Stereum and Allied Genera of Fungi in the Upper Mississippi Valley

by Paul L. Lentz

Agriculture Monograph No. 24
U. S. DEPARTMENT OF AGRICULTURE
Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.
Acknowledgments

Preparation of this monograph has been facilitated immeasurably by the advice and assistance of a number of individuals. George W. Martin, head of the Department of Botany, State University of Iowa, Iowa City, originally stimulated my interest in the study of the Thelephoraceae and has been unfailing in his guidance and encouragement of this work.

John A. Stevenson, curator of the National Fungus Collections, also has given me every encouragement toward the completion of the work. William W. Diehl and Edith K. Cash, also of the National Fungus Collections staff, have been very helpful in solving the many technical problems encountered.

Donald P. Rogers, curator of fungi at the New York Botanical Garden, has been very cooperative in sending fungus specimens to me, as have many others in institutions throughout the world. Dr. Rogers has also been helpful concerning many technical matters.

Others who have been especially helpful during this study include Ross W. Davidson, now at the Forest Insect and Disease Laboratory, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo., and Walter F. Jeffers, Department of Botany, University of Maryland, College Park.

P. L. L.
Stereum and Allied Genera of Fungi in the

Upper Mississippi Valley

by

Paul L. Lentz

Associate Mycologist
Horticultural Crops Research Branch
Agricultural Research Service

Agriculture Monograph No. 24

U. S. DEPARTMENT OF AGRICULTURE
Washington, D. C. November 1955
Modern research methods are utilized in this study to unite approximately 400 names in 26 accepted species of *Stereum* and allied genera of fungi. Recent investigations have shown that a considerable number of these fungi are of economic importance in causing disease of living trees and in rotting timber and all kinds of timber products. Proper classification of these fungi is basic to development of control methods. In that respect, this monograph should serve as a tool for future investigators in their efforts to prevent destruction of timber and wood products.

Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Economic significance</td>
<td>1</td>
</tr>
<tr>
<td>Method of study</td>
<td>5</td>
</tr>
<tr>
<td>Key to the species of Stereum and allied genera</td>
<td>7</td>
</tr>
<tr>
<td>Cotilydia</td>
<td>10</td>
</tr>
<tr>
<td>Cryptochaete</td>
<td>15</td>
</tr>
<tr>
<td>Laxitextum</td>
<td>18</td>
</tr>
<tr>
<td>Stereum</td>
<td>24</td>
</tr>
<tr>
<td>Literature cited</td>
<td>61</td>
</tr>
<tr>
<td>Glossary</td>
<td>68</td>
</tr>
<tr>
<td>Index of fungus names</td>
<td>71</td>
</tr>
</tbody>
</table>
Stereum and Allied Genera of Fungi in the Upper Mississippi Valley

By Paul L. Lentz, associate mycologist, Horticultural Crops Research Branch, Agricultural Research Service

Introduction

*Stereum* is a genus of Homobasidiomycetes included by Burt (1914) in the Thelephoraceae. This family of fungi is essentially equivalent to the order Thelephorales of Fries (1874). In the classification system of Patouillard (1900) *Stereum* was placed in the series of Stereums of the subtribe Odontinae, tribe Porohydneae, family Aphylophoraceae. Pilát (1930b) has included it in the family Stereaceae, a position similar to that which it occupies in the subdivision Streines of Bourdot and Galzin (1928). Several hundred species of the genus have been described, but there are probably not more than about 100 good species. Of this number, 26 species of *Stereum* or *Stereum*-like fungi are recognized in the Upper Mississippi Valley. *Stereum* has affinities with the genera *Peniophora* and *Aleurodiscus*, but differs from both by its more complex structure. In addition, it diverges from *Peniophora* by its reflexed to stipitate habit and from *Aleurodiscus* by its smaller spores and basidia.

As the present study of the various species has progressed, certain ones have been found to differ from the basic concept of the genus. These have, accordingly, been placed in one of three other genera included in this monograph. All the stipitate species of the Upper Mississippi Valley were included in *Cotilydia* Karst. *Cryptochaete* Karst. seemed an appropriate place for the fungus commonly known as *Stereum rufum* (Fr.) Fr. For three other species, it has seemed desirable to recognize a new genus. The various genera are characterized at the appropriate places in this monograph. All the species of the four genera are included in a single key.

Economic Significance

Nearly all the species of *Stereum* discussed are active in decomposing dead timber. In addition, several species attack living trees, and some may be serious pathogens. Among the most important of the pathogens are *S. purpureum*, *S. sanguinolentum*, *S. gausapatum*, and *S. subpileatum*.

---

1 Submitted for publication, April 18, 1955.
2 References to Literature Cited (p. 60) are herein indicated by the name of the author (or authors) followed by the year of publication.
Others, in some cases probably of less importance, include *S. frustulatum*, *S. hirsutum*, *S. complicatum*, *S. sulcatum*, and *S. murrai*. Recognition of the importance of Stereums as pathogens has been facilitated recently by the use of refined isolation and inoculation techniques. The following examples of diseases and deterioration are only a random sample, and many more instances could be added from a thorough review of the literature.

Probably the best known disease caused by a species of *Stereum* is silver leaf. This disease has been studied thoroughly by Brooks and his associates (1911, 1913, 1919, 1923, 1926, 1929, 1931a, 1931b), and there is no doubt that it is caused by *S. purpureum*. Silver leaf disease is especially prevalent among woody Rosaceae, particularly plums and apples. The fungus enters the host through wounds, causes a silverlike appearance of the leaves, kills the branches in the immediately vicinity of its entry, and ultimately causes the death of the tree. Although the pathogen may be obtained in culture from the tissues of the host at any time after it has become established, production of basidiocarps does not occur until at least some tissues of the host have been killed, the basidiocarps developing only from dead wood. Many reports have been made of this disease on plums, apples, peaches, and cherries, and it has also been reported on raspberry canes (Brien and Atkinson, 1942), on apricots (Coombe, 1952), on cherry-laurel [*Prunus laurocerasus* L.] (Beaumont, 1935), and on *Cotoneaster melanocarpa* Lodd., *Crataegus sanguinea* Pall., and *Sorbus hybrida* L. (Jørstad, 1948). Reports of the pathogenicity of *S. purpureum* on hosts in families other than the Rosaceae have also been made. Beaumont (1935), for example, reported silver leaf disease of black and red currant and gooseberry, all in the Grossulariaceae. The disease has rarely been found in the United States, except in the Pacific Northwest. Sprague and Hord (1950) found it to be very common in parts of Washington following injury to apple trees during the severe winters of 1948–49 and 1949–50. Berkeley (1930) reported the disease on apples in Canada, and Wehmeyer (1950) has cited reports in the Canadian Plant Disease Survey both from apple and cherry.

Another serious disease of trees is the red heart rot which *S. sanguinolentum* causes in various conifers. As early as 1911 Eddelbüttel reported that this fungus grows in wounds of living spruce. Overholts (1939) stated that it causes a serious decay of hemlock. Recent isolation studies by Bier, Salisbury, and Waldie (1943) have shown *S. sanguinolentum* to be responsible for 46.8 percent of the total volume of decay in *Abies lasiocarpa* (Hook.) Nutt. and *A. amabilis* (Doug.) Forb. left from a logged-over area in British Columbia, and they state that this fungus has previously been reported to cause serious losses in balsam fir [*A. balsamea* (L.) Mill.]. Bier (1949) reported that red heart rot is common in fir, pine, and spruce in British Columbia. He also says that recent studies have shown that *S. sanguinolentum* may occur as a root-rotting organism which kills trees in coniferous plantations. Mielke and Davidson (1947) also have called attention to the importance of *S. sanguinolentum* as a cause of disease of spruce and fir. They found that it was decaying living trees of *Picea engelmannii* Parry and *Abies lasiocarpa* (Hook.) Nutt. in Colorado. In Norway, Jørstad and Juul (1939, pp. 444–472, 480–481) found that *S. sanguinolentum* causes a brown
and rather structureless heart rot in living spruce [Picea abies (L.) Karst.]. Entrance of the fungus was through wounds of the top caused by snow, or through wounds of the trunk, or less often through wounds of the roots. Peace (1938) has isolated S. sanguinolentum from European larch in Great Britain and found that it was the cause of staining as well as of a soft brown or streaked rot.

Among the numerous species of Stereum commonly associated with oaks, several are known to cause rots in living trees. Culture studies by Davidson (1934) have shown that S. gausapatum is a common cause of heart rot in living trees. Genaux and Kuenzel (1939), in southeastern Iowa, found that S. gausapatum was responsible for most of the basal decay of oak. Later, Davidson, Campbell, and Vaughn (1942) showed that in the eastern United States S. gausapatum was the most important species causing butt rot in young sprout oak stands where parent stumps were the main source of infection, and was also important as a top-inhabiting species in mature- or old-growth stands. According to Wakefield and Dennis (1950, p. 258), this fungus enters the host through branch stubs and then attacks the heartwood, causing long pipes of rot that spread up and down the trunk. Overholts (1939) also has called attention to the extensive and destructive heart rot of living oak trees caused by S. gausapatum.

S. subpileatum also causes a heart rot of oak trees. Long (1917), working in Arkansas, found that this fungus is among the most important of the organisms that cause heart rots of living oaks and then continue to grow in the infected wood after the trees are felled. Butler (1918, p. 97) relates that the fungus gains entrance to the host tissues through wounds and insect burrows. According to Boyce (1923), the destruction of host tissues starts with the appearance of water-soaked areas; this is followed by delignification and the appearance of honeycomb-like pits and finally by destruction of the cellulose lining of the pits. Freeman (1905, pp. 242–243) has stated that S. frustulatum is also able to attack living trees. The two species are closely related, and the progress of the disease is very much the same in both instances.

An estimate of the importance of S. hirsutum as a pathogen is difficult to make because the fungus is so poorly known. Since S. hirsutum first was described by Willdenow (1787, p. 397), almost every conceivable Stereum-like fungus has at some time or other been misdetermined as belonging to this species. Some of the most often misdetermined are specimens belonging in S. ostrea, S. complicatum, and particularly S. gausapatum. However, enough reports of the pathogenicity of S. hirsutum have been made to justify the belief that this species is indeed a frequent cause of disease in trees. Butler (1918, p. 97), Bresadola and Cavara (1901), and Cooke (1906, p. 210) have reported that this fungus grows on living trees, as well as on dead stumps, branches, and logs. According to Bijl (1922), S. hirsutum is a wound parasite of fruit and other trees.

A study (Campbell and Davidson, 1940) of fungi associated with top wounds of glaze-damaged black cherry [Prunus serotina Ehrh.] in Pennsylvania has shown that S. complicatum [as rameale] is able to infect such trees and can cause a white rot of the heartwood. S. complicatum was isolated 27 times and constituted 17 percent of the total isolations made from
the decay. The authors believe that the wound parasites, such as *S. complicatum*, will eventually die as the wounds heal, although they may cause so much damage that the affected tree may be unmerchantable. Davidson, Campbell, and Vaughn (1942) have reported that *S. complicatum* is usually associated with sapwood rot in oaks, but that it may penetrate a short distance into the heartwood in some instances.

*S. sulcatum* usually grows on coniferous logs, but at least two reports have been made of its occurrence on living trees. Burt (1931) reported that this species was collected from the trunk of a living, aged *Chamaecyparis formosensis* Matsum. Mielke and Davidson (1947) have isolated *S. sulcatum* from a yellow stringy rot in the base of a large living *Picea engelmannii*, and considered the fungus to be the cause of the rot.

Davidson, Campbell, and Lorenz (1941) found *S. murraii* to be a common cause of heart rot in living trees of *Betula lutea* Michx. They also isolated it from heart rot in *Acer saccharum* Marsh. In addition, cultures of this fungus were isolated from cankers on living trees of *A. saccharum* and *B. lutea*, and sporocarps were found associated with cankers on living trees of *A. pensylvanicum* L., *Fagus grandifolia* Ehrh., and *Ostrya virginiana* (Mill.) K. Koch.

All the *Stereum* species previously discussed continue to grow on dead wood and help to bring about its disintegration. Most species are commonly found on rotting twigs, branches, stumps, and logs of forest trees, but sometimes they may cause serious damage to wood products. *S. abietinum* produces an intensive and often harmful dirty-whitish rot of wood structures, such as bridges and buildings in mountainous regions (Pilát, 1930b). In addition, it has been found on decaying coniferous fencing material (Lundell and Nannfeldt, 1937, p. 22) and on mine timbers (Pilát, 1930b). *S. hirsutum* also has frequently been reported to cause serious damage to mine timbers (Gillot, 1882; Roumeguère, 1886; Bourdot and Galzin, 1928, p. 370; Doidge, 1950, p. 490). Other species that have been found on mine timbers include *S. complicatum* and *S. gausapatum* (Maize, Scheffer, and Greenwald, 1941) and *S. sanguinolentum* (Harz, 1888; Pilát, 1930b; Möller, 1945, p. 119).

Many other reports have been made concerning the damage to wood products caused by various species of *Stereum*. *S. frustulatum* has rotted oak crossties of a cog railway (Pilát, 1930b), oak wood of the hull, deck, and framing timbers in boats (Davidson, Lombard, and Hirt, 1947), and was also found to rot empty oak kegs in a wine cellar (Pilát, 1930b). *S. hirsutum* has been reported on wood flooring of a bridge in the Philippines (Reinking, 1920) and on timber in storage (Doidge, 1950, p. 490). *S. purpureum* was very abundant on corded wood at a paper mill in Ohio (Hard, 1908, p. 457). *S. radiatum* has been obtained from rotten wood of a greenhouse in Russia (Burt, 1920, p. 182) and also from hemlock frames of cellar doors in New York (Fairman, 1892). It is moderately common on coniferous structural timbers (Overholts, 1939).

In the forests, various species of *Stereum* are very prominent in decomposing dead timber. In general, the fungi of this genus occupy wood while it is still in a reasonably sound condition and are among the earlier links in
the chain of humus-producing organisms. Long (1917) found that the four fungi most commonly found rotting white oak slash in Arkansas were species of Stereum, including S. ostrea [as fasciatum], S. complicatum, S. versiforme, and the species hitherto known as S. umbrinum. Zeller (1929) has reported that S. erumpens is the most common telephore on pomaceous fruit trees in the Pacific Northwest, but he does not indicate whether he considers it a pathogen. Long (1917), in Arkansas, reported that S. ochraceoflavum was the principal fungus found rotting fire-killed oak bushes with branches not more than 2 inches in diameter, and Overholts (1939) also has mentioned that this species is common on shrubs in fire-swept areas. S. ostrea, S. gausapatum, S. complicatum, and S. frustulatum are common in the woodlands of the Upper Mississippi Valley and must account for a very large proportion of the decomposition of dead trees in that region. Throughout the world, species of Stereum are among the most ubiquitous of wood-inhabiting fungi and certainly must account for a significant amount of the deterioration of timber caused by fungi.

The foregoing survey of the economic significance of Stereum, as known at the present time, is only a small part of the story. Poorly understood is the fact that the relatively small size of the Stereum basidiocarp has no relation to its activity within the host. When so many of the most familiar species are shown to cause disease of living trees, there is reason to believe that study of the more unfamiliar species will reveal equally active pathogens. It is significant that the limited number of isolation studies made up to the present time have so often evoked from the investigators expressions of surprise that species of Stereum, instead of more conspicuous fungi, have proved to be the cause of serious rots of living trees. Stereum is still a moderately difficult genus taxonomically, few mycologists attempting to recognize more than a few of the more common species. Isolation studies from rots of living trees are very few indeed; correlation of the characteristics of cultures obtained from wood-rot isolations with those of cultures obtained from named basidiocarps is a very promising but relatively unworked field; serious study of rots caused by tropical Stereums is practically nonexistent. The work of assessing the true economic significance of Stereum has only begun.

Method of Study

Methods used in this study were essentially those described by Burt (1914, p. 195) and since used by many other students of the Thelephoraceae. Terminology for designating the various categories of typification was based on articles Nos. 18 to 21 of the International Code of Botanical Nomenclature edited by Lanjouw and others (1952) and also on the method outlined by Patterson and Diehl (1921, pp. 2–3). From the latter article, the term "type collection" has been borrowed to designate a collection made at the same time and locality and under the same collection number as the holotype and considered to be conspecific with it. An additional useful term is "authentic specimen," i.e., one determined by the author of a species as belonging to that species. Originally the term "extype" was used to designate a part, a piece, of the holotype. This has been discarded, because it has not been
possible always to determine whether a piece or the entire specimen was being examined.

The lists of synonymy preceding each specific description in this monograph are slightly more involved than in many reports, and perhaps require some explanation. An attempt has been made to indicate exactly the basis for and the significance of each binomial, as well as of all varieties and forms, in each list. Every specific epithet should be based on a type specimen. Whatever change of name may occur as the result of the work of various authors, the type of the epithet always must remain the particular specimen (or specimens) upon which the epithet was originally based. After a fungus has been placed in several different genera by various mycologists, it has several different binomial names. All these names are based on the precise type that was first used as the basis for the original binomial. All these binomials, therefore, are obligate synonyms of one another. In some instances, several different epithets may be based on a certain type specimen, and these also are obligate synonyms of one another. Often, however, there may be a number of different epithets based on several different types but all, according to the interpretation of the investigator, belonging in a single species. These epithets are facultative synonyms of one another. There may be some doubt about the actual conspecificity of facultative synonyms, since their synonymy is a matter of evaluation, but there can be no doubt about the conspecificity of obligate synonyms.

In this monograph, the accepted binomial heads the list of synonymy. Immediately following the accepted binomial, and indented from the margin, are the obligate synonyms of that binomial. Following these synonyms, and at the margin of the page, is the first facultative synonym, and this is followed by its obligate synonyms. Thus, each binomial at the margin is a facultative synonym of every other marginal binomial and of every obligate synonym included under the various facultative synonyms. Each binomial in an indented group, on the other hand, is an obligate synonym of every other binomial in that group and of the marginal binomial heading that group. Furthermore, in all instances in which I have examined the type specimen (or specimens), the data pertaining to that specimen are included in the list of synonymy in immediate juxtaposition to the original binomial based on the particular type cited. The method of indicating obligate and facultative synonyms that I have adopted was devised by E. W. Mason (1942). That, together with the citation of types in the lists of synonymy, should give the most precise characterization of every binomial included in each list. When it has not been possible to examine a type or authentic specimen, it has been necessary to accept the interpretation of some other mycologist, and this is noted at the proper places in the lists of synonymy.

Type and authentic specimens cited in the lists of synonymy are not included in the formal lists of specimens examined. In the list of specimens examined, the name of the institution from which the specimen was obtained, the place of collection, the name of the collector and his collection number if known, and the name on the specimen if different from that considered the correct name are given.

