rubiginosa* but differing by having this setigerous layer seated directly upon the substratum instead of upon an intermediate layer. The structure in section places *H. fuliginosa* in the group of species with *H. corrugata;* it is distinguished from the latter by not cracking, by colliculose surface, and by color. American specimens agree well with that received from Bresadola, whom I have followed as to name for the present.

Specimens examined:

Sweden: authentic specimen from Karsten of *Hymenochaete fusca,* comm. by J. Bresadola.

Austria-Hungary: Hungary, *Kmet,* det. and comm. by J. Bresadola.

Vermont: Middlebury, *E. A. Burt,* three collections, and *C. G. Lloyd, 10693* (in Lloyd Herb., and in Mo. Bot. Gard. Herb., 55555).

Maryland: Takoma Park, *C. L. Shear, 1157.*

Ohio: Cincinnati, *A. P. Morgan,* comm. by Lloyd Herb., 2642; locality not stated, *C. G. Lloyd, 3579.*

Kentucky: Crittenden, *C. G. Lloyd, 1414* (in Lloyd Herb., and in Mo. Bot. Gard. Herb., 55556).

Cuba: *C. G. Lloyd, 435* (in Lloyd Herb., and in Mo. Bot. Gard. Herb., 55156).

SPECIES IMPERFECTLY KNOWN

37. Hymenochaete pallida Cooke & Massee, Linn. Soc. Bot. Jour. **27** : 97. 1890; Sacc. Syll. Fung. **9** : 227. 1891.

Type: in Kew Herb.

"Cartilagineo-coriacea; pileo reniformi v. subflabellato, applanato, spongioso-velutino, pallido, concentrice sulcato-zonato, margine sublobato, acuto; hymenio lineato-rugoso, velutino, umbrino, subrutilante; setis prominulis, subclavatis, 40–50×5 μ; sporae ellipsoideae, 6×3–4 μ. (Type in Herb. Kew.)

"Mexico.

"Pilei thin, 1–2 in. across, densely velvety, the pile arranged in a porous, sponge-like manner, pallid, when old almost white." —Original description.

I did not find the type of *H. pallida* in Kew Herbarium and can make no addition to the above description.

EXCLUDED SPECIES

Hymenochaete abnormis Peck, **H. fimbriata** Ell. & Ev., and **H. rugispora** Ell. & Ev. have colored paraphyses rather than cystidia and will receive consideration in *Stereum.*

Hymenochaete crassa (Lév.) Berk. is *Stereum umbrinum* or very near it.

Hymenochaete frustulosa Berk. & Curtis is *Septobasidium frustulosum.*

Hymenochaete multispinulosa Peck is *Stereum umbrinum.*

Hymenochaete musicola Berk. & Curtis is an *Asterostroma.*

Hymenochaete paupercula Berk. & Curtis is a *Peniophora.*

Hymenochaete purpurea Cooke & Morgan is *Stereum umbrinum.*

Hymenochaete setosa Berk. & Curtis is a *Hyphomycete.*

Hymenochaete siparia Berk. & Curtis is a *Septobasidium* in poor condition.

Hymenochaete tomentosa Berk. & Curtis is a *Hyphomycete.*

(To be continued.)

EXPLANATION OF PLATE

PLATE 16

The figures of this plate have been reproduced natural size from dried herbarium specimens.

Fig. 1. *Hymenochaete damaecornis*. Figure on right, from specimen collected in Jamaica by L. M. Underwood, 1399; two on left, from collection in Cuba by J. A. Shafer, 3326.

Fig. 2. *H. formosa* stage. From collection in British Honduras by M. E. Peck.

Fig. 3. *H. aspera*. Upper figure, upper surface of reflexed portion of specimen collected in Cuba by F. S. Earle, 340; lower figure, hymenium of resupinate specimen collected in Cuba by Underwood and Earle, 1513.

Fig. 4. *H. badio-ferruginea*. Collected at East Galway, New York, by E. A. Burt.

Fig. 5. *H. Berkeleyana*. Upper figure, a rosette-like cluster viewed from above, collected in Jamaica by W. A. and E. L. Murrill, 371; lower figure, hymenium of a single pileus.

Fig. 6. *H. borealis*. Upper figure, a cluster of imbricated fructifications from the type collected at Abby Pond, Ripton, Vermont, by E. A. Burt; lower figure, hymenium of a single pileus.

Fig. 7. *H. corticolor*. Reflexed specimens collected at Gainesville, Florida, by N. L. T. Nelson.

BURT—THELEPHORACEAE OF NORTH AMERICA

1. HYMENOCHAETE DAMAECORNIS. 2. H. FORMOSA STAGE. 3. H. ASPERA. 4. H. RADIO-FERRUGINEA. 5. H. BERKELEYANA. 6. H. BOREALIS. 7. H. CORTICOLOR.