---

3 No attempt has been made to note obligate and facultative synonyms in the synonymy of the genera.
Specimens have been obtained from many institutions, which are indicated as follows: BPI = National Fungus Collections in the Plant Disease Epidemics and Identification Section (formerly Division of Mycology and Disease Survey), Horticultural Crops Research Branch, Agricultural Research Service, U. S. Department of Agriculture; DAOM = Mycological Herbarium, Division of Botany and Plant Pathology, Science Service, Department of Agriculture, Ottawa, Ontario, Canada; DLK = Dominion Laboratory of Plant Pathology, Kentville, Nova Scotia, Canada; FH = Farlow Herbarium; FI = Herbarium Universitatis Florentinae, Istituto Botanico; H = University of Helsinki Botanical Museum; ILL = University of Illinois Department of Botany; IMI = Commonwealth Mycological Institute, Kew; L = Rijksbureau, Leiden, Netherlands; LPS = Instituto de Botanica C. Spegazzini, Universidad Nacional de La Plata; MO = Missouri Botanical Garden; NY = New York Botanical Garden; NYS = New York State Museum; PAC = Pennsylvania State College Department of Botany and Plant Pathology; PC = Museum National d'Histoire Naturelle, Laboratoire de Cryptogamie, Paris; PH = Philadelphia Academy of Natural Sciences; PR = Botanical Department of the National Museum, Prague, Czechoslovakia; S = Naturhistoriska Riksmuseet, Botaniska Avdelningen, Stockholm; STR = Institut de Botanique, Universite de Strasbourg; SUI = State University of Iowa Department of Botany; TRT = University of Toronto Department of Botany; UPS = Botaniska Museet, Upsala Universitet.

The Upper Mississippi Valley, as defined for the present purpose, includes the area of Missouri, Iowa, Illinois, Wisconsin, and Minnesota. While many of the specimens examined were collected in that region, I have not limited myself to studying only specimens from that area. Once it had been ascertained that a particular species occurs in that region, I have studied specimens of that species from whatever source they might be available. Although this monograph concerns the species that occur in the Upper Mississippi Valley, in practice it may be used for the identification of most of the species throughout the northern United States. In the southern United States various species occur that are not mentioned in this monograph.

In the specific descriptions, the quoted colors are from Color Standards and Color Nomenclature by Ridgway (1912) and common colors such as whitish, grayish, or tan have been used when no exact color seemed applicable. Measurements of sectioned material do not include the tomentum of the upper surface of the pileus; in some instances the tomentum may be thicker than the section itself.

Key to the Species of Stereum and Allied Genera

This key includes all the species of Stereum known to occur in the Upper Mississippi Valley and, in addition, those species of other genera which are likely to be sought in Stereum. The genus Stereum is abbreviated as S., Cotylidia as C., and Laxitextum as L.
1. Basidiocarp terrestrial, stipitate
2. Basidiocarp typically lignonicolous, resupinate, effused-reflexed, or laterally sessile
3. Basidiocarp merisomatoid; hymenium with gloeocystidia
4. Basidiocarp flabelliform to infundibuliform; hymenium with cystidia
5. Basidiocarp pallid, 1.5 to 4.5 cm. tall; cystidia at least 69μ by 9.5μ
6. Basidiocarp brownish, up to 1.5 (rarely to 2.5) cm. tall; cystidia not more than 60μ by 9.5μ
7. On gymnosperms; hymenial surface glaucous from a covering of microscopic threadlike crystals; hymenium stratose; with brown setalike cystidia
8. On gymnosperms or angiosperms; hymenial surface lacking a glaucous covering of crystals; hymenium simple or stratose; cystidia, if present, not setalike
9. On various gymnosperms or angiosperms; hymenium simple or stratose; lacking acanthophyses; spores 3μ to 5μ by 2.5μ to 3μ
10. Basidiocarp in the form of hemispherical or angular tubercles usually not larger than 18 mm. in diameter, gregarious in colonial patches; cystidia lacking; with acanthophyses
11. Basidiocarp effused-reflexed sheets, not colonial tubercles; hymenium usually with both cystidia and acanthophyses, sometimes lacking one or the other
12. Hymenium having a chalky texture, whitish with a ruddy tinge, stratose; cystidia incrusted and 8μ to 13μ in diameter; spores subglobose, often minutely echinulate
13. Hymenium “light buff” to “wood brown”; cystidia hyaline to yellowish, 68.5μ to 175μ by 12.5μ to 34μ; basidia 50μ to 56μ by 9μ to 11.5μ; spores 8μ to 15μ by 5.5μ to 10μ
14. Hymenium some shade of brown, drab, or gray, or occasionally “vinaceous-buff” to “wood brown”; cystidia brownish and up to 125μ by 13.5μ, or hyaline to pale-yellowish-brown and up to 80μ by 23μ; basidia up to 35μ by 6μ or slightly larger; spores generally smaller than
15. Usually on angiosperms; hymenium not stratose; cystidia brown or hyaline, 5.5μ or more in diameter
16. Hymenium lacking dendrophyses and differentiated brown hyphal tips
17. Cystidia brownish, 75μ to 125μ long; hymenium lacking dendrophyses and differentiated brown hyphal tips
18. Hymenium “vinaceous-buff” to “army brown,” or “light cinnamon-drab,” margin usually white or pale-colored except in old specimens; spores 7.5μ to 10μ by 2.5μ to 4μ
13. Hymenium some shade of brown, buff, drab, or gray, with the margin not contrasting as conspicuously as in S. albobadium; spores 5μ to 7μ by 1.5μ to 2.5μ.

14. Hymenium “Mars brown” to “Prout’s brown,” fading to “cinnamon-drab”; with brown dendrophyses reaching or slightly surpassing the hymenial surface.

14. Hymenium “vinaceous-buff” to “wood brown,” “light drab,” or “pale mouse gray”; with dendrophysoid or simple dark-brown hyphal tips forming a stratum a short distance beneath the hymenial surface.

15. Practically limited to Populus; basidiocarp tuberculiform; hymenium red and waxy; with gloeocystidia; with small incrusted cystidia so inconspicuous that they are nearly always overlooked; spores 6μ to 8.5μ long.

4. Cryptochaete rufa

16. Basidiocarp spongy-fragile; the upper surface and most of the context brown, with the context consisting of loosely interwoven brown hyphae with clamp connections; hymenium pale to whitish; with hyaline, refractile gloeocystidia 70μ to 110μ by 4.5μ to 8.5μ.

5. L. bicolor

16. Basidiocarp usually leathery or corky; context hyphal hyaline to subhyaline, parallel or interwoven, with or without clamp connections; hymenium lacking gloeocystidia, or with yellowish gloeocystidia shorter than 70μ.

17. Basidiocarp almost entirely of elliptical to subglobose vesicles; hymenium with inconspicuous yellowish gloeocystidia.

17. S. murraii

17. Basidiocarp soft to leathery; vesicles, if present, scattered in a single fairly narrow layer in the context near the subhymenium and sometimes in the subhymenium; hymenium lacking gloeocystidia.

18. Hymenium “fawn color” to “benzo brown,” pruinulose-waxy; subhymenium and adjoining context with scattered pyriform to globose vesicles.

18. S. purpureum

18. Hymenium colored differently than in S. purpureum, usually not waxy; subhymenium and context lacking vesicles.

19. Hymenium “Rood’s brown,” “army brown,” or “deep vinaceous-lavender,” fading to “cinnamon-buff,” “cinnamon,” “Mikado brown,” or “fawn color,” tessellately cracked when dry; numerous branched pseudodendrophysoid hyphae with prominent clamp connections present in the hymenium.

19. Hymenium usually dull-orange, buff, or gray; lacking pseudodendrophyses.

20. Practically limited to Carpinus; the upper surface sericeous, pale gray-buff; basidiocarp 200μ to 375μ thick; cuticular layer inconspicuous or sometimes lacking.

20. S. striatum

20. On various gymnosperms or angiosperms; the upper surface not uniformly sericeous, variously colored; basidiocarp usually thicker than S. striatum; cuticular layer usually at least moderately distinct.

21. Basidiocarp usually about 5 mm. in diameter, more or less cup-shaped or conical and attached by the umbo or by one side and the umbo; the upper surface with long, soft, whitish hairs; hymenial surface yellowish or “cream-buff”; cuticular layer often not very distinct; hymenium with umbonate-tipped pseudocystidia.

21. S. ochraceo-flavum

21. Basidiocarp usually broader than 5 mm., rarely cup-shaped or conical; the upper surface usually tomentose or strigose, lacking soft whitish hairs; hymenial surface dull-orange or variously buff or brown to gray; cuticular layer usually conspicuous; pseudocystidia, if present, rarely umbonate-tipped.
22. On gymnosperms; context, subhymenium, and hymenium with numerous
dark-brown vascular hyphae that exude a reddish liquid when the
fresh hymenial surface is cut; hymenium usually with aculeate-tipped
basidioles

22. Occasionally on gymnosperms, but usually on angiosperms; with or with-
out brown vascular hyphae, but these not likely to exude a red liquid
(although the fresh hymenium of S. gausapatum may darken when
cut); hymenium with or without aculeate-tipped basidioles

23. Basidiocarp effused-reflexed to dimidiate, usually loosely radially plicate, often
cespitose-imbricate; with a moderate proportion of vascular hyphae often
having brown contents; hymenium lacking aculeate-tipped basidioles

23. Basidiocarp effused-reflexed to laterally sessile, usually not radially plicate,
usually not cespitose-imbricate; few or no vascular hyphae having colored
contents; hymenium with aculeate-tipped basidioles

24. Basidiocarp usually small, with the reflexed portions mostly 2 to 15 mm.
long and broad, usually not more than 500μ thick; hymenial surface
orange when fresh, fading to dull-orange or “cinnamon-buff.”

24. Basidiocarp, usually larger and thicker than in S. complicatum; hymenium
some dull shade of buff, brown, or gray

25. Usually on Quercus; often densely cespitose-imbricate; the upper surface
usually a rich brown color near “ochraceous-tawny” or “buckthorn
brown,” sometimes near dull “clay color”; basidiocarp 500μ to 1,000μ
thick

25. On various hosts, mostly angiosperms; usually not cespitose-imbricate; the
upper surface whitish or a lighter and brighter shade of brown than S.
gausapatum, or occasionally grayish; basidiocarp usually not more than
700μ thick

25. S. hirsutum

**Cotilydia**

*Cotilydia* Karst., Rev. Mycol. 3 (9): 22. 1881.

*Thelephora* Ehrh. ex Fr., Syst. Myc. 1: 428. 1821 (pro parte, sed non typica).

*Stereum* Hill ex S. F. Gray, British Plants 652. 1821 (pro parte, sed non
typica).

*Podoscypha* Pat., Essai Tax. 70–71. 1900.


**Macroscopic**

Basidiocarp terrestrial or lignicolous, bilobus to coriaceous, stipitate,
with the stipe simple or compound, pileus flabelliform to infundibuliform;
upper surface glabrous to villose or lanate, often zonate; hymenial surface
inferior, even or with low undulated ridges.

**Microscopic**

In section consisting of two layers, the context appearing as a homogeneous
layer of hyphae extending in a direction parallel with the pileus surface, the
hymenium consisting of elements arranged vertically; pileocystidia often
present and arising from the upper surface as simple, nonincrusted, hairlike
structures; cystidia, cystidioles, or gloeocystidia often present in the hy-
menium; basidia 2- or 4-sterigmate; spores hyaline, simple, ellipsoidal to
subglobose, smooth.
Discussion

The type species is *Cotylydia undulata* (Fr.) Karst., Rev. Mycol. 3 (9) : 22. 1881; *Cantharellus undulatus* Fr., Syst. Myc. 1: 321. 1821, excl. syn. Schaeff., Sow., Bull., Pers. *Cotylydia* differs from *Stereum* in the absence of a cuticular layer at the upper surface and by its generally delicate structure throughout, so that the context usually appears more homogeneous than that of most species of *Stereum*. Arthur Welden, at James Millikan University, has recently suggested that the homogeneous appearance may be related to the fact that the species which I have included in *Cotylydia* all seem to be of monomitic structure. *Cotylydia* differs from most species of *Stereum* by its stipitate habit, but some true Stereums are stipitate.

1. *Cotylydia aculeata*

(Pls. 1, A; 8, A; 13, A)


Macroscopic

Basidiocarp terrestrial, centrally stipitate, cespitose-confluent, with several individuals coalescing more or less intimately to form a compound fructification 4.5 to 5 cm. tall and 1.5 by 5 cm. in its lateral dimensions, the apices of individual pilei rosette-formed, thin, with margins fimbriate to incised; upper surface intermediate between "tawny" and "russet," having a translucent resinoid appearance; hymenial surface intermediate between "light buff" and "warm buff," even except for low, sinuous, vertical ridges or veins.

Microscopic

In section 545 μ thick, thinner near the apices and much thicker through the stipe; context approximately 400 μ thick, hyphae hyaline, mostly moderately thick-walled with few clamp connections, but in the subhymenial region thin-walled, with numerous clamp connections, 3.5 μ in diameter; hymenial region with gloeocystidia and numerous embedded spores; gloeocystidia hyaline, waxy-appearing, slender, flexuous, tapering toward the apex, with homogeneous contents, 98 μ to 175 μ by 8 μ to 12.5 μ; basidia 4-sterigmate, 43.5 μ by 5.5 μ; spores hyaline to pale-buff, subglobose, smooth, with the wall slightly thickened, 4.5 μ to 6.5 μ by 3.5 μ to 5 μ, very numerous and apparently embedded throughout the hymenial region as well as attached to the sterigmata. Plate 13, A, shows a gloeocystidium, basidium, and spores.

Habitat

On the ground.

Distribution

Reported only from South Carolina and Missouri.

Miscellaneous Specimens Examined

MO and BPI: Missouri—no locality (Emig MO 58744 and Weir 18820, two parts of same specimen, as *Stereum aculeatum*).
2. Cotylydia diaphana

(Pls. 1, B; 8, B; 12, A)


Thelephora sullivantii Mont., Syll. Crypt. 176. 1856 [type, Columbus, Ohio (Sullivant), in BPI].


Macroscopic

Basidiocarp terrestrial, stipitate, infundibuliform, with the pileus entire or split into spathulate processes, the margin even or laciniate, fructification 1.5 to 4.5 cm. tall including the stipe, 0.5 to 3 cm. broad at the apex, with the stipe 0.75 to 3.5 mm. in diameter; upper surface “pinkish buff” or somewhat darker, having a translucent resinoid appearance, faintly to distinctly striate, somewhat zonate; hymenial surface concolorous with the upper surface or often paler, pruinulose, even or minutely ridged; stipe covered by a delicate white tomentum which envelops a small ball of substratum at the stipe base.

Microscopic

In section 175μ to 350μ thick; context hyphae hyaline, densely massed, longitudinally arranged but with numerous perpendicular branches, septate, apparently lacking clamp connections, 2.5μ to 4.5μ in diameter; cystidia hyaline, nonincrusted, hairlike, 69μ to 102μ by 9.5μ to 13μ, protruding up to 65μ beyond the hymenial surface; basidia 4-sterigmate, approximately 20μ to 25μ by 5μ to 6μ; spores hyaline, ellipsoidal to oval, smooth, 4μ to 6μ (rarely to 7μ) by 2.5μ to 4μ. Plate 12, A, shows a cystidium, a basidium, and spores.

Habitat

On the ground.

Distribution

Canada, United States, Argentina, South Africa, China. Specimens from Iowa, and Burt (1920, p. 99) reports it from Missouri.

Miscellaneous Specimens Examined

BPI: New York—Alcove (Shear), Six Mile Creek (Thom), Taughannock (Thom); Washington—Spokane (Flowers), Sumner (Harper 1191); West Virginia—Fayette County (Nuttall); all as Stereum diaphanum. MO: New York—Jamesville (House MO 55498, as S. willeyi). SUI: Iowa—Bluffton (Martin 1852), North Liberty (Brasfield), State Quarry (Martin 1848); all as S. diaphanum.

Illustrations

Burt (1920, text fig. 3; pl. 2, figs. 8 and 9); House (1920, fig. 3); Lloyd (1913, fig. 534); Overholts (1939, pl. 15, fig. 13); Talbot (1954, fig. 4).
3. Cotilydia undulata

(Pls. 1, C and D; 12, B; and 13, D)


Stereum tenerrimum Berk. & Rav., Grevillea 1: 162. 1873 [syntype, North Carolina (Curtis 5029), in IMI; syntype, North Carolina (ex herb. Bresadola), in BPI; syntype, South Carolina (Ravenel 1437), in IMI; syntype, South Carolina (Ravenel), in NYS].


Macroscopic

Basidiocarp terrestrial, gregarious, stipitate, coriaceous, flabelliform to infundibuliform, sometimes lobed and split, with the margin subfimbriate to lacerate, fructification 5 to 14 mm. tall including the stipe which is 2 to 10 mm. long, pileus 1 to 9 mm. broad, stipe 0.15 to 0.6 mm. thick. European specimens sometimes considerably exceeding these measurements; upper surface “clay color,” “buffy brown” to “olive-brown,” or “Sayal brown” to “bister,” delicately fibrillose-striate, often minutely setulose; hymenial surface concolorous with the upper surface, even; stipe slender, solid, often minutely setulose above, covered by a delicate whitish or pale-buff pubescence toward the base, with the base flattened or enveloping a minute ball of substratum.

Microscopic

In section 135µ to 250µ thick; context hyphae hyaline, sparsely branched, moderately thin-walled, septate, lacking clamp connections, 2.5µ (rarely 1µ to 3.5µ) in diameter; pileocystidia originating as slightly inflated free apices of context hyphae curving out from the upper surface of the pileus, hyaline, nonincrusted, filiform, up to 50µ by 5µ to 8.5µ, protruding up to 25µ beyond the upper surface; cystidia hyaline, nonincrusted, filiform, 35µ to 60µ by 5µ to 9.5µ, protruding up to 40µ beyond the hymenial surface; basidia 4-sterigmate, 11µ to 18µ by 3µ to 4.5µ; spores hyaline, ellipsoidal to oval, smooth, 3.5µ to 5µ by 2µ to 3µ. Plate 12, B, shows pileocystidia, part of the hymenium with cystidia and basidioles, a basidium, and spores. Plate 13, D, shows cystidia, a basidium, and a spore.
Discussion

The description of *Cotilydia undulata* presented here is based on specimens from the United States that would be placed by Burt (1920) in the species *Stereum exiguum* and *S. tenerrimum*, and also on a specimen of *Podoscypha undulata* from Sweden. It was with some hesitancy that I referred *S. tenerrimum* to *C. undulata*, but I was unable to convince myself that it could be maintained as a distinct species or even as a variety. The infundibuliform basidiocarps have previously been referred to *S. exiguum* or *P. undulata*, while the flabelliform ones have been called *S. tenerrimum*. However, there is considerable variation of form in individual collections of this group, and there is no microscopic distinction worthy of consideration.

According to Maire (1909), the breadth at the apex of the pileus of *P. undulata* ranges from 5 to 25 mm. This is so much larger than measurements of American specimens (1 to 7 mm.) as to cause uncertainty concerning the identity of American specimens. Nevertheless, Maire's measurements of microscopic anatomical structures and his illustrations of these agree perfectly with those obtained from American specimens. Further, Maire presented a photograph of some specimens from the Fries Herbarium in which the pileus apex diameters range from 3 to 9 mm., based on the scale accompanying the specimens. His photograph of a French collection shows the apex diameters to range from 7 to 17 mm. if the photograph is natural size. Specimens from Lundell and Nannfeldt’s Fungi Exs. Suecici 1022 (in BPI) range from 2.5 to 9 mm. at the apex when dry. Peck (1902, p. 953) described the pileus of *Thelephora exigua* as 1.5 to 3 lines broad, or approximately 3.25 to 6.5 mm. In his description of *T. undulata* in the Elenchus, Fries (1828, p. 164) described the apex as measuring ½ to 1 inch, or approximately 8 to 25 mm. It is evidently from this description that Maire obtained his figure for the maximum diameter of the pileus. Now it appears from Maire’s photograph that Fries actually had some specimens with an apex diameter as small as 3 mm., so the seeming discrepancy in size of European and American specimens becomes of little importance, and the striking identity of microscopic features leads to the conviction that all belong to the same species. This is all the more likely since the Lundell and Nannfeldt specimen is from Sweden, and their fungus should have been recognized as something else were it not truly Fries’ species.

Habitat

On the ground, usually among mosses.

Distribution

Europe (from France and Great Britain to Sweden and Russia), United States (South Carolina, North Carolina, New York, Iowa, Wisconsin, Minnesota), Cuba. Rarely collected.

Miscellaneous Specimens Examined

SUI: Iowa—Iowa City (Martin, as *Stereum tenerrimum*); Minnesota—Crosslake (Newbro, as *S. exiguum*). NYS: New York—Croghan in Lewis County (Peck, as *S. tenerrimum*), Highland in Ulster County (Peck, as *S. tenerrimum*), Indian Lake in Hamilton County (Peck, as *S. tenerrimum*).
**Exsiccati Examined**
Lundell and Nannfeldt, Fungi Exs. Suecici 1022, as *Podoscypha undulata*.

**Illustrations**
Burt (1920, pl. 2, figs. 10 and 11); Lloyd (1913, fig. 535); Maire (1909, figs. 1–3).

**Cryptochaete**


**Macroscopic**
Basidiocarp cartilaginous or coriaceous, erumpent, at first tuberculiform and remaining so in at least one species.

**Microscopic**
In section lacking a cuticular layer at the upper surface; context of glassy-appearing hyphae radiating from the point of attachment toward the basidiocarp margin and hymenium; gloecystidia yellowish or hyaline, refractile, subglobose to elongate; cystidia present or lacking; basidia 4-sterigmate; spores hyaline, simple, curved-cylindrical to allantoid, smooth.

**Discussion**
The lectotype species is here designated as *Cryptochaete rufa* (Fr.) Karst., Bidr. till Finlands Nat. och Folk 48: 408. 1889; *Thelephora rufa* Fr., Elench. 1: 187. 1828. The original description by Fries very adequately typifies this species, but he seems to have been mistaken in citing Persoon’s (1822, p. 124) *T. rufo-marginata* and Sowerby’s (1803, pl. 388, fig. 3) *Auricularia cinerea*. Persoon’s description of *T. rufo-marginata* is not very well applied to *T. rufa*, and Sowerby’s figure does not resemble it. According to Bourdot and Galzin (1928, p. 329), *T. rufo-marginata* is a *Peniophora*, and they say that Romell considers *T. rufa* of Fries as certainly distinct from Persoon’s species. Burt (1920, pp. 120–121) did not include Persoon’s and Sowerby’s species in synonymy.

Pilát (1930b, p. 15) says that *C. rufa* is anatomically unrelated to all species of *Sterea* and forms a transition to the *Cyphellaceae*, particularly to *Cytidia*. Burt and others have evidently considered it to belong in *Sterea* because the margin of the basidiocarp is free. As a matter of fact, the hymenium often curves around the margin until it is practically in contact with the substratum. Bourdot and Galzin (1928, p. 384) placed this species in their Section II. Sterea Spuria. B. Ambigua. It has no cuticular layer at the upper surface, the hyphae of the context show no indication of a horizontally parallel arrangement, and the texture and appearance of the basidiocarp are generally unlike other species more properly referred to *Sterea*.

Karsten (1889, p. 407) proposed the genus *Cryptochaete* for this species and for *T. polygonia* Pers. ex Fr., Syst. Myc. 1: 444. 1821. The two apparently belong in the same genus, but whether or not *T. polygonia* is more
properly placed in *Corticium* or *Peniophora* does not alter the facts that *C. rufa* is not a *Stereum* and is not apparently referable to any other known genus; therefore, Karsten's genus remains the only apparent alternative to devising another genus to include it.

While differing in gross appearance, *C. rufa* and *C. polygonia* have a number of characteristics in common. In each the sporocarp originates by erupting from the substratum more or less in the form of a tubercle. The margin of this tubercle then "spills" outward from the original point of attachment. In *C. polygonia*, the sporocarp spreads broadly and is generally adherent to the substratum so that it has a corticioid form. The margin is often free, however, and in any event there is a similarity in the growth pattern of these two species that is not entirely veiled by the fact that the basidiocarp of *C. rufa* remains tuberculiform while that of *C. polygonia* spreads and coalesces with adjacent basidiocarps. The appearance of the context in section is very similar in these two species. Both have fairly thick-walled, glassy-appearing context hyphae bearing clamp connections. Both have gloecystidia, although the form of these differs between the two species. Both have more or less suballantoid spores and, curiously, both species occur principally on *Populus*.

Pilát (1926) has placed *C. polygonia* in a subgenus of *Aleurodiscus*, but the small spores and basidia prohibit its presence in that group as *Aleurodiscus* is generally understood. The other feature characterizing that genus, unusual hyphal-end modifications, has been abundantly demonstrated by the various species of *Stereum* and also occurs in other genera, families, and orders. I have considered leaving *C. rufa* in *Corticium*, where Schrenk (1894) placed it, but the development and structure of this species differ from that generally found in *Corticium*.

Bourdot and Galzin (1928, p. 320) and Eriksson (1950) have included *C. polygonia* in *Peniophora* Cke. sect. *Coloratae* Bourd. & Galz. Although it lacks cystidia, Eriksson regards that of slight importance and finds that the morphology of this species agrees with that of other *Coloratae* in several respects. At present, I prefer to follow Karsten's treatment.

4. **Cryptochaete rufa**

*Cryptochaete rufa* (Fr.) Karst., Bidr. till Finlands Nat. och Folk 48: 408. 1889; *Thelephora rufa* Fr., Elench. 1: 187. 1828; *Stereum rufum* (Fr.) Fr., Epicr. 553. 1838 (non sensu Velenov., Ceske Houby 762. 1922); *Xerocarpus rufus* (Fr.) Karst., Bidr. till Finlands Nat. och Folk 37: 135. 1882, lacking Fr. publication data.


Macroscopic
Basidiocarp lignoncolus, waxy-cartilaginous, erumpent, tuberculiform, scattered or gregarious, rarely laterally coalescent, up to 9 mm. in diameter; hymenial surface various shades of "Corinthian red" to "vinaceous-brown," often with a grayish pruinose bloom, plane or convex, rugose.

Microscopic
In section up to 2,000µ thick; context pale "cream color" in mass, consisting of somewhat interwoven hyphae radiating from the point of attachment of the basidiocarp and having thick, gelatinous-refractile walls; gloeocystidia numerous and conspicuous in the subhymenium and hymenium, apex rounded, acute, acuminate, or retuse, wall thickened by a gelatinous sheath, contents granular, 52µ to 190µ by 7.5µ to 27.5µ, but only 5µ to 19µ in diameter excluding the gelatinous sheath, usually not protruding beyond the hymenial surface; cystidia in the hymenium exceedingly inconspicuous, usually recognizable only by the incrusted apices, observable length up to 36.5µ, diameter measured over the incrustation 4.5µ to 7.5µ, exserted very little; basidia 4-sterigmate, 30µ to 47.5µ by 3.5µ to 5.5µ; spores hyaline, curved-cylindrical or suballantoid, smooth, 6µ to 8.5µ by 2µ (rarely 1.5µ to 3µ). Plate 11, A, shows a hypha, gloeocystidia, a basidium, and spores.

Discussion
Thelephora rufa of Fries, Elench. 1: 187. 1828, is supposed by Fries to be the same as Persoon's (1822, p. 124) T. rufo-marginata, which Fries mistakenly lists as T. rufa. The host (Tilia) given by Fries is for Persoon's fungus. Persoon's T. rufo-marginata is not the same fungus as T. rufa of Fries; therefore, this and numerous other reports of Tilia as a host for T. rufa are erroneous. Fries says "etiam in Suecia," so Sweden is probably to be regarded as the type locality.

In describing Hypocrea richardsoni, Berkeley (1875) has listed a specimen from the mountains of New York, 4506, which he stated to be a small variety. I have examined this specimen and find that it is truly a Hypocrea. Since H. richardsoni, as exemplified by specimen 5870, is actually C. rufa, it and specimen 4506 are entirely different fungi.

There seems to be no previous report of cystidia in the present species. This is understandable, since they are so exceedingly inconspicuous and appear to be only some crystalline masses at and near the hymenial surface. I have examined these structures by oil immersion, and have no doubt that they are cystidia.

Habitat
Branches and twigs of Populus, especially P. tremuloides Michx. Possibly very rarely on other woody angiosperms.

Distribution
Europe, Asia, North America. Specimens from Iowa and Minnesota, and Burt (1920, p. 122) reports it from Wisconsin. Rea (1922, p. 667) says Miss Wakefield regards British records as actually Eichleriella spinulosa (Berk. & Curt.) Burt.

Miscellaneous Specimens Examined
BPI: Mexico (Smith E & PO 70416). SUI: Iowa—Cedar Quarry (Wolf), Homestead (Davidson), Iowa City (Macbride; Martin 6516, 6517, 6518), West Okoboji
Laxitextum gen. nov.


**Generic Characterization**

Basidiocarpi typice effuso-reflexi; nullo strato definito marginali in superficie superrior; contextu laxe intertexto, hyalino vel brunneo, non xanthochroico; hymenio inferiori, plano; cystidiis, gloecystidiis et hyphalibus apicibus sterilibus praesentibus vel carentibus; basidiis sporisque ut in *Stereum* et *Peniophora*.

**Macroscopic**

Basidiocarp occasionally resupinate, but usually effused-reflexed, spongy-fragile to spongy-coriaceous, hymenial surface even.

**Microscopic**

In section lacking a cuticular layer at the upper surface; context of loosely interwoven hyphae that tend to form a network and only rarely assume a somewhat parallel arrangement; hymenium of vertically oriented elements that form a continuous stratum; sterile hyphal elements such as cystidia, gloecystidia, or dendritically branched hyphae may be present; basidia and spores approximate those of *Stereum* and *Peniophora*.

**Discussion**

This genus differs from *Corticium* and *Peniophora* by having a more complex organization of the basidiocarp than is found in most species of those genera and by always having some individuals that are not totally resupinate. It differs from *Stereum* by lacking a cuticular layer, by not having a horizontally parallel arrangement of the context hyphae, and thus by having a much more loosely arranged context than is found in *Stereum*.

The type species is designated as *Thelephora bicolor* Pers. ex Fr., Syst. Myc. 1: 438. 1821. The species included in this genus are among those which Patouillard (1900, pp. 72–73) and Bourdol and Galzin (1928, p. 382) placed in *Stereum* subgen. *Malachodermum* Fr. Upon examining Fries’s (1851, pp. 111–112) original discussion of this group, I found that his S. (*Malachod.* *) tenuissimum* Berk. is now known to be *Hymenochoaete rheicolor* (Mont.) Lév. (see Petch and Bisby, 1950, p. 44), and his S. (*Malachod.*) *roseo-carneum* Schw. var. *ramealis* Fr. has *Corticium leveileanum* Berk. listed as probably synonymous, while his type species, *S. vitile* Fr. (Fries, 1848, p. 143), has not been recognized since the original collection and probably no specimens now exist (see Doidge, 1950, p. 494). It has seemed advisable...
to establish a new genus instead of attempting to elevate this subgenus, since *Malachodermum* Fr. may now be considered to be a nomen dubium.

5. *Laxitextum bicolor*

*(Pls. 2, A; 8, D; 15, A)*


*Stereum coffeatum* Berk. & Curt., *Grevillea* 1: 164. 1873 [syntype, South Carolina (Curtis 2923), in IMI; syntype, South Carolina (Ravenel 910 [sic]), in IMI].


**Macroscopic**

Basidiocarp lignicolous, spongy, pliant, becoming somewhat fragile when dry, effused-reflexed and extending up to 15 by 7 cm., or conchate and often imbricate; upper surface "snuff brown" to "Prout's brown," wrinkled-membranaceous to indistinctly appressed-strigose, with a tendency to be concentrically sulcate; hymenial surface white when fresh, drying "light buff," "pale pinkish buff" to "clay color," or more rarely "avellaneous" to "wood brown," glabrous to pruinulose, even.

**Microscopic**

In section 800μ to 1,400μ thick; context hyphae brown, loosely interwoven, with prominent clamp connections, 2μ to 3.5μ (rarely 1μ to 4.5μ) in diameter; subhymenial hyphae hyaline, densely interwoven, profusely branched; gloecystidia originating at the base of the subhymenium, colorless, refractile, slender, tapering toward the apex, 70μ to 110μ by 4.5μ to 8.5μ, protruding up to 10μ beyond the hymenial surface; basidia 4-sterigate, 16.5μ to 24μ by 3.5μ to 4.5μ; spores hyaline, ellipsoidal to oval, smooth, 3.5μ to 4.5μ (rarely to 6μ) by 2μ to 3μ. Plate 15, A, shows a gloecystidium, basidia, and spores.

**Discussion**

The contrast between the pale hymenium and the coffee-colored upper surface of *Laxitextum bicolor* is highly distinctive. This, together with the brown nodose-septate hyphae of the spongy context and the numerous gloecystidia, makes the recognition of this species relatively easy.

**Habitat**

On rotting wood usually of angiosperms, rarely gymnosperms.
Distribution

Cosmopolitan but not common. Specimens from Iowa and Wisconsin, and Burt (1920, p. 120) reports it from Missouri.

Miscellaneous Specimens Examined

BPI: Florida—Camp O’Lena State Park (Dybas, as Stereum bicolor); Indiana—Scottsburg (Weir 6257, as S. fuscum); Maine—Canton (Parlin 17371, as S. fuscum); Maryland—Takoma Park (Shear 934, as S. fuscum; Hedgcock 2101, as S. bicolor); Virginia—Clarendon (BPI 61082, as S. fuscum); Washington—Metaline Falls (Weir 1771, as S. fuscum); Wisconsin—Phillips (Humphrey 6805, as S. fuscum); India—Askat (Koelz 21450, as S. bicolor). SUI: Iowa—Iowa City (Martin 6530, 6531, 6532, as S. bicolor).

Exsiccati Examined

Ellis and Everhart, Fungi Columbiani 1019; Ravenel, Fungi Carolinian, Fasc. 2, 33; Ravenel, Fungi Americani 9; Rick, Fungi Austro-Americani 183; Thuemen, Myc. Univers. 1704. All specimens as Stereum bicolor.

Illustrations

Banerjee (1935, text fig. 11; pl. 3, figs. 18–23; pl. 9, fig. 49); Bresadola (1932, t. 1067, fig. 1); Burt (1920, text fig. 10; pl. 4, fig. 26); Coker (1921, pl. 21, center); Karsten (1883, t. 2, fig. 9); Overholts (1939, pl. 14, fig. 5); Pilát (1930a, t. 17, fig. 12); Talbot (1951, pl. 26; 1954, fig. 21).

6. Laxitextum crassum

(Pls. 2, B; 8, E; 11, C)


Stereum umbrinum Berk. & Curt., Grevillea 1: 164. 1873 [type, South Carolina (Ravenel), in IMI], (non S. umbrinum Fr. in Lehms., Pl. Preiss. 2: 137. 1847); Hymenochaete umbrina (Berk. & Curt.) Berk. & Curt. ex Cke., Grevillea 8: 148. 1880.

Hymenochaete multispinulosa Pk., Bot. Gaz. 7: 54. 1882 [type, Camp Lowell, Ariz. (Pringle), in NYS].


**Macroscopic**

Basidiocarp lignicolous spongy-coriaceous, resupinate, with the margin often narrowly reflexed, up to 3 cm. in diameter, often coalescent with adjoining basidiocarps and then up to 15 cm. in diameter; hymenial surface “Sayan brown” to “benzo brown,” with the margin often “pale grayish vinaceous,” pruinulose to puberulent, often minutely cracked when dry.

**Microscopic**

In section 300μ to 525μ thick (up to 1,000μ according to Burt, 1920, p. 192); context brownish, of loosely interwoven hyaline to pale-yellowish hyphae; cystidia originating at various levels of the context as the terminations of thick-walled septate hyphae, appearing most prominently in the hymenium, pale-yellowish-brown, incrusted with hyaline granular matter toward the apex, the apex rounded or tapering to a point, 75μ to 125μ by 7.5μ to 13.5μ, protruding up to 60μ beyond the hymenial surface; basidia borne in candelabra-like clusters, 4-sterigmate, 18.5μ to 22.5μ by 4μ to 6μ; spores hyaline, cylindrical, smooth, 7μ to 7.5μ (rarely 5.5μ to 8.5μ) by 3μ to 3.5μ. Plate 11, C, shows a cystidium, basidia, and spores.

**Discussion**

Laxitextum crassum is occasionally mistaken for an Hymenochaete, but it has incrusted cystidia instead of setae and also lacks the xanthochroic basidiocarp of Hymenochaete. The cystidia and the loosely interwoven context are distinctive for this species. According to Talbot (1951, p. 43), the cystidia are to be considered as apical modifications of skeletal hyphae.

**Habitat**

On dead trunks and branches of woody angiosperms.
Distribution

Cosmopolitan, or nearly so. Specimens from Iowa, and Burt (1920, p. 195) reports it from Illinois and Missouri.

Miscellaneous Specimens Examined

BPI: Florida—Camp Wewa in Orange County (Schallert), Kelly Park in Orange County (Schallert); Kansas—Manhattan (Rogerson and Shaffer R 3495, R 3501); Maryland—Herald Harbor (Stevenson), Shadyside (Diehl); North Carolina—Statesville (Shear); Liberia—Belfanai (Baldwin 12214); all as Stereum umbrinum; Timor (Ferreira, as Lloydella vinosa). SUI: Iowa—Iowa City (Martin 2000, 3960, 3975, 6510, 6511, June 24 in 1943, SUI 915. Aug. 7 in 1936; McGuire SUI 1731; Brasfield SUI 1729, SUI 1730, SUI 1732, Sept. 28 in 1936, July 16 in 1937), North Liberty (Gilbert Nov. 16 in 1931); all as S. umbrinum.