Explanation of Plate

PLATE 17

The figures of this plate have been reproduced natural size from dried herbarium specimens.

Fig. 8. *Hymenochaete cubensis.* Figure on left, upper side of pileus, and figure on right, hymenium of two small pilei, from collection in Cuba by Underwood and Earle, 1565.

Fig. 9. *H. Curtisii.* Reflexed specimens on bark collected near St. Louis, Missouri, by L. O. Overholts; the lower figure shows upper surface of the narrowly reflexed part.

Fig. 10. *H. fuliginosa.* Collected at Middlebury, Vermont, by E. A. Burt.

Fig. 11. *H. lutco-badia.* Upper figure, upper surface, and lower figure, hymenium of specimen from type distribution in Weigelt Exs., 1827, collected in Dutch Guiana.

Fig. 12. *H. pinnatifida.* From collection at New Smyrna, Florida, by C. G. Lloyd, 2140.

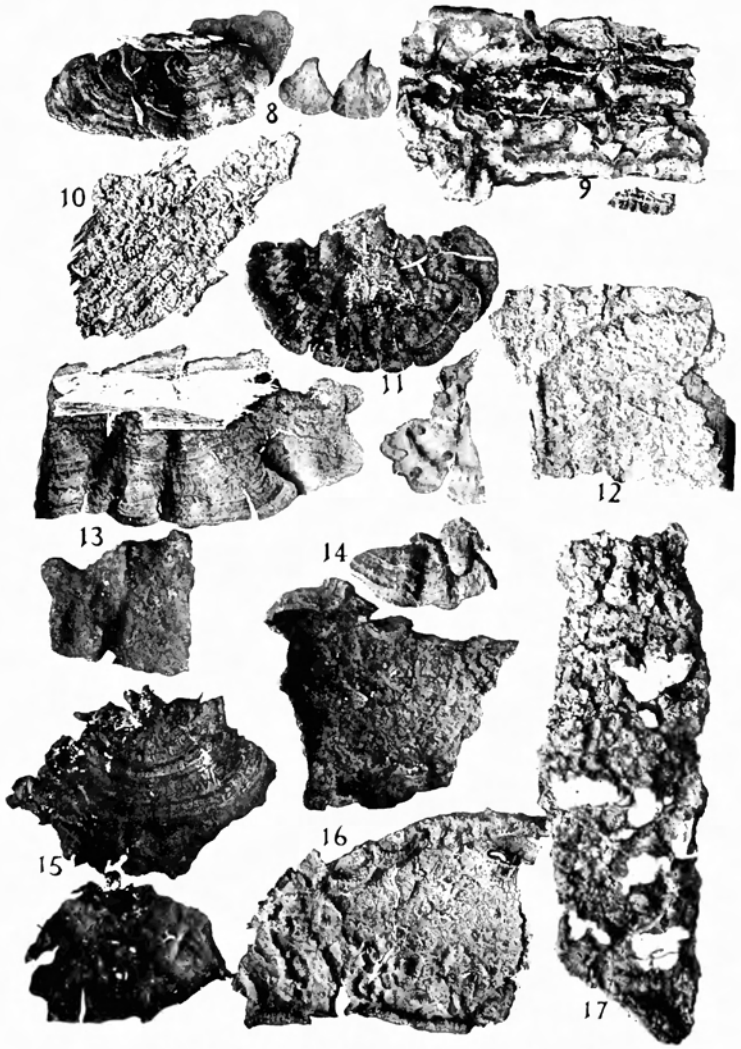
Fig. 13. *H. reflexa.* Upper figure, upper surface, and lower figure, hymenium of type collected in Jamaica by W. A. Murrill and W. Harris, 989.

Fig. 14. *H. rubiginosa.* Collected at Lake Dunmore, Vermont, by E. A. Burt.

Fig. 15. *H. Sallei.* Upper figure, upper surface, and lower figure, hymenium of specimen collected in Florida by C. G. Lloyd, 2071.

Fig. 16. *H. tabacina.* Collected at North Ferrisburg, Vermont, by E. A. Burt. The cross lines of half-tone reproduction render somewhat indistinct the systems of cracks of the hymenium which were hoped to be shown.

Fig. 17. *H. ungulata.* From the type, collected at Jalapa, Mexico, by W. A. and E. L. Murrill, 176.



BURT THELEPHORACEAE OF NORTH AMERICA

8. HYMENOCHAETE CURRISII. 9. H. CURTISII. 10. H. FULIGINOSA. 11. H. LUTEO-BADIA. 12. H. PINNATIFIDA. 13. H. REFLEXA. 14. H. RUBIGINOSA. 15. H. SALLEI. 16. H. TABACINA. 17. H. UNGULATA.