Exsiccati Examined

Ellis, N. Am. Fungi 606b, as Stereum papyrinum, 1108, as Hymenochaete scabriseta; Ellis and Everhart, N. Am. Fungi 2315, as H. purpurea; Ravenel, Fungi Caroliniani, Fasc. 2, 36, as S. papyrinum.

Illustrations

Banerjee (1935, text fig. 12); Burt (1920, text fig. 31; pl. 6, fig. 59): Emmons (1927, pl. 2, fig. 6); Massie (1890, pl. 5, fig. 7); Overholts (1929, pl. 1, fig. 1; 1939, pl. 14, fig. 7); Talbot (1951, pl. 28; 1954, fig. 19).

7. Laxitextum roseo-carneum

(Pls. 2, C and D; 8, F; 11, B)


Corticium subrependum Berk. & Cke., Grevillea 6: 81. 1878 [type, Newfield, N. J. (Ellis, Fungi New Jersey 2487), in IMI].

Stereum sendaiense Lloyd, Mycol. Writ. 5, Mycol. Notes 48: 680. 1917 [type, Sendai, Japan (Yasuda), in BPI (Lloyd Herb.)].

Macroscopic

Basidiocarp lignicolous, soft-coriaceous, at first orbicular, 1 to 5 mm. or more in diameter, becoming confluent and effused, up to 9 by 3 cm. or more, the margin adherent or free but usually not broadly reflexed; hymenial surface “Rood’s brown,” “army brown,” or “deep vinaceous-lavender,” later fading to “cinnamon-buff,” “cinnamon,” “Mikado brown,” or “fawn color,” with the context showing through the cracked hymenium as “light buff” to whitish, even, the margin often minutely fibrillose and “avellaneous” in young sporocarps or “light buff” to whitish in older specimens.
Microscopic

In section 240μ to 460μ thick; context of irregularly interwoven, hyaline, branching, septate hyphae with numerous clamp connections, 2.5μ to 3μ (rarely 1.5μ to 3.5μ) in diameter, with the outer surface of the hyphal wall often bearing numerous delicate granular particles, the granules particularly abundant near the subhymenium; pseudodendrophyses in the hymenium hyaline to pale-yellowish-brown, irregularly branched, moderately thin walled, septate, with clamp connections, 1.5μ to 3μ in diameter, often somewhat obscured by granular matter; basidia 4-sterigmate, approximately 49μ by 8.5μ; spores hyaline, oval and flattened on one side, or approaching ellipsoidal, smooth, 8.5μ to 11μ (rarely 7μ) by 4.5μ to 6μ. Plate 11, B, shows a hypha, pseudodendrophyses, a basidium, and spores.

Discussion

The branched, dendrophysis-like hymenial hyphae afford the most distinctive feature, other than color, for recognition of *Laxitextum roseo-carneum*. These resemble ordinary context hyphae that have grown through the basidial layer and put forth numerous stunted branches. Clamp connections appear throughout these branched structures. They are not true dendrophyses of the type found in *Stereum versiforme* and *S. albobadium*. They also differ from those of *Eichleriella levellleana* (Berk. & Curt.) Burt, which Bresadola (1896, p. 288) cited as being a synonym of *L. roseo-carneum*. The two species are clearly distinct from each other, and Bresadola’s description of his fungus resembles neither species.

*Thelephora sterilis* Fr. (Fries 1821, p. 454; 1828, p. 226) and *T. anthochroa* Pers. ex Fr. (Fries 1828, p. 207) have been considered by some authors, starting with Fries, as synonymous with *T. roseo-carnea* Schw. Although I have not studied authentic specimens of these species, it seems unlikely that either belongs with the present species. *T. roseo-carnea* is not reported from Europe by Pilát (1930b), and there does not seem to be reference to it by other European authors except those based on American specimens or errors such as Killermann’s (1943, p. 275) questioning referral of it to *Aleurodiscus roseus*.

*Thelephora roseo-carnea* is apparently restricted to woody angiosperms, while *T. sterilis* was described from *Abies*. In his Hymenomycetes Europaei, Fries (1874, p. 645) placed *T. sterilis* in quotation marks and included it among imperfect or sterile species. It does not seem to have been known to later authors. According to Burt (1920, p. 229), *T. anthochroa* of Schweinitz, but not of European authors, is a synonym of *T. roseo-carnea*. By this, he apparently means that Schweinitz (1832, p. 168) mistakenly referred his *T. roseo-carnea* to *T. anthochroa* Fr. According to Burt, *T. anthochroa* of European authors, evidently including Persoon, Albertini and Schweinitz, and Fries, is distinct from *T. roseo-carnea*, and I have accepted his judgment.

Habitat

On dead branches of woody angiosperms.
Distribution

Reported from Canada, United States, Brazil, Japan, and China. In the United States from New England to North Carolina and west to Iowa (Emmons, 1927) and Wisconsin (Burt, 1920, p. 232), but uncommon.

Miscellaneous Specimens Examined

BPI: District of Columbia—Washington (Pergande, as Corticium lilacino-fuscum); Maryland—Bowie (Lentz 31, as Stereum roseo-carneum), Patuxent Wild Life Refuge (Lentz 45, 47, as S. roseo-carneum); New Hampshire—Chocorua (Farlow, as C. lilacino-fuscum); New York—Alcove (Shear 1001, 1004, Oct. 1893, as S. roseo-carneum), Woodstock (Shear 788, as C. lilacino-fuscum); Nova Scotia—Colchester County (Wehmeyer 1587?, as S. roseo-carneum), Kings County (DLK 137; DAOM–F 5461; both as S. roseo-carneum).

Exsiccati Examined

Ellis, N. Am. Fungi 20, as Corticium incarnatum, 515, as C. lilacino-fuscum.

Illustrations

Burt (1920, text fig. 48; pl. 6, fig. 77); Lloyd (1917a, text fig. 1015); Overholts (1939, pl. 15, fig. 10).

Stereum


Thelephora Fr., Syst. Myc. 1: 428. 1821 (pro parte, sed non typica).

Lopharia Kalchb. & MacOwan, Grevillea 10: 58. 1881.


Sterellum Karst., Bidr. till Finlands Nat. och Folk 48: 405. 1889.


Stereophyllum Karst., Hedwigia 28: 190. 1889.


Stereum Hill ex S. F. Gray subgen. Crystallocystidium Rick, Brotéria (ser. 3) 9: 43. 1940.

Stereum Hill ex S. F. Gray subgen. Stereogloeocystidium Rick, Brotéria (ser. 3) 9: 43. 1940.

Stereo-gloeocystidium (Rick) Rick, Brotéria (ser. 3) 9: 79. 1940.

Crystallocystidium (Rick) Rick, Brotéria (ser. 3) 9: 139. 1940.

Macroscopic

Basidiocarp usually on wood but also occurring on soil, soft-leathery to corky or nearly woody, occasionally almost entirely resupinate, but usually effused-reflexed, dimidiate, or laterally sessile; upper surface often covered by a brownish or grayish tomentum of usually thick-walled hyphae; hymenial surface usually yellowish or orange to brown, purple, or gray, usually glabrous or pruinulose, even or occasionally rough, but not spiny, poroid, or lamellate.
Microscopic

In section consisting of three definite layers in addition to the tomentum of the upper surface; the cuticular layer, or differentiated upper surface layer, having a golden-yellow to brown or nearly black color, consisting of densely massed to coalescent hyphae oriented parallel with the surface; the context, or intermediate layer, hyaline to yellowish or sometimes brownish in mass, consisting usually of both thin-walled and moderately thick walled hyphae oriented more or less parallel with the surface but not massed so compactly as in the cuticular layer and tending to be somewhat sinuous; hymenial layer, comprising the inferior surface, usually a single layer but sometimes of two or more strata composed of vertically oriented basidia and sterile hyphal ends variously modified as cystidia, pseudocystidia, cystidioles, gloeocystidia, dendrophyses, acanthophyses, or similar elements; basidia usually clavate, 2- or usually 4-sterigate; spores hyaline or rarely slightly colored in mass, simple, subglobose to cylindrical and sometimes slightly curved, smooth, usually within the dimensions 3μ to 20μ by 1.5μ to 15μ.

Discussion

The type species is Stereum hirsutum (Willd. ex Fr.) S. F. Gray, Brit. Plants 1: 653. 1821; Thelephora hirsuta Willd. ex Fr., Syst. Myc. 1: 439. 1821; Willd., Fl. Berolinensis Prodr. 397. 1787. The species of Stereum, excluding species that are segregated in other genera discussed in this monograph, constitute a reasonably homogeneous group characterized by their tough basidiocarp, their nonresupinate habit, and especially by their distinctive differentiation of the upper surface, context, and hymenium. Species resembling S. hirsutum, such as S. ostrea and S. gausapatum, form a closely related group. Superficial observation might lead one to believe that the stratose species such as S. subpileatum and S. sulcatum are definitely set apart from nonstratose species. Actually there is no difference in the basidiocarp of the two forms beyond the construction of additional hymenial layers in the stratose species. Even in S. frustulatum the same arrangement of the cuticular layer, context, and hymenial elements may be observed. Furthermore, basidiocarps of S. ostrea and other supposedly nonstratose species may be found to have at least one extra hymenial layer. A few species, such as S. albobadium, S. erumpens, and S. versiforme, do not entirely conform to the usual morphology of the genus, but they approach it so closely that it seems best not to remove them. These three species have some of the characteristics of Peniophora Cke. sect. Coloratae Bourd. & Galz., and perhaps eventually will be included in that group. In such case, Peniophora must be redefined to include species that are not completely resupinate.

Höhnel and Litschauer (1907) and Pilát (1926), especially, have directed considerable attention to the various modified sterile hyphal ends in the hymenia of various thelephores, particularly with respect to the kind found in species of Aleurodiscus. These structures are considered to be the most distinctive feature of Aleurodiscus, along with the large size of the spores and basidia. A careful study of the various species of Stereum shows that there is no fundamental difference between Stereum and Aleurodiscus with respect to modified hyphal ends. Acanthophyses are found in S. frustulatum and S.
subpileatum. Such common species as *S. ostrea* and *S. sanguinolentum* may have aculeate-tipped basidioles. Others, such as *S. ochraceo-flavum* and *S. striatum*, have umbonate-tipped pseudocystidia. *S. albobadium*, *S. versiforme*, and *S. erumpens* have dendrophyses. In addition, there are cystidia, gloecystidia, vesicles, various kinds of cystidioles, and basidioles. Some species, such as *S. sanguinolentum* and *S. gausapatum*, have moderately thick walled hyphae with colored contents. These hyphae often end among the hymenial elements and, although not very conspicuous, the hymenial ends of these hyphae may be called pseudocystidia. Usually they do not protrude from the hymenium as do the pseudocystidia of *S. ochraceo-flavum* and *S. striatum*. Other species, including *S. complicatum*, *S. hirsutum*, and *S. ostrea*, also may have these hyphae, but in these species usually fewer of the hyphae have colored contents.

8. Stereum albobadium

(Pls. 2, E; 14, D)


*Stereum bizonatum* Berk. & Curt., Grevillea 1: 163. 1873 [type, South Carolina, in IMI].

**Macroscopic**

Basidiocarp lignicolous, thin, coriaceous, resupinate, with the margin sometimes reflexed, approximately 1 to 10 mm. in diameter, enlarging to 2 to 25 by 1 to 4 cm. by confluence with adjoining basidiocarps; upper surface of reflexed basidiocarps “wood brown” to “snuff brown,” silky to somewhat strigose, more or less zonate; hymenial surface “vinaceous-buff” to “army brown,” becoming “light cinnamon-drab” to “drab” in old specimens, pruinulose, the margin white or pale-colored in younger specimens, later concolorous with the hymenium, velutinate.

**Microscopic**

In section 200μ to 550μ thick; cuticular region brownish, thin, often poorly defined or lacking; context hyphae subhyaline, loosely interwoven to more
or less horizontally parallel, with clamp connections, 2µ to 2.5µ (rarely 1.5µ to 3.5µ) in diameter; dendrophyses very numerous in the hymenium, sub-hyaline or pale-brown; cystidia hyaline, incurved, conical, 24µ to 51µ by 9.5µ to 14µ, some completely submerged, others protruding up to 25µ beyond the hymenial surface; basidia 4-sterigmate, approximately 26.5µ to 27.5µ by 5µ; spores hyaline, cylindrical, smooth, 7.5µ to 10.5µ by 2.5µ to 4µ. Plate 14, D, shows dendrophyses, a cystidium, and spores.

Discussion

Stereum albobadium is distinguished from Peniophora by the narrowly reflexed margin or by the dark cuticular region when this is sufficiently developed. The antler-branched dendrophyses are very distinctive. Young specimens of S. albobadium usually have a bright hymenial surface, the brown hymenium contrasting strikingly with the white margin. With age, the hymenium becomes uniformly "drab" and the fungus is then much less conspicuous. S. erumpens and S. versiforme may be distinguished from S. albobadium by differences in size of cystidia and spores.

Habitat

On dead wood and fallen branches of many woody angiosperms.

Distribution

Eastern half of the United States and south to the Caribbean region. Specimens from Iowa, and Burt (1920, p. 219) reports it from Missouri. Talbot (1951, p. 45) says that Kalchbrenner's (1881) report from South Africa is erroneous.

Miscellaneous Specimens Examined

BPI: Alabama—Auburn (Underwood); District of Columbia—Washington (Shear); Florida—Winter Park (Shear); Kansas—Manhattan (Rosengren and Shaffer R 3482, R 3487, R 3490, R 3493, R 3494); Maryland—Bowie (Lentz 6), Great Falls (Stevenson), Patuxent Wild Life Refuge (Lentz 36, 46); Pennsylvania—Holland (McConnell); Virginia—Blacksburg (Shear), East Falls Church (Weir and Diehl). SUI: Iowa—Iowa City (Martin 5133, 5142, 6512, 6513, 6515), Michael (Shimek), Montrose (Shimek).

Exsiccati Examined

Bartholomew, Fungi Columbiani 3688; Ellis, N. Am. Fungi 15; Ravenel, Fungi Caroliniani, Fasc. 1, 29.

Illustrations

Burt (1920, text fig. 42; pl. 6, fig. 71); Coker (1921, pl. 31, figs. 14 and 15); Overholts (1939, pl. 14, fig. 6).

9. Stereum versiforme

(Pls. 2, F; 8, G; 14, A)


**Macroscopic**

Basidiocarp lignicolous, coriaceous, resupinate or narrowly reflexed, orbicular, 1 to 14 mm. in diameter, spreading by growth and confluence up to 10 by 2.5 cm.; upper surface at first “Mars brown” to “Prout’s brown,” puberulent, finally “bone brown” to dull-black, glabrous; hymenial surface “Mars brown” to “Prout’s brown” or occasionally “cinnamon-drab,” velutinous, even, often cracked in dried specimens, the narrow margin often “russet,” or “fawn color” to “cinnamon-drab.”

**Microscopic**

In section 100μ to 250μ (rarely to 350μ) thick; cuticular region a blackish organization of dark-brown densely massed branching hyphae which project abundantly into the context to give it a brown color; dendrophyses numerous in the hymenium, brown, profusely branched; cystidia originating in all parts of the basidiocarp but most conspicuous in the hymenium. pale-yellowish-brown toward the base, with a hyaline incrustation toward the apex, 36μ to 80μ by (rarely 9.5μ) 15μ to 23μ, protruding up to 10μ or 15μ (rarely to 25μ) beyond the hymenial surface; basidia 4-sterigmate; spores hyaline, curved-cylindrical, smooth, 5μ to 7μ by 1.5μ to 2μ. Plate 14, A, shows dendrophyses, a cystidium, and a spore.

**Discussion**

The general aspect of Stereum versiforme is somewhat like that of S. albobadium, from which it is distinguishable by its generally darker color, larger cystidia, and smaller spores. Surely Eriksson (1950) must be incorrect in his assertion that S. versiforme is totally resupinate. There may be some question as to whether the species belongs in Stereum, but certainly a large proportion of basidiocarps that I have seen are at least narrowly reflexed.

**Habitat**

On dead branches and twigs of woody angiosperms.

**Distribution**

Europe, China, Canada, the eastern half of the United States south to South Carolina and Alabama. A specimen from Illinois, and Burt (1920, p. 224) reports it from Iowa and Missouri.

**Miscellaneous Specimens Examined**

BPI: Illinois—Metropolis (Humphrey 9621); Indiana—Turkey Run State Park (Bechtel); Maryland—Glen Sligo (Shear 1050), Takoma Park (Shear 1020; Shear); New York—Ithaca (Thom), McLean Bog near Ithaca (Stevenson), Pleasantville
STEREUM AND ALLIED GENERA

(Hedgcock); Pennsylvania—Bear Meadows in Center County (Overholts 5430); Virginia—Shenandoah Natl. Park (Stevenson); West Virginia—Fayette County (Nuttall 1347); China—Hangchow (Ou 3357). FH: France—St. Sernin (Galzin, det. Bourdot 4012 (2), as Peniophora carbonicina).

Exsiccati Examined
Ellis and Everhart, N. Am. Fungi 3209, as Peniophora ellisii; Ellis and Everhart, Fungi Columbiani 611, as P. ellisii; Thuemen, Myc. Univers. 307.

Illustrations
Burt (1920, text fig. 44; pl. 6, fig. 73); Eriksson (1950, text fig. 23); Overholts (1939, pl. 16, fig. 18).

10. Stereum erumpens
(Pls. 3, A; 9, A; 14, B)


Macroscopic
Basidiocarp lignicolous, erumpent from the substratum to form a small pezizaform or plane frustule with the margin adnate and delicately fimbriate or free and entire, or often attached to the substratum by an umbo and adherent along one side with the other side reflexed, the individual basidiocarp 1 to 8 by 0.5 to 4 mm., sometimes confluent with adjoining basidiocarps to extend for several centimeters; upper surface “bister” or “mummy brown,” crustose, sometimes with delicately puberulent zones, obscurely concentrically sulcate; hymenial surface “pale mouse gray,” “light drab,” or “vinaceous-buff” to “wood brown” when dry, becoming “wood brown,” “bone brown,” or “seal brown” when moistened, pruinulose, even or with inconspicuous rounded tubercles.

Microscopic
In section 175μ to 400μ thick, 500μ to 800μ thick through the umbo; cuticular region of densely massed blackish hyphae; context of intermixed brown and hyaline hyphae which are pale brown in mass, often with one or two darker strata and a final dark stratum at or near the subhymenium marking the terminations of brown hyphae; cystidia originating at various levels of the context and subhymenium, hyaline, or yellowish toward the base, incrusted, 25μ to 69μ by 5.5μ to 23μ, remaining submerged or exserted up to 25μ; basidia 4-sterigmate, 19μ to 20μ by 4.5μ to 5μ; spores hyaline, cylindrical or slightly curved-cylindrical, smooth, 6μ to 7μ by 1.5μ to 2.5μ. Plate 14, B, shows dendrophyses, cystidia, a basidium, and spores.

Discussion
Stereum erumpens resembles S. versiforme rather closely, but seems to differ in habit of growth and also in color. The brown hyphal tips, which Burt (1920, p. 210) considers to be of considerable diagnostic importance, are variable in form and to some extent also in position. In some specimens, as in the type, these structures are antler-like dendrophyses similar to those of S. versiforme. In other specimens the form appears to be simple, with a
complete absence of branching. The “gloozystiden” noted by Killermann (1943, p. 274) must be the crystal-incrusted cystidia that occur both in S. versiforme and S. erumpens.

**Habitat**

On woody angiosperms.

**Distribution**

Canada, the United States from New England to Alabama and west to Washington. Zeller (1929) reports that it is the most common thelephoraceous species on pomaceous fruit trees in the Pacific Northwest. Burt (1920, p. 211) reports it from Illinois, and Gardner (1947) includes it in her Iowa list.

**Miscellaneous Specimens Examined**

BPI: District of Columbia—Washington (Shear 959); Indiana—Scottsburg (Weir 5836); Montana—Missoula (Weir 1761); Oregon—Grants Pass (Weir 8701); North Dakota—Custer (Weir 9629); Washington—Bellingham (Weir 1759).

**Exsiccati Examined**

Bartholomew, Fungi Columbiani 5090.

**Illustrations**

Burt (1920, text fig. 38; pl. 6, fig. 67).

### 11. *Stereum radiatum*

**(Pls. 3, B; 9, B; 12, E)**


**Macroscopic**

Basidiocarp lignicolous, coriaceous, suborbicular, resupinate, with the margin usually narrowly reflexed, 2.5 to 12.5 by 2 to 8 cm., or rarely forming an imbricate cluster of small, broadly reflexed pilei; upper surface “bone brown” to dull-black, tomentulose, with the tomentum becoming appressed, inconspicuously concentrically sulcate; hymenial surface “amber brown” or “Sudan brown,” or sometimes charcoal black over much of the surface, minutely velutinous, radiately corrugate.

**Microscopic**

In section 300μ to 800μ thick; tomentum 300μ to 800μ thick, the tomental hyphae grayish-brown to grayish-black, entangled, sparingly branched, thick-walled, often with verruculose protuberances covering the surface of the wall, (rarely 2.5μ) 3.5μ to 4.5μ in diameter; cuticular layer black; context hyphal hyaline or subhyaline, with occasional brown hyphae interspersed, loosely
arranged in the subhymenium and adjoining context, 2μ to 3.5μ in diameter; 
cystidioles inconspicuously incrusted, filiform, occasionally branched, apex 
more or less pointed, lumen usually dark-brown, 1.5μ to 4μ in diameter, 
protruding up to 30μ or more beyond the hymenial surface; basidia 4-steri-
mate, 5μ to 6μ in diameter (30μ to 35μ by 6μ to 7μ sec. Bourdot and Galzin 
1928, p. 373); spores hyaline or rarely pale-brown, cylindrical, smooth, 7.5μ 
to 9.5μ by 2.5μ to 3.5μ. Plate 12, E, shows nodulose hyphae, cystidioles, 
basidioles, a basidium, and spores.

Discussion

Stereum radiatum has somewhat the appearance of an Hymenochaete, but 
the basidiocarp is not xanthochroic and lacks setae. The rusty-brown 
hymenium, blackish upper surface, and slender, protruding cystidioles are 
distinctive.

Habitat

On logs, boards, and charred wood of gymnosperms.

Distribution

In mountainous and northern areas of Europe, Asia, and North America. In the 
United States from New England to Montana and south to the Smoky Mountains. A 
specimen from Wisconsin, and C. E. Bessey (1884, p. 148) reports it from Iowa.

Miscellaneous Specimens Examined

BP1: Michigan—Brutus (Gehman); Montana—Darby (Weir 1697); New York— 
Albany (Peck), Ithaca (Thom), North Greenbush (Peck); Pennsylvania—State College 
(Overholts 2653); Virginia—Shenandoah Natl. Park (Stevenson); Wisconsin—Lady-
smith (Humphrey 6832).

Exsiccati Examined

Ellis, N. Am. Fungi 407.

Illustrations

Burt (1920, text fig. 26; pl. 5, fig. 53); Overholts (1939, pl. 18, fig. 28); Pilát (1930b, t. 
2, bottom).

12. Stereum abietinum

(Pls. 3, C; 13, E)

Stereum abietinum (Pers. ex Fr.) Fr., Epicr. 553. 1838; Thelephora abietina 
Pers. ex Fr., Syst. Myc. 1: 442. 1821; Pers., Syn. 573. 1801 [type, 
Harz Mts., Germany, in L]; Xerocarpus abietinus (Pers. ex Fr.) Karst., 
publication data; Chaetocarpus abietinus (Pers. ex Fr.) Karst., Bidr. till 
Finlands Nat. och Folk 48: 406. 1889; Hymenochaete abietina (Pers. ex 

569. 1801 [type, Harz Mts., Germany, in L].

Thelephora conchata Fr., Syst. Myc. 1: 438. 1821; Stereum conchatum (Fr.) 
Fr., Epicr. 549. 1838 [syn. sec. Pilát, Hedwignia 70: 75–76. 1930].

Thelephora striata Schrad. ex Gmel. in L., Syst. Nat. (ser. 13) 2: 1441. 1791 
346283 0—55—3}
Elench. 1: 179. 1828); Stereum striatum Fr., Epier. 551. 1838 (non S. striatum (Fr.) Fr., Epier. 548. 1838); Lloydella striata (Fr.) Bres. in Lloyd. Mycol. Writ. 1, Mycol. Notes 6: 51. 1901, lacking Fr. citation.


_Hymenochaete fimбриata_ Ell. & Ev., Jour. Mycol. 1: 149. 1885 [type, Yellowstone Natl. Park, Mont., in NY].


_Stereum pinicolum_ Velenov., Ceske Houby 764. 1922 [syn. sec. Pilát, Hedwigia 70: 75–76. 1930.]

**Macrosopic**

Basidiocarp lignicolous, coriaceous-spongy, resupinate with a thin, even margin, or effused-reflexed with the free margin often thickened and sulcate; upper surface “chestnut-brown” or “Mars brown,” matted-tomentose, sometimes inconspicuously sulcate with the bare sulcate areas “fuscous”; hymenial surface “vinaceous-buff” to “wood brown,” or more often “pale vinaceous-drab,” “light drab,” or “pale mouse gray,” often covered by a pruinose white bloom, even.

**Microscopic**

In section 435µ to 2,175µ thick; tomental hyphae “tawny-olive,” thick-walled, nonseptate or with few septa, 3µ to 4.5µ in diameter; cuticular layer blackish, well-defined; context brown in mass, with hyphae of two kinds—one kind hyaline, branching, thin-walled, septate, with clamp connections, 2µ to 3µ in diameter, the other kind brownish, unbranched or sparingly branched, thick-walled, mostly nonseptate, lacking clamp connections, 3µ to 6.5µ in diameter, often broadened toward the apices to form embedded pseudocystidia up to 300µ by 5µ to 9.5µ, these structures together with true cystidia forming several more or less distinct strata in the region underlying the active hymenium; cystidia pale when young and moderately thin walled, darkening with increasing thickness of the wall and eventually becoming very dark brown, not incrusted, wall finally 1.5µ to 6µ thick, with a basal clamp connection, 75µ to 260µ by 8µ to 17µ, protruding up to 80µ beyond the hymenial surface; basidia 4-sterigmate, with a basal clamp connection, 72µ to 100µ by 6µ to 7µ; spores hyaline, smooth, 8.5µ to 11.5µ by 4.5µ to 5µ. Plate 13, _E_., shows cystidia, a basidium, and a spore.

**Discussion**

The brown hyphae of _Stereum abietinum_ often originate from branched, hyaline hyphae. There is a clamp connection at the juncture between the two forms, but there are no further clamp connections in the brown part. Occasionally a clamp connection may be seen at the base of a hymenial
cystidium, and it appears that a clamp connection is often or always present wherever the hyaline part of a hypha gives rise to a thicker walled brown part.

The cobwebby pruinosity over the hymenium is seen under magnification to consist of colorless, extremely long and slender threadlike crystals. These may be 15\(\mu\) to 220\(\mu\) long, or perhaps even longer, and 0.5\(\mu\) to 1.5\(\mu\) (rarely to 6\(\mu\)) in diameter. An additional distinctive character of this species is the unusual length of the basidia. Burt (1920, p. 187) says that the cystidia may be incrusted, but I have not seen them thus. Overholt's (1939) and Bourdot and Galzin (1928, p. 377) describe the walls as sometimes rugose, but not incrusted. Patouillard's (1900, p. 72, fig. 48) illustration shows crystalline matter in the context and on the cystidia.

**Habitat**

On stumps and logs of gymnosperms.

**Distribution**

In mountainous and northern areas of Europe and North America. Burt (1920, p. 188) cites a specimen from Wisconsin.

**Miscellaneous Specimens Examined**

BPI: Alaska—Ketchikan (Baxter), Lower Russian Lake (Baxter), Sheep's Creek (Baxter); Canada—Burnt Island (Baxter), Fort Smith (Baxter); Austria—Bad Ratzes (?) (Bresadola), Vienna (Höhnel); France—Strasbourg (Maire), Vosges (Maire); Italy—Castelfondo (Bresadola), Rumo (?) (Bresadola); Sweden—Stockholm (Romell 6, 2913), Uppsala (Lloyd 08521).

**Exsiccati Examined**


**Illustrations**

Bier (1949, pl. 21, figs. 1–6); Burt (1920, text fig. 28; pl. 5, fig. 56); Killermann (1928, text fig. 99, C); Massee (1890, pl. 5, fig. 8); Patouillard (1900, fig. 48); Peck (1889, pl. 1, figs. 13–16); Pilát (1930a, t. 16, fig. 7).

**13. Stereum chailletii**

(Pls. 3, D; 9, C; 12, C)


Macroscopic
Basidiocarp lignicolous, coriaceous, resupinate, with the margin often narrowly reflexed, covering areas up to 13 by 6 cm.; upper surface “drab” to “hair brown,” subtomentose, obscurely concentrically sulcate; hymenial surface “avellaneous” to “wood brown” or intermediate between “cinnamon” and “Sayal brown,” subvelutinate, even or somewhat uneven.

Microscopic
In section 300µ to 1,000µ thick; tomental hyphae brown; cuticular layer dark-brown, thin; context of intermixed hyaline and pale-brown hyphae 2µ to 4µ in diameter, the brown hyphae usually of greater diameter than the hyaline; hymenial region simple or occasionally stratose; cystidia originating as brown hyphal elements of the context, incrusted, with a basal clamp connection, 50µ to 125µ (rarely to 207µ) by 4.5µ to 5µ (rarely 3.5µ to 6µ), protruding up to 22.5µ beyond the hymenial surface: basidia 4-sterigate, approximately 26µ by 4.5µ; spores hyaline, ellipsoidal-cylindrical to cylindrical, smooth. 6µ to 8.5µ by 2.5µ to 3µ. Plate 12, C, shows cystidia, a basidium, and spores.

Discussion
Stereum chailettii has brown cystidia instead of setae and does not darken in potassium hydroxide solution as does Hymenochaete. It may be distinguished from Peniophora by the margin that is often at least narrowly reflexed and, in sectional preparations, usually by the well-differentiated cuticular region characteristic of Stereum.

Habitat
On gymnosperm logs, only rarely on Pinus.

Distribution
In mountainous and northern areas of Europe, China, and North America. A specimen from Iowa, and Burt (1920, p. 202) reports it from Wisconsin.

Miscellaneous Specimens Examined
BPJ: Idaho—Coolin (Weir 11527), Priest River (Weir 1752); Iowa—Kendallville (Shimek SU 1748); Washington—Bellingham (Weir 7559), Lake Crescent (Alex. Smith 14061), Stanwood (Humphrey 7358); British Columbia—Salerno (Weir 1754); Bohemia—Trebon (Bubak, as Lloydella chailletti); Sweden—Stockholm (Romell 7, as Stereum abietinum).

Exsiccati Examined
Ellis and Everhart, N. Am. Fungi 2904, as Hymenochaete simulans nom. nud., [type].

Illustrations
Burt (1920, text fig. 34; pl. 6, fig. 62); Pilát (1930a, t. 16, fig. 6; 1933, p. 322).

14. Stereum frustulatum
(Pls. 4, A; 13, C)
an Habit of spores usually narrow, centrically reflexed, or newly reflected, often gregarious as polygonal frustules each attached to the substratum by a narrowed base, 2 to 18 mm. in diameter, forming colonial aggregations up to 10 by 4 cm. or sometimes larger; upper surface of reflexed basidiocarps “warm sepia,” “bister,” or black, glabrous, concentrically sulcate; hymenial surface “light buff,” slightly paler than “tawny olive,” or “tilleul buff” to “avellaneous,” pruinulose, even or somewhat rugulose.

Microscopic
In section up to 3,000μ thick; cuticular layer brown; context often very narrow, soon giving rise to a multistratose, very thick hymenial region that usually includes much crystalline matter; acanthophyses hyaline when young, darker in the deeper strata, with numerous aculeate protuberances, 28μ to 55μ by 3.5μ to 6.5μ; basidia 4-sterigmate, 22.5μ to 31.5μ by 3.5μ to 5μ; spores hyaline, ovoid, smooth, 3.5μ to 5μ by 2.5μ to 3μ. Plate 13, C, shows an acanthophysis, a basidium, and spores.

Discussion
Stereum frustulatum is closely related to S. subpileatum, but it is much different macroscopically and also lacks the cystidia that commonly appear in S. subpileatum.

Habitat
On stumps and logs of Quercus and less commonly on Castanea.

Distribution
Europe, China, the Philippine Islands, North America from Canada to Mexico and west to North Dakota and Texas. A report from Oregon (Burt, 1920, p. 229) evidently refers to a specimen that Weir (1919) found on an oak timber sent from Ohio. Common in the Upper Mississippi Valley.

Miscellaneous Specimens Examined
BPI: Kansas—Manhattan (Rogerson R 3486); Maryland—Beltsville Forest Service (Lentz 2, 11). SUI: Iowa—Cou Falls (Macbride and Puckett), Iowa City (Martin 3492, 6520, Apr. 25 in 1935; McGuire SUI 1737; Emmons SUI 1085; Newbro), Milford (Lohman SUI 1254), North Liberty (Martin 1050), Pine Hollow (Martin 6519), Sedan (Shimek), Turkey Creek (Martin Sept. 28 in 1933; Wolf Oct. 29 in 1927).
Exsiccati Examined

Bartholomew, Fungi Columbiani 1881, 4587, both as Stereum frustulosum; Ellis, N. Am. Fungi 106, as S. frustulosum; Lundell and Nannfeldt, Fungi Exs. Sueci 79; Ravenel, Fungi Carolinianii, Fasc. 2, 34, as S. frustulosum; Thuemen, Myc. Univers. 308, as S. frustulosum.

Illustrations

Burt (1920, text fig. 47; pl. 6, fig. 76); Coker (1921, pl. 18, left; pl. 35, figs. 9 and 10); Cooke (1906, pl. 20, fig. 20); Emmons (1927, pl. 2, fig. 9); Freeman (1905, text fig. 118); Lloyd (1917b, text fig. 1041; 1925, pl. 322, fig. 3087); Overholt's (1939, pl. 18, fig. 27); Pilát (1930a, t. 17, fig. 16; 1930b, t. 2, top) Tubeuf and Smith (1897, text figs. 260 and 261); Velenovsky (1922, text pl. 136, fig. 5).

15. Stereum subpileatum

(Pls. 4, B; 15, B)


Macroscopic

Basidiocarp lignoncolous, rigid, ellipsoidal and with the central part of the upper surface attached to the substratum by an umbo or several umbos, pileus usually broadly reflexed around part or all of its circumference, very loosely radiately plicate; upper surface entirely “ochraceous-tawny” to “cinnamon-brown,” tomentose, or often “cinnamon-brown,” “Mars brown,” or “Sayal brown” to “snuff brown” toward the center when the tomentum in that region is matted to form a tough-punky rind, the tomentum interrupted at intervals by distinct “bone brown” to dull-black concentric glabrous sulcations; hymenial surface near “light buff” when dry, “ochraceous-buff” when moistened, even or somewhat uneven.

Microscopic

In section 500μ to 1,800μ thick; tomentum up to 400μ thick, the tomental hyphae hyaline, yellowish-brown, or pale-brownish, free or entangled, unbranched, with thick and refractile walls, nonseptate or with few septa, (rarely 3.5μ) 4.5μ to 7μ in diameter; cuticular layer very dense, orange to “ochraceous-tawny,” 100μ to 240μ thick; context 250μ to 400μ thick, hyaline to pale-yellowish-brown, with the hyphae hyaline to pale-yellowish, 3μ to 5μ
in diameter, with walls somewhat thickened; hymenial region of usually 3 to 9 strata, bearing incrusted cystidia or acanthophyses or both; acanthophyses and aculeate-tipped basidioles hyaline, thin-walled, 2.5\(\mu\) to 4\(\mu\) in diameter; cystidia hyaline to pale-yellowish-brown, incrusted, thick-walled, with the wall under the incrustation either smooth or beset with aculeate protuberances, 32\(\mu\) to 51\(\mu\) by 6\(\mu\) to 9.5\(\mu\); basidia 4-sterigmate, 20.5\(\mu\) to 26\(\mu\) by 3.5\(\mu\) to 5\(\mu\); spores hyaline, smooth, 4\(\mu\) to 4.5\(\mu\) by 2.5\(\mu\) to 3\(\mu\). Plate 15, B, shows acanthophyses, cystidia, basidia, and a spore.

**Discussion**

*Stereum subpileatum*, as interpreted by Burt (1920, pp. 213–214), includes those forms with incrusted cystidia and with few or no aculeate basidioles or acanthophyses. Those specimens with incrusted cystidia and numerous acanthophyses are named *S. sepium* Burt, while those with many acanthophyses and no cystidia are called *S. insigne* Bres. Coker (1921) has followed Burt's concept. Imazeki (1939) treats *S. subpileatum* and *S. sepium* in the same way as Burt, but has given the new species name *S. hiugenese* Imazeki to a fungus having acanthophyses and lacking cystidia. From his description, this species may be close to or the same as *S. insigne* Bres. Höhnel and Litschauer (1907) consider *S. insigne* to be synonymous with *S. subpileatum*, with which view Bourdot and Galzin (1928, p. 375) and Pilát (1930b) concur. The latter also lists *S. sepium* as synonymous with *S. subpileatum*, as does Overholts (1939). Macroscopically the various forms are nearly if not completely indistinguishable from one another. Some specimens apparently have only incrusted cystidia, but sometimes the cystidial walls under the incrustation are found to have aculeate protuberances. The best solution seems to consist of considering all as belonging to a single species showing some variability with regard to sterile hyphal ends in the hymenium. Several tropical species, such as *S. princeps*, also appear to be very close to this species, and most or all of these fungi are usually on *Quercus*.

**Habitat**

On logs and stumps of *Quercus*, perhaps rarely on *Castanea, Fagus, Liquidambar*, and *Ulmus*.

**Distribution**

Europe, India, the Netherlands Indies, China, Japan, South and Central America, and the United States, particularly the southern part. Specimens from Illinois, Iowa, and Missouri.

**Miscellaneous Specimens Examined**

BPI: Louisiana—St. Martinville (Humphrey 3520); Maryland—Patuxent Wild Life Refuge (Lentz 35); Missouri—Wicks (Overholts 3161); North Carolina—Duke Forest (Wolf 510); Ohio—Cincinnati (Morgan), no locality (Morgan 140); India (Koelz 20514, 21703, 22123, as *Stereum insigne*). ILL: Illinois—Canton (Wolf ILL 22244, as *S. rugosum*; ILL 27637), Urbana (ILL 27968). SUI: Iowa—Dubuque County (Shimek); Louisiana—Lake Charles (Shimek).

**Exsiccati Examined**

Ravenel, Fungi Caroliniani, Fasc. 1, 30; Ravenel, Fungi Americani 219.
Illustrations

Burt (1920, text figs. 40, 41, and 45; pl. 6, figs. 69, 70, and 74); Coker (1921, pl. 21, top; pl. 35, fig. 3); Long (1915, pl. 41, figs. 1–10); Overholts (1939, pl. 15, fig. 12); Pilát (1930a, t. 16, fig. 8; 1930b, t. 1, figs. 1 and 2).

16. Stereum sulcatum

(Pls. 4, C; 9, E; 11, D)


Macroscopic

Basidiocarp lignicolous, hard and rigid when dry, corky when moistened, resupinate or narrowly reflected, up to 15 by 10 cm.; upper surface of reflected basidiocarps “cinnamon-buff,” consisting of a bibulous mat of densely massed tomental hymenial, usually less appressed toward the margin, or “ochraceous-tawny,” “Sayal brown” to “bister,” or “drab,” and consisting of a glabrous rind, often distinctly sulcate particularly in the thickened reflexed margin, with the sulcations usually dull-black; hymenial surface “pale ochraceous-salmon,” “pale ochraceous-buff” to “light ochraceous-buff,” or “light buff” when dry, when moistened becoming “light ochraceous-buff,” “apricot buff,” or “pinkish cinnamon,” even toward the margin, often somewhat uneven toward the center and sometimes cracked, the margin often bordered by a thin dark line of “argus brown” to blackish which, in turn, is often bordered by the tomentum of the upper surface extending beyond the hymenial margin for a short distance.

Microscopic

In section 675μ to 2,800μ thick; tomentum up to 1,000μ thick, yellowish-brown to brown in mass, the tomental hymenial yellowish to pale-brownish, branching, thick-walled, septate, with clamp connections, 2.5μ to 4μ in diameter; cuticular layer reddish-brown; context with two kinds of hyphae—one kind hyaline to pale-yellowish, branching, thick-walled, sparingly septate, with occasional clamp connections, 2μ to 4μ in diameter, the other kind hyaline, branching, thin-walled, septate, with clamp connections, 1.5μ to 2.5μ in diameter; hymenial region stratose, bearing numerous incrusted cystidia; cystidia apparently formed as the broadened ends of thick-walled context hyphae, hyaline to yellowish, heavily incrusted with hyaline or pale-yellowish crystalline masses, 38μ to 69μ by 8μ to 13μ, protruding up to 22μ beyond the hymenial surface; basidia 2- or 4-sterigmate, 23μ to 33μ by 4.5μ to 6μ; spores hyaline, subglobose, smooth or delicately echinulate, with the wall slightly thickened, 4.5μ to 6μ by 4.5μ. Plate 11, D, shows a cystidium, basidia, and spores.

Discussion

Stereum sulcatum is characterized by a bright hymenial surface having the aspect of delicately salmon-tinted chalk, by its incrusted cystidia borne
in a stratose hymenium, and by the spores. The minute asperity of the latter is highly distinctive for a species of *Stereum*, but is not always apparent.

**Habitat**

On gymnosperm logs.

**Distribution**

In Austria (Litschauer, 1930), Siberia, Alaska, Canada, the United States, Formosa, Japan, and China. Burt (1920, p. 212) reports it from Wisconsin.

**Miscellaneous Specimens Examined**

BPI: Colorado—Cottonwood Lake (Davidson 591); Idaho—Bovill (Shattuck), Grangeville (Rhoods), Priest River (Weir 1728, 9206); Montana—Evaro (Weir 1722), Hamilton (Weir 1725); New Hampshire—North Conway (Overholts 5033); Washington—Chelan Lake (Weir 11107); Alaska—Mt. McKinley Natl. Park (Baxter).

**Exsiccati Examined**

Bartholomew, Fungi Columbiani 5093.

**Illustrations**

Burt (1920, text fig. 39; pl. 6, fig. 68); Litschauer (1930, text fig. 1; t. 19, figs. 2–4); Lloyd (1916, text fig. 878); Overholts (1929, text fig. 8; 1939, pl. 17, fig. 25); Pilát (1933, pl. 24, fig. 6).

17. *Stereum murrattii*

(Pls. 4, D; 9, D and F; 14, C)


*Stereum tuberculosum* Fr., Hym. Eur. 644. 1874 (pro parte) [type, Norway (Blytt), in UPS], (non *S. tuberculosum* Velenov., Ceske Houby 762. 1922); *S. murrattii* (Berk. & Curt.) Burt var. *tuberculosum* (Fr.) Pilát, Hedwigia 70: 91. 1930; *S. murrattii* (Berk. & Curt.) Burt forma *tuberculosum* (Fr.) Pilát, Ceskoslov. Akad. Zemedel. Sborn. 5: 399. 1930.


*Corticium effusum* Overh., Mycologia 22: 238. 1930 [type, Ferdinand, Vt. (Spaulding FP 43963), in PAC].

**Macroscopic**

Basidiocarp lignicolous, corky when fresh, drying hard and brittle, resupinate, with the margin usually narrowly reflexed, up to 10 cm. in diameter; upper surface “Verona brown” to “fuscous,” glabrous, often concentrically sulcate; hymenial surface dull “cartridge buff,” even, or tuberculate and then often deeply and intricately cracked.
Microscopic

In section 1,000μ to 2,300μ thick; cuticular layer very dark brown and thick in some sections but almost completely lacking in others; context of horizontally parallel hyphae near the upper surface in some sections, but with this region almost completely lacking in other sections, most of the context filled with vesicles that tend to be arranged in numerous obscure strata; vesicles numerous and conspicuous, hyaline, ellipsoidal to subglobose, 13μ to 37μ by 8.5μ to 20.5μ; gloeocystidia in the hymenium yellowish, refractile, usually rather inconspicuous, 20.5μ to 44.5μ by 5μ to 10.5μ, sometimes protruding slightly beyond the hymenial surface; basidia 4-sterigmate, approximately 17μ to 19μ by 4.5μ to 5μ; spores hyaline, ovoid-ellipsoidal, smooth, 4μ to 5μ by 2μ to 2.5μ. Plate 14, C, shows gloeocystidia, vesicles, a basidium, and spores.

Discussion

The vesicles of Stereum murræii may be partly filled with a homogeneous material, but usually appear nearly or entirely empty. The type specimen of Corticium effusum clearly shows the origin of the vesicles as enlargements of hyphal tips. In the hymenial region these enlarged hyphal tips may elongate somewhat, often contain a refractile yellowish substance, and are then gloeocystidia.

The European form of S. murræii (forma tuberculosum) supposedly differs from the American form by having a tuberculose hymenium and by growing usually on gymnosperms instead of woody angiosperms. However, the specimen in Sydow, Mycotheca Germanica 2062 was reputedly collected from Fagus sylvatica L. in Bavaria, and Sumstine (1941) has reported the collection of a specimen from pine logs in Pennsylvania. Overholts (1939) found that specimens in Pennsylvania may have a very rugose hymenium even though growing on woody angiosperms. I have seen many North American specimens with a rugose hymenium. The type of S. tuberculosum was found to consist of 3 small pieces of S. chailletii and 1 large piece of the tuberculose form of S. murræii. I have not included this in the synonymy of S. chailletii, since the 3 pieces may have been added subsequent to the original description and since the original description more nearly characterizes S. murræii.

Habitat

Usually on woody angiosperms in America, and on gymnosperms in Europe.

Distribution

In Europe, particularly in subalpine regions, in Canada, the United States, Cuba, Jamaica, Puerto Rico, and South Africa. Specimens from Illinois and Iowa, and Burt (1920, p. 134) reports it from Wisconsin. The report from South Africa by Doidge (1950, p. 491) apparently is the result of confusing the synonym Stereum pulverulentum Pk. with S. pulverulentum (Lév.) Mont., for she listed the latter as synonymous with S. murræii. I have examined Léveillé's (1846, p. 149) type of Thelephora pulverulenta, Cape of Good Hope (Drège 9442), in PC, and have determined it to be Hymenochaete luteobadia (Fr.) Höhn. & Litsch. I have not seen Bijl's specimen 708 which Doidge cites from Zululand, but Talbot (1954) says that this specimen is S. murræii and he also cites another specimen from South Africa.
**Miscellaneous Specimens Examined**

BPI: New York—Saranac Inn (Spaulding 971); Rhode Island—Providence (Spaulding and Collins); Vermont—Newfane (Anne Hibbard, as Stereum tuberculatum, in Lloyd Herb. 23746); Virginia—Shenandoah Natl. Parf. (Stevenson 70918, Oct. 27 in 1938); Ontario—Huntsville (Cain TRT 3606); Czechoslovakia—Trebushany (Pilát Aug. 1937, as S. murrayi var. tuberculatum). SUI: Illinois—Jo Daviess County (Martin 1291); Iowa—Postville (Shimek SUI 1747); Maine—Lake Millinocket (Martin 5067); New York—Inlet (Rogers and Alpha Mac Rogers 3003).

**Exsiccati Examined**

Ellis and Everhart, N. Am. Fungi 2903, as Corticium colliculosum Berk. & Curt.; Ellis and Everhart, Fungi Columbiani 704, as Stereum rugosum (Pers. ex Fr.) Fr.; Lundell and Nannfeldt, Fungi Exs. Suecici 1030; Sydow, Myc. Germanica 2062, as S. tuberculatum.

**Illustrations**

Burt (1920, text fig. 15; pl. 4, figs. 31 and 32); Lloyd (1920, pl. 148, fig. 1690); Overholts (1929, pl. 3, fig. 2; 1930, pl. 28, fig. 2; 1939, pl. 14, fig. 2 and pl. 16, fig. 17); Pilát (1930a, t. 17, fig. 15); Talbot (1954, fig. 16).

18. Stereum purpureum

(Pls. 5, A and B; 9, C; 15, C)


*Stereum vorticosa* Fr., Epierc. 548–549. 1838; *Thelephora vorticosa* Fr., Obs. Myc. 2: 275. 1818 [type, Femsjo, Sweden, in UPS].

*Stereum rugosiusculum* Berk. & Curt., Grevillea 1: 162. 1872 [type, New England (Sprague, comm. Curtis 5412), in IMI].

*Corticium nyssae* Berk. & Curt., Grevillea 1: 166. 1873 [type, Pennsylvania (Michener 3486), in IMI].

*Corticium siparium* Berk. & Curt., Grevillea 1: 177. 1873 [type, Alabama (Peters 5239), in IMI].

*Stereum purpureum* (Pers. ex Fr.) Fr. var. *violaceum* Thuem., Fungi Austriaci 820. 1874 [type, Teplitz, Bohemia, in BPI].

Stereum purpureum (Pers. ex Fr.) Fr. var. atromarginatum W. G. Sm., Syn. British Basid. 405. 1908; S. purpureum (Pers. ex Fr.) Fr. forma atromarginatum (W. G. Sm.) Pilát, Hedwigia 70: 90. 1930.

Macroscopic

Basidiocarp lignicolous, coriaceous, resupinate to effused-reflexed, up to 6 cm. in diameter, the reflexed pilei sometimes imbricate; upper surface “light ochraceous-buff” to “cinnamon-buff,” tomentose, but with the tomental hyphae becoming appressed to form a glabrous wrinkled surface; hymenial surface “fawn color” to “benzo brown,” waxy-pruinulose, even.

Microscopic

In section 450μ to 750μ thick; tomental hyphae hyaline, unbranched, with moderately thin to thick refractile walls, sparingly septate; cuticular layer yellowish-brown; context of hyaline hyphae, some ending as vesicular enlargements in the subhymenial region and adjoining context; vesicles hyaline to pale-yellowish, pyriform to globose, 13μ to 26μ by 12μ to 22μ; cystidioles sometimes present in the hymenium, hyaline, not incrusted, hairlike, 3.5μ to 7.5μ in diameter, protruding up to 35μ beyond the hymenial surface; basidia 4-sterigmate, 4μ to 6μ in diameter; spores hyaline, broadly cylindrical, smooth, 5μ to 6.5μ by 2μ to 3μ. Plate 15, C, shows a vesicle and part of the hymenium with cystidioles, basidioles, and a basidium.

Discussion

Stereum purpureum is characterized by its purplish, waxy hymenium and by having vesicles in the subhymenium and adjacent context. Cystidioles sometimes develop in the hymenium. These have been the basis for referring specimens to S. rugosiusculum, although Berkeley (1873) did not mention these structures in his type description. Burt (1920, pp. 128-129), Rea (1922, pp. 664-665), and Overholts (1939) all distinguished S. rugosiusculum from S. purpureum primarily on the basis of the cystidioles, whereas Patouillard (1883, p. 65), Brooks (1923), Exell (1925), Bourdot and Galzin (1921; 1928, p. 381), Pilát (1930b), and Robak (1942, p. 19) made no such distinction. I have examined 1 specimen which Overholts determined as S. purpureum and 7 specimens determined or verified by Burt as S. purpureum. The Overholts specimen and 3 of the Burt specimens had cystidioles and 1 or 2 others may have had disintegrating cystidioles. This, together with evidence presented by Brooks, Bourdot and Galzin, and Robak, in particular, indicates the impossibility of maintaining S. purpureum and S. rugosiusculum as separate species. Ward (1898) has published an article on the biology of a fungus that he thought was S. hirsutum. His illustrations, particularly figs. 6 and 9, leave no doubt that the fungus with which he worked was S. purpureum. This fact should be kept in mind when reading H. P. Brown’s (1915) comparison of the wood rot of Hymenochaete rubiginosa with that of “S. hirsutum,” since he used Ward’s description as a basis for comparison.
Habitat

Usually on woody angiosperms, but sometimes on gymnosperms.

Distribution

Cosmopolitan, reasonably common in the Upper Mississippi Valley.

Miscellaneous Specimens Examined

BPI: Idaho—Priest River (Weir 8970); Maryland—Bowie (Lentz 26), Patuxent Wild Life Refuge (Stevenson), Takoma Park (Hedgecock 2102); Montana—Helena (Weir 10907); New York—Alcove (Shear 1122); Virginia—Fairfax (Davidson FP 52855); Washington—Easton (Humphrey FP 6085); Argentina—Province of Tucuman (Singer T 535); Germany—East Prussia (Gramberg, as Stereum purpureum forma resupinata Bres.); India—Rytal (Koelz 22109), Rungling Pass (Koelz 21329). MO: Indiana—Lafayette (Orton MO 44082); Minnesota—Park Rapids (Jensen MO 11100); Wisconsin—Madison (Trelease MO 5043); Canada—Vancouver Island (Macoun MO 5737), Winnipeg (Buller MO 58975). SUI: Iowa—Homestead (SUI 1856, as S. rugosiusculum).

Exsiccati Examined

Bartholomew, Fungi Columbiana 3489; Desmazières, Pl. Crypt. du Nord France, Fasc. 3, 117, as Thelephora purpurea; Ellis and Everhart, N. Am. Fungi 323, 2018; Lundell and Nannfeldt, Fungi Exs. Suecici 460; Rabenhorst, Fungi Europaei 1407, as Stereum rufum; Shear, N. Y. Fungi 311. Note: Holl, Schmidt, and Kunze, Deutschlands Schwamme 46, was cited by Fries, Syst. Myc. 1: 440. 1821, as an example of T. purpurea. This number in the BPI set is Auricularia mesenterica (Fr.) Fr., Epicr. 555. 1838.

Illustrations

Many illustrations are cited by Saccardo (1911, pp. 891-892). Others include Batsch (1786, t. 25, fig. 131); Brooks (1913, pls. 12 and 13); Burt (1920, text figs. 13 and 14; pl. 4, figs. 29 and 30); Cleveland (1935, text fig. 57); Exell (1925, text figs. 6-7); Graham (1944, pl. 5, fig. 11); Overholts (1929, text fig. 25 and pl. 3, fig. 3; 1939, pl. 17, fig. 20); Patouillard (1883, fig. 150); Pilát (1930a, t. 17, fig. 17); Talbot (1954, fig. 17); Wakefield and Dennis (1950, pl. 106, fig. 2); Ward (1898, figs. 1-19).

19. Stereum cinerascens

(Pls. 5, C; 10, A; 13, B)


Stereum dissitum Berk., Grevillea 1: 164. 1873 [type coll., Texas (Wright), in BPI]; Peniophora dissita (Berk.) Cke., Grevillea 8: 150. 1880; Lloydella dissita (Berk.) Rick, Brotéria (ser. 3) 9: 87. 1940, lacking Berk. publication data.


Stereum purpurascensLloyd, Mycol. Writ. 4, Let. 53: 15. 1914 [type, West Roxbury, Mass. (Anne Hibbard), in BPI (Lloyd Herb.)].


**Macroscopic**

Basidiocarp lignicolous, coriaceous, resupinate to effused-reflexed, up to 16.5 by 6 cm., the reflected margin up to 1.7 cm. broad; upper surface “cinnamon-buff” to “cinnamon” or “avellaneous,” sometimes gray except near the margin, strigose-hirsute, usually zonate; hymenial surface “light buff” to “wood brown,” minutely pruinose-setulose, even, often delicately cracked.

**Microscopic**

In section 400μ to 800μ thick; tomental hyphae hyaline to pale-yellowish-brown, usually abundant, long, flexuous; cuticular layer yellowish-brown to brown; context hyaline to pale-yellowish-brown in mass, with some hyphae relatively unbranched, thick-walled, approximately 3μ in diameter, other hyphae moderately branching and somewhat thick-walled or much-branched and thin-walled, (rarely 1.5μ) 3μ in diameter; cystidia hyaline and incrusted.
toward the apex, yellowish and smooth toward the base, conical, 68.5 $\mu$ to 175$\mu$ by 12.5 $\mu$ to 34$\mu$, some entirely embedded in the hymenium, others protruding up to 100$\mu$ beyond the hymenial surface; basidia 4-sterigate, 50$\mu$ to 56$\mu$ by 9$\mu$ to 11.5$\mu$; spores hyaline, ovoid to broadly cylindrical, smooth, 8$\mu$ to 15.5$\mu$ by 5.5$\mu$ to 10$\mu$. Plate 13, B, shows a cystidium, basidium, and spores.

**Discussion**

The large, conical cystidia and large spores are distinctive characters of *Stereum cinerascens*. This species has often been mistaken for a *Peniophora*, but it differs from that genus by its reflexed margin and by the characteristic *Stereum*-like appearance in section. Bresadola (1926) has listed *Hymenochaete bonaerensis* Speg. as a synonym of *Lloydella cinerascens* (Schw.) Bres. The type of *H. bonaerensis* [Palermo, Argentina (Spegazzini 24629), in LPS] is a resupinate *Hymenochaete* with true setae. It has no relationship with *S. cinerascens*.

**Habitat**

On dead trees and fallen branches of woody angiosperms, especially *Morus* and *Ulmus*.

**Distribution**

In Europe, South Africa, Asia, the Philippine Islands, North America, and South America. It is fairly common in the Upper Mississippi Valley.

**Miscellaneous Specimens Examined**

BPI: California—Berkeley (Parks 2752); District of Columbia—Washington (Hedgecock 622, 815); Massachusetts—Boston (Weir); Texas—Waco (Shoemaker). SUI: Iowa—Cou Falls (Emmons SUI 1264, SUI 1279; Himmel and Martin SUI 1253), Hills (Martin 432), Iowa City (Martin 1920, 1921, 6504, 6505, 6506, 6507, 6508, 6509, Oct. 11 in 1946, Oct. 21 in 1947; Brasfield SUI 1726, SUI 1727), Lyon County (SUI 1728), Midriver (Martin 1093), Milford (Martin 1265; Lohman), no locality (in 1896 on box elder).

**Exsiccati Examined**

Shear, N. Y. Fungi 313, as *Stereum neglectum* (authentic specimen); Torrend, Mycotheca Lusitanica 51.

**Illustrations**

Burt (1920, text fig. 36; pl. 6, fig. 64); Cooke (1879, pl. 122, fig. 4); Emmons (1927, pl. 2, fig. 10); Overholts (1939, pl. 18, fig. 31); Talbot (1951, pl. 27; 1954, fig. 18).

**20. Stereum striatum**

(Pls. 6, A; 10, B; 12, D)

Macroscopic

Basidiocarp lignicolous, coriaceous, thin, plane, orbicular and attached by a central umbo, or effused-reflexed or sometimes dimidiate, margin very thin and usually subfimbriate, up to 1.5 cm. in diameter or confluent with adjoining basidiocarps to extend up to 10 cm. or more along the substratum; upper surface "smoke gray" toward the base, or entirely "cartridge buff" or "light buff" to "tilleul buff," sericeous, with closely adnate radiating fibrils, delicately zonate; hymenial surface "light buff" to "pale ochraceous-buff," or occasionally "wood brown," even.

Microscopic

In section 200µ to 375µ thick; cuticular layer often not well-defined; context hyaline or pale-yellowish in mass, hyphae with walls slightly thickened, 2.5µ to 4.5µ in diameter; pseudocystidia visible in the subhymenial region and hymenium, inconspicuous, hyaline, some with umbonate tips, nonexserted; basidia 4-sterigmate, 4.5µ to 7.5µ in diameter; spores hyaline, cylindrical, smooth, 6µ to 8.5µ by 2µ to 3.5µ. Plate 12, D, shows part of the hymenium with pseudocystidia and basidioles, basidia, and spores.

Discussion

Stereum striatum is distinguished from S. complicatum by its plane, rather than plicate, usually thinner basidiocarp, by the more sericeous upper surface with the fibrils more closely adnate, by the hymenium that usually lacks the ruddy hue of S. complicatum, and by the usually indistinct cuticular layer.

A developmental series was observed in one of the exsiccati examined (Shear, N. Y. Fungi 312). The basidiocarps erupted from the bark of the host at first as minute, semiglobose, grayish-white, plumulose masses of sterile fibrils. These masses enlarged to a diameter of approximately 1 mm. before forming a hymenial pocket by the unfolding of the plumulose mass at the apex. Further development resulted in the formation of a cup, with the hymenium lining the inside and an abundance of fibrils causing the exterior to have a distinct hirsuteness. Finally, the cup flattened out to form an orbicular-reflexed or effused-reflexed basidiocarp. As growth continued, the hirsuteness remained confined to the base, so there were no free fibrils over the greater area of the upper surface.

Habitat

On twigs and branches of Carpinus, rarely reported on other woody angiosperms.

Distribution

Eastern Canada, the United States, and Mexico. Specimens from Iowa, and Burt (1920) reports it from Missouri.

Miscellaneous Specimens Examined

BPI: District of Columbia—Rock Creek Park (Lentz 253); Maryland—Bowie (Lentz 27), Patuxent Wild Life Refuge (Lentz 37); New York—Alcove (Shear 1209); Ontario—Toronto (Jackson TRT 3944). SUI: Iowa—Canoe Creek (Shimek SUI 1741), Clayton County (Shimek SUI 1742), Hesper (Shimek SUI 1738), Pine Hollow (Shimek SUI 1739), Postville (Shimek SUI 1740): New Jersey—Whitesbog (Martin 1846). All specimens as Stereum sericeum.
Exsiccati Examined
Ellis, N. Am. Fungi 19; Shear, N. Y. Fungi 312, as Stereum sericeum.

Illustrations
Burt (1920, text fig. 25; pl. 5, fig. 49); Coker (1921, pl. 35, fig. 7); Henry (1949, pl. 1, fig. 4); Overholts (1939, pl. 15, fig. 11; pl. 17, fig. 26).

21. Stereum ochraceo-flavum
(Pls. 6, B; 10, C; 16, F)
Stereum ochraceo-flavum (Schw.) Ell., 4 N. Am. Fungi 17. 1878; Thelephora ochraceo-flava Schw., Am. Phil. Soc. Trans. (n. s.) 4: 167. 1832 [type or paratype ?, Bethlehem, Pa., or Florida, in BPI (Michener Herb.)].

Macroscopic
Basidiocarp lignicolous, coriaceous, cup-shaped to conical and attached by an umbo or adherent along one side also, up to 12 mm. in diameter and 7 mm. deep, or sometimes effused-reflexed and often laterally coalescent along small twigs; upper surface conspicuously villose or silky-hirsute with long whitish fibrils, indistinctly zonate; hymenial surface "pale orange-yellow" to "cream-buff," even.

Microscopic
In section 160μ to 365μ thick; tomental hyphae hyaline, long, slender, unbranched, with walls up to 1.75μ (rarely 2μ) in diameter, infrequently septate, lacking clamp connections, 3μ to 5μ in diameter; cuticular layer yellowish-brown, approximately 25μ thick; context with two kinds of hyphae—one kind branching, thin-walled or with the wall only slightly thickened, septate, (rarely 1.5μ) 2μ to 4μ in diameter, especially thin and much-branched in the subhymenium, the other kind unbranched, with the wall 1.5μ (rarely 2μ) thick, with very few septa, 4μ to 7μ in diameter, often protruding somewhat beyond the hymenial surface as pseudocystidia; pseudocystidia obtuse or umbonate at the tips, with homogeneous to granular and sometimes yellowish and refractile contents, 4.5μ to 7μ in diameter, often protruding up to 15μ beyond the hymenial surface; basidia 4-sterigmate, approximately 27μ by 4.5μ to 5μ; spores hyaline, cylindrical, smooth, 5.5μ to 7μ by 1.5μ to 2μ. Plate 16, F, shows a hypha with double clamp connections, the pseudocystidial apices of vascular hyphae, basidia, and a spore.

Discussion
Stereum ochraceo-flavum is characterized by the bright yellowish hymenium and abundant whitish, silky tomentum. Clamp connections were not observed on hyphae of dissected basidiocarps, but hyphae from the context of specimen R 3480 developed single or double clamp connections at many septa when cultured on malt agar.

*S. ochraceo-flavum (Schw.) Rav., Fungi Caroliniani, Fasc. 2, 31. 1853, lacks Schweinitz publication data and apparently was not intended to be a new combination by Ravenel. The same is true of Pk., N. Y. State Cabinet Nat. Hist. Rpt. 22: 40, 86. 1869, and of Fr. in Thuem., Myc. Univers. 10. 1875.
Habitat

On twigs and small branches of woody angiosperms.

Distribution

Southern Canada to Mexico. Burt (1920, pp. 185–186) reports it from Wisconsin, Iowa, and Missouri, but its usual habitat is more southern. One specimen examined from Iowa. Doidge (1950, p. 491) reports this species from South Africa.

Miscellaneous Specimens Examined

BPI: Arkansas—Fordyce (Humphrey FP 5617); Florida—Gainesville (Nuttall), Jacksonville (Rhoads), Kelly Park (Schallert), Narcoosse (Schallert 1638), New Smyrna (Weir 21079); Iowa—Decorah (Holway); Kansas—Manhattan (Rogerson R 3480); Maryland—Takoma Park (Shear 1240); Massachusetts—Nantucket County (Seeler); Mississippi—Ocean Springs (Earle); Virginia—Bull Run Mts. (Allard).

Illustrations

Burt (1920, text fig. 27; pl. 5, fig. 55); Coker (1921, pl. 35, fig. 8); Graham (1944, pl. 5, fig. 14); Overholts (1939, pl. 17, fig. 24).

22. Stereum sanguinolentum

(Pls. 6, C; 10, D; 16, C)


Macroscopic

Basidiocarp lignonolous, coriaceous, often orbicular and resupinate with the margin narrowly reflexed and curled inward toward the hymenium, often coalescing with adjoining basidiocarps and extending up to 10.5 by 1.5 cm. along tree branches or up to 9 by 5 cm. on broad substrata, some basidiocarps broadly reflexed and occasionally imbricate; upper surface “pinkish buff” to dull “cinnamon-buff,” pubescent toward the margin to tomentose, hirsute,
and often strigose toward the base, indistinctly zonate; hymenial surface near “wood brown” when dry, becoming “hazel” or “Verona brown” when moistened, even, often radiately cracked when dry.

Microscopic

In section (rarely 150μ) 200μ to 585μ thick; tomental hyphae usually hyaline, unbranched, often with refractile walls, with infrequent delicate septa, 3μ to 5.5μ in diameter, some with dark-brown granular contents and 4.5μ to 6.5μ in diameter; cuticular layer yellowish-brown, 15μ to 25μ thick; context with two kinds of hyphae—one kind hyaline to pale-yellowish, branching, thin-walled, septate, 3μ to 3.5μ in diameter in the context and 2μ to 3μ in diameter in the subhymenial region, the other kind often somewhat thicker walled, with infrequent septa (rarely 3μ), 3.5μ to 6μ in diameter in the context, some with brownish contents often enlarging to 6.5μ to 11μ in diameter in the subhymenial and hymenial regions and differentiated as pseudocystidia; pseudocystidia usually with brown, granular contents that exude as a reddish-brown discoloration when the hymenium is injured; basidioles originating in the basidial fascicles, with the tips fimbriate or having several aculate protuberances, thin-walled, 20μ to 27μ by 2μ to 3.5μ, nonexserted; basidia 2- or 4-sterigate, large-spored basidia 31.5μ to 43μ by 6μ to 8.5μ, small-spored basidia shorter and approximately 5μ in diameter; spores hyaline, cylindrical, smooth, the large spores (rarely 7μ) 8μ to 14μ by 3μ to 5μ, the small spores 5μ to 7μ (rarely 8.5μ) by 2μ to 3.5μ. The small-spored specimens are more common than those with large spores. Plate 16, C shows the pseudocystidial apex of a sanguinolentous vascular hypha, basidioles, basidia, and spores.

Discussion

Hyphae of Stereum sanguinolentum specimens with large spores and basidia separated from one another much more satisfactorily in crushed mounts than did those in specimens with smaller spores and basidia. Most of the larger spored basidiocarps were obtained from Tsuga, particularly T. canadensis, although this was not absolutely consistent. Probably some host relationship is involved, but additional study is required before it can be understood. S. sanguinolentum is one of the “bleeding” species.

Habitat

On gymnosperms.

Distribution

Europe, Asia, and North America. It is also reported from South Africa by Doidge (1950, p. 493), and by Talbot (1954). Specimens examined from Wisconsin.

Miscellaneous Specimens Examined

BPI: Idaho—Coeur d’Alene (Rust 1023), Grangeville (Rhoads), Priest River (Weir 1707; Weir and Rhoads), Sandpoint (Hubert); Maine—Oxford County (Parlin 15423), Sugar Island (Spaulding FP 43936); Massachusetts—Petersham (Spaulding FP 43985); Montana—Elkhorn (Weir 9749), Evaro (Weir 1713), Kalispell (Hubert), Libby (Hubert); New York—Knowlesville (Shear); Oregon—Crater Lake (Weir 1706); Vermont—Bethel (Spaulding 2706), Ripton (Burt); Virginia—Hawksbill Mt. (Allard); Washington—Hoquiam (Humphrey), Seattle (Shear), Tacoma; Wisconsin—Hayward (Humphrey 9760), Rothschild (Richards 39251); Alaska—Juneau (Baxter); British

**Exsiccati Examined**

Lundell and Nannfeldt, Fungi Exs. Suecici 462; Sydow, Myc. Germanica 2061.

**Illustrations**

Many illustrations are cited by Saccardo (1911, pp. 892–893). Others include Bier (1949, pl. 14, figs. 1–4); Bier, Salisbury, and Waldie (1948, pl. 3; pl. 5, fig. 2); Burt (1920, text fig. 20; pl. 5, fig. 40); Coker (1921, pl. 35, fig. 2); Exell (1925, text fig. 9); Jørstad and Juul (1939, figs. 33–38); Möller (1945, text fig. 45, B); Overholts (1929), pl. 2, fig. 6; 1939, pl. 16, fig. 15, and pl. 16, fig. 19); Pilát (1930a, t. 16, figs. 2 and 3); Talbot (1951, pl. 25; 1954, fig. 15); Wakefield and Dennis (1950, pl. 106, fig. 5).

23. **Stereum complicatum**

(Pls. 6, D and E; 16, D)

*Stereum complicatum* (Fr.) Fr., Epicr. 548. 1838; *Thelephora complicata* Fr., Elench. 1: 179. 1828 [authentic specimen, Mexico (Liebmann), in UPS].


**Macroscopic**

Basidiocarp lignicolous, thin, coriaceous, flabelliform or dimidiate, or more often effused-reflexed and often coalescing with adjoining basidiocarps to extend up to 10 by 2.5 cm., the reflexed margins usually radiately plicate, often imbricate, up to 1.5 cm. broad; upper surface “cinnamon-buff” to “hazel,” often paler near the margin, or the entire surface sometimes grayish, strigose at the base to appressed silky-strigose near the margin, zonate; hymenial surface dull “cream-buff” to “cinnamon-buff,” or more nearly “orange” when fresh and moist, even, often slightly ridged at the lines of coalescence of adjoining basidiocarps.

**Microscopic**

In section 400µ to 500µ (rarely 300µ to 850µ) thick; tomental hyphae hyaline to subhyaline, with thick refractile walls; cuticular layer yellowish-brown; context with two kinds of hyphae—one kind thin-walled. septate, with infrequent clamp connections, the other kind thick-walled. nonseptate or with few septa, usually with hyaline contents but some having yellowish-brown granular contents and sometimes ending in the hymenial region as inconspicuous nonexserted pseudocystidia; basidia 4-sterigmate, 24.5µ to
31.5 μ to 3.5 μ to 5 μ; spores hyaline, cylindrical to curved-cylindrical, smooth, 5 μ to 6.5 μ by 2 μ to 2.5 μ. Plate 16, D, shows a hypha with a clamp connection, the pseudocystidial apex of a vascular hypha, basidioles, basidia, and spores.

**Discussion**

*Stereum complicatum* is distinctive in having delicate, thin, often radiately plicate basidiocarps which are smaller than those of most other species that might be confused with it. This species is distinguished from *S. ostrea* and its varieties by its smaller size, its plicate and often intricately lobed margin, its more abundant thick-walled hyphae with colored contents (sanguinolentous hyphae), and by lack of aculeate-tipped basidioles. The basidiocarps of *S. complicatum* are thinner and smaller than those of *S. hirsutum* and do not have the richly hirsute upper surface characteristic of the latter. The ruddy coloration and plicate margin of *S. complicatum* distinguishes it from *S. striatum*, and it is not restricted to *Carpinus* as is *S. striatum*.

**Habitat**

On dead trunks and branches of woody angiosperms, especially *Quercus*. Coker (1921) reported a form on cedar (*Juniperus* sp.) poles.

**Distribution**

Canada to Mexico, Jamaica, Puerto Rico, the Philippine Islands (H. Sydow and P. Sydow, 1917, p. 170; Teodoro, 1937, p. 284), China (Teng, 1939, p. 326), Siberia (Killermann, 1943, p. 277). It is very common in the Upper Mississippi Valley.

**Miscellaneous Specimens Examined**

BPI: Alabama—Mobile Bay (Dybas); District of Columbia—Fort Dupont (Steven-son); Indiana—Crawfordsville (Bechtel), Turkey Run State Park (Bechtel); Louisiana—Bogalusa (Hedgcock 812); Maryland—Bowie (Lentz 32), Takoma Park (Shear); North Carolina—Creedmoor (Stevens); Virginia—Little Stony Man Mt. (Lentz); Peru—Province of Paucartambo (Vargas 6806). SUI: Iowa—Cou Falls (Himmel SUI 196), Hills (447), Iowa City (Brasfield SUI 1746; Martin 1284, June 10 in 1924, Aug. 10 in 1934; Emmons SUI 1285, Sept. 24 in 1942, Jan. 7 in 1939), North Liberty (Brasfield), Tiffin (Nicholson and Gilmore), Turkey Creek (1956), West Union (Shimek); Louisiana—Vinton (Shimek); Michigan—Sister Lake at Dexter (Lasser). All specimens as Stereum rameale.

**Exsiccati Examined**

Bartholomew, Fungi Columbiansi 2881, 4985, 5089; Ellis, N. Am. Fungi 324; Ellis and Everhart, Fungi Columbiansi 307; Ravenel, Fungi Caroliniani, Fasc. 2, 30; Ravenel, Fungi Americani 117; Thuemen, Myc. Univers. 1404.

**Illustrations**

Bertoloni (1856, t. 19, fig. 2, E-G); Burt (1920, text fig. 24; pl. 5, fig. 48); Campbell and Davidson (1940, fig. 2, D); Coker (1921, pl. 21, bottom; pl. 23; pl. 35, figs. 5 and 6); Graham (1944, pl. 5, fig. 12); Henry (1949, pl. 1, fig. 3); Lloyd (1925, pl. 323, fig. 3094); Overholts (1939, pl. 14, fig. 8; pl. 17, fig. 22; pl. 18, figs. 30 and 32).

24. *Stereum gausapatum*

(Pis. 7, A; 10, E; 15, D)

*Stereum gausapatum* (Fr.) Fr., Hym. Eur. 638. 1874; *Thelephora gausapata* Fr., Elench. 1: 171. 1828; *Cladoderris gausapata* (Fr.) Fr., Acta Acad. Sci. Holm. 142. 1848.


Stereum occidentale Lloyd, Mycol. Writ. 5, Let. 69: 12. 1919 [type, Sunset Peak, San Antonio Mts., Calif. (Johnston), in BPI (Lloyd Herb.)].

Stereum lacunosum Velenov., Ceske Houby 763. 1922 [syn. sec. Pilát, Hedwigia 70: 63. 1930].

Stereum gausapatum (Fr.) Fr. forma resupinata Pilát, Hedwigia 70: 65. 1930.

**Macroscopic**

Basidiocarp lignicolous, coriaceous, effused-reflexed, dimidiate, or laterally sessile and hemiobicular, with the margin sometimes loosely radiately plicate, cespite-imbricate, the resupinate areas of effused-reflexed forms up to 10 cm. in diameter, the free pilei up to 5 cm. long and 6 cm. broad, often laterally coalesceant and then up to 9 cm. or more broad; upper surface “buckthorn brown,” “ochraceous-tawny,” or “cinnamon-buff” to “clay color,” densely pubescent to hirsute or sometimes strigose, zonate; hymenial surface “wood brown,” “Sayal brown,” or “pinkish buff” to “clay color,” discoloring to “bister,” “fawn color,” or “bone brown” when wounded, even.

**Microscopic**

In section 500μ to 1,000μ thick; cuticular layer yellowish-brown; context with two kinds of hyphae—one kind hyaline, branching, septate, apparently lacking clamp connections, the other kind most prominent in the hymenial
side of the context and in the subhymenium, nonbranching, thick-walled vascular hyphae, many with brown contents, 5μ to 8.5μ in diameter, often extending into the hymenium as nonexserted pseudocystidia; basidia obtuse at the apex, lacking aculate protuberances; basidia 4-sterigmate, approximately 5μ in diameter; spores hyaline, cylindrical, smooth, 5μ to 7.5μ (rarely 8.5μ) by 2μ to 3μ. Plate 15, D, shows the pseudocystidal apex of a sanguinolentous vascular hypha, a basidium, and spores.

**Discussion**

*Stereum gausapatum* is one of the “bleeding” Stereums, since the sanguinolentous hyphae of fresh basidiocarps exude a deep-red liquid substance when injured. Sanguinolentous hyphae occur in a number of species of *Stereum*, but in only a few, such as *S. sanguinolentum*, *S. rugosum*, and *S. gausapatum*, is the hymenium discolored by the contents of these hyphae. The reddish liquid may be visible as it oozes from the cut hymenial surface of *S. sanguinolentum* basidiocarps, but as a rule the discoloration of the hymenium is the only gross evidence of the presence of this substance in specimens of *S. gausapatum*.

**Habitat**

On stumps and logs of *Quercus*, rarely on other woody angiosperms.

**Distribution**

Europe, Asia, Australia, North America from Canada to Mexico. It is common in the Upper Mississippi Valley.

**Miscellaneous Specimens Examined**

BPI: Illinois—Bogota (Schallert 1883); Maryland—Beltsville Forest Service (Lentz 4), Cabin John Run (Stevenson), Great Falls (Stevenson), Herald Harbor (Stevenson), Suitland Bog (Diehl), Takoma Park (Shear 1273); New York—Albany County (House), Alcove (Shear 1201); Texas—Boerne (Hedgcock 808); Virginia—Arlington (Stevenson and Diehl), Clarendon (Weir), Hawkinsbill Mt. (Stevenson), Shenandoah Natl. Park (Stevenson and Charles); Washington—Sumner (Harper 1158). ILL: Illinois—Urbana (Gibbs, as *Stereum applanatum*; Gibbs and Clinton ILL 27967, as *S. versicolor*). SUI: Iowa—Homestead (Oct. 17 in 1926), Iowa City (Martin 3955, June 28 in 1939, summer of 1947), Johnson County (1907; Aug. 21 in 1943), Turkey Creek (Martin 1933).

**Exsiccati Examined**

Bartholomew, Fungi Columbiani 2589, 2883, 4292, 4987, 5092, all as *Stereum spadiceum*; Ellis, N. Am. Fungi 325, as *S. spadiceum*; Lundell and Nannfeldt, Fungi Exs. Suecici 1337; Ravenel, Fungi Caroliniani, Fasc. 2, 32, as *S. spadiceum*; Ravenel, Fungi Americani 447; Romell, Fungi Exs. Praes. Scandinavici 122, as *S. cristulatum*; Thuemen, Fungi Austriaci 921, as *S. spadiceum*.

**Illustrations**

Burt (1920, text fig. 18; pl. 4, fig. 36); Coker (1921, pl. 20; pl. 35, fig. 1); Henry (1949, pl. 1, fig. 2); Overholts (1929, text fig. 19; 1939, pl. 14, fig. 4); Filat (1930a, t. 16, fig. 5; t. 18, figs. 1 and 2); Quélet (1875, pl. 1, fig. 15); Wakefield and Dennis (1950, pl. 106, fig. 3).

25. *Stereum hirsutum*

(Pls. 7, B; 16, A)

Thelephora hirsuta Willd. ex Fr. forma faginea Fr., Syst. Myc. 1: 439. 1821; Stereum hirsutum (Willd. ex Fr.) S. F. Gray var. fagineum (Fr.) Thuem., Fungi Austriaci Exs. 332. 1872, var. attrib. to Fr., lacking Fr. publication data.


Stereum hirsutum (Willd. ex Fr.) S. F. Gray var. pilosiusculum Thuem., Fungi Austriaci Exs. 821. 1873 [type, Teplitz, Bohemia, in BPI]; S. hirsutum (Willd. ex Fr.) S. F. Gray forma pilosiusculum (Thuem.) Pilát, Hedwigia 70: 53. 1930.


Stereum hirsutum (Willd. ex Fr.) S. F. Gray forma ramosa Gillot, Rev. Mycol. 4: 183. 1882.

Stereum hirsutum (Willd. ex Fr.) S. F. Gray forma foliacea Gillot, Rev. Mycol. 4: 183. 1882.

Stereum hirsutum (Willd. ex Fr.) S. F. Gray forma striato-foliaceum Roum., Rev. Mycol. 8: 203. 1886.


Stereum variicolor Lloyd, Mycol. Writ. 4, Let. 53: 10. 1914 [type, Corvallis, Oreg. (C. E. Owens), in BPI (Lloyd Herb.)].


Corticium reisneri Velenov., Ceske Houby 758. 1922 [syn. Stereum hirsutum forma resupinata sec. Pilát, Hedwigia 70: 52. 1930].

Stereum neuwirthi Velenov., Ceske Houby 760. 1922 [type, Jindřichův, Czechoslovakia (Neuwirth), in PR]; S. hirsutum (Willd. ex Fr.) S. F. Gray forma neuwirthi (Velenov.) Pilát, Hedwigia 70: 52. 1930.

Stereum hirsutum (Willd. ex Fr.) S. F. Gray var. luteocitrinum Sacc. ex Rea, British Basid. 664. 1922; S. hirsutum (Willd. ex Fr.) S. F. Gray forma luteocitrinum (Sacc. ex Rea) Pilát, Hedwigia 70: 55. 1930.


Stereum hirsutum (Willd. ex Fr.) S. F. Gray forma faginea Pilát, Hedwigia 70: 53. 1930.

Stereum hirsutum (Willd. ex Fr.) S. F. Gray forma badium Pilát, Hedwigia 70: 54. 1930.

Stereum hirsutum (Willd. ex Fr.) S. F. Gray forma ciliatum Pilát, Hedwigia 70: 54. 1930.

Stereum hirsutum (Willd. ex Fr.) S. F. Gray forma setosum Pilát, Hedwigia 70: 54. 1930 [authentic specimen, District of Tara, Siberia (Krawtzew), in PR].


Macroscopic

Basidiocarp lignicolous, coriaceous, dimidiate, effused-reflexed, or sometimes resupinate with the margin usually loosely radiately plicate; upper surface whitish or “cinnamon-buff” to “wood brown,” sometimes grayish toward the base or over the entire surface, hirsute or strigose-hirsute, zonate; hymenial surface yellowish, “cinnamon-buff” to “wood brown,” or grayish, even.

Microscopic

In section 500μ to 700μ thick; tomental hyphae unbranched, with moderately thick to thick refractile walls, infrequently septate, 4.5μ to 8μ in diameter; cuticular layer yellowish-brown; context with two kinds of hyphae—one kind branching and septate, the other kind unbranched, thick-walled, with few or no septa, appearing most prominently in the subhymenial region, often with yellowish-brown granular contents, ending in the hymenium often as nonexserted pseudocystidia; basidioles with the tips obtuse or pointed but lacking aculeate protuberances, 2μ to 3μ in diameter; basidia 4-sterigmate, approximately 4.5μ in diameter, spores hyaline, cylindrical, smooth, 5μ to 8μ by 2μ to 3.5μ. Plate 16, A, shows the pseudocystidial apices of vascular hyphae, basidioles, and spores.

Discussion

Stereum hirsutum appears to be related very closely to both S. ostrea and S. complicatum. It is a variable species and has been divided into numerous varieties and forms. I have not made a critical study of these various subdivisions of the species, but have included all such names as synonyms. I do know that in some instances, as in Pilát’s form resupinata, nothing more fundamental than its position on the substrate is responsible for the particular appearance of the basidiocarp. The few so-called varieties and forms that I have studied did not seem worthy of being distinguished by a subspecific epithet. The type specimen of Thelephora rhicnopilus Lév. is in very poor condition, but appears to be S. hirsutum.

Habitat

On dead woody angiosperms, less commonly on gymnosperms.

Distribution

Apparently the most universally distributed species of Stereum. It is very common in Europe where S. ostrea is uncommon, but much less common than S. ostrea in the United States east of the Rocky Mountains. It apparently occurs in the Upper Mississippi Valley, but I am somewhat uncertain whether the resupinate specimens from Iowa that I have examined are this species. Burt (1920, p. 153) reports it from Wisconsin, Minnesota, and Missouri.

Miscellaneous Specimens Examined

BPI: Canada—Fort Wrigley (Baxter); Ethiopia—50 k. west of Addis Ababa (Archer); Fiji Islands—Viti Levu (A. C. Smith 4353); India—Kaudia (Koelz 21739),
26. Stereum ostrea

(Pls. 7, C and D; 10, F; 16, B and E)


Thelephora fasciata Schw., Naturf. Gesell. in Leipzig Schrift. I: 106. 1822 [type coll. ?, Salem, N. C. (Schweinitz) in BPI (Michener Herb.)]; T. versicolor Sw. ex Fr. β T. fasciata (Schw.) Fr., Elench. I: 175. 1828; Stereum fasciatum (Schw.) Fr., Epicr. 546. 1838; S. lobatum (Kunze ex Fr.) Fr. var. S. fasciatum (Schw.) Rick, Broteria (ser. 3) 9: 43. 1940.

Thelephora lobata Kunze ex Fr., Syst. Myc. 3 (Index): 188. 1832; Fr., Linnaea 5: 527. 1830; Kunze in Weigelt, Exs. 1827 [type, Surinam (Weigelt), in UPS]; Stereum lobatum (Kunze ex Fr.) Fr., Epicr. 547. 1838.

Thelephora boryana Fr. ex Fr., Syst. Myc. 3 (Index): 185. 1832; Fr., Linnaea 5: 528–529. 1830; Stereum boryanum (Fr. ex Fr.) Fr., Epicr. 547. 1838 [syn. S. lobatum sec. Berk. in Hook., Fl. Nov. Zelandiae, Part 2. 183. 1855].


Stereum sprucei Berk., Linn. Soc. London, Jour., Bot. 10: 331. 1869 [type, Cuba (Wright 552), in BPI; paratype, Brazil (Salle), in BPI].


Stereum hirsutum (Willd. ex Fr.) S. F. Gray forma rotundum Pilát, Hedwigia 70: 54. 1930 [type, Mnisek, Czechoslovakia (Pilát 159409), in PR].

Macroscopic

Basidiocarp lignicolous, coriaceous, petaliform, flabelliform, or hemiorbicula, laterally sessile or dimidiate, or effused-reflexed and with the resupinate part spreading along the lower surface of the substratum, or more rarely pseudoinfundibuliform and on the upper surface of the substratum, individual free pilei 1 to 6.5 cm. long and 0.5 to 7 cm. broad, often laterally coalescent with adjoining pilei, sometimes imbricate; upper surface “light buff” to “cinnamon-buff,” or “drab” to “pale mouse gray,” sometimes grayish toward the base and brownish toward the margin, tomentose, often with the bare “vinaceous-russet” or “hazel” upper surface showing through the tomentum in narrow to broad transverse zonations; hymenial surface “drab,” “avellaneous,” “light ochraceous-buff,” or “pinkish-buff” to “Verona brown,” even.

Microscopic

In section 500μ to 700μ (rarely 400μ to 800μ) thick; tomental hyphae hyaline to subhyaline, long, flexuous, unbranched, moderately thick walled, with very thin septa; cuticular layer yellowish-brown; context with two kinds of hyphae—one kind branching, septate, the other kind nonbranching, thick-walled, nonseptate, with hyaline or sometimes pale-brown contents, appearing in the hymenium as nonexserted pseudocystidia; basidioles numerous but inconspicuous in the hymenium, with their tips pointed or often with minute aculeate projections; basidia 4-sterigate, 22.5μ to 26.5μ by 4.5μ to 5.5μ; spores hyaline, cylindrical, smooth, 5μ to 7.5μ by 2μ to 3μ. Plate 16, B, shows a basidiole, a basidium, and spores; 16, E, shows the pseudocystidial apex of a vascular hypha, basidioles, a basidium, and spores.

Discussion

Stereum ostrea presents a very difficult taxonomic problem. Burt (1920), Pilát (1930b), Banerjee (1935), and Hendrickx (1948, p. 83) have considered it to be a synonym of S. fasciatum. Massee (1890), Cooke (1892), Höhnel and Litschauer (1907), Reinking (1920), and Boedijn (1940) have considered it to be synonymous with S. lobatum. In the National Fungus Collections is a broad representation of specimens classified under S. ostrea,
S. lobatum, S. fasciatum, S. concolor, and other related groupings. Upon examination of these specimens, it becomes apparent that they represent all intergradations of a single highly variable species. Since the earliest valid name for these is S. ostrea, it is necessary to adopt that name for this complex. In North America, S. fasciatum is a well-recognized entity differing in minor respects from the type of S. ostrea. In the tropics, especially, S. lobatum is well-recognized and in its typical expression has a slightly different appearance than the type of S. ostrea. In North America, however, S. fasciatum and S. lobatum intergrade. At present, it is very difficult to reach a satisfactory judgment concerning varieties and forms. For that reason, no attempt is made to recognize subspecific entities. Plate 7, C, shows the habit of the S. fasciatum expression of S. ostrea. Plate 7, D, shows the habit of the temperate S. lobatum expression of S. ostrea.

Stereum ostrea is distinguished from S. complicatum by being larger, usually thicker, and not radiately plicate, by the hymenium usually not being so ruddy as that of S. complicatum, and by the thick-walled vascular hyphae not having their contents colored so often as in S. complicatum. Aculeate-tipped basidioles are reasonably common among the basidia of S. ostrea, but are lacking in S. complicatum. S. hirsutum, another species often confused with S. ostrea, is often somewhat radially plicate, has a more hirsute tomentum, usually has more colored vascular hyphae in the context and hymenium, and apparently lacks the laterally sessile forms so common in S. ostrea but is almost always effused-reflexed.

**Habitat**

On dead woody angiosperms.

**Distribution**

Cosmopolitan. It rivals Stereum complicatum in abundance in the Upper Mississippi Valley.

**Miscellaneous Specimens Examined**

BPI: California—Klamath Natl. Forest (Hedgecock 1694); Indiana—Crawfordsville (Bechtel); Kansas—Manhattan (Rogerson and Shaffer R 3483); Louisiana—Bogalussa (Hedgecock 802, 804, 810); Maryland—Beltsville (Davidson and Lentz 12), Bowie (Lentz 3, 9, 10), Takoma Park (Hedgecock 1704); Michigan—Cross Village (Stevenson); Mississippi—Sandy Hook (Hedgecock 801); New Mexico—Coronado Natl. Forest (Hedgecock 803), Sandia Mts. (Hedgecock 800); Texas—Boerne (Hedgecock 805); Mexico—San Luis Potosi (E & PQ 65024); all as Stereum fasciatum; Kansas—Manhattan (Rogerson R 3479); Louisiana—Bogalussa (Hedgecock 811, 813); Maryland—Bowie (Lentz 5, 30); Mississippi—Sandy Hook (Hedgecock 806); Texas—Little Thicket Nature Sanctuary (Mrs. Miner); Argentina—Querbrada del Diablo (Killip 39623); Fiji Islands—Viti Levu (A. C. Smith 4013, 4349, 4394, 4705, 5547, 5821); India—Bona (Koelz 20900); all as S. lobatum; Philippine Islands—Mt. Maquiling (Patouillard 741, as S. boryanum). ILL: Illinois—Bluff Lake (Seymour ILL 2048), Camp Point (Seymour ILL 27633, ILL 27634), Cobden (Cinton), Grafton (Seymour ILL 6302), Hudson (Seymour ILL 27632), Mahomet (Gibbs and Clokey ILL 27665), Minert (Clinton ILL 27622); Seymour ILL 27625), Monticello (Seymour and Waite ILL 27630, ILL 27635); Oregon (Waite ILL 7551), Twin Grove (Seymour ILL 2762), Villa Ridge (Seymour ILL 4550); all as S. versicolor. SUI: Iowa—Atalissa (Brasfield SUI 1743), Hills (Martin 1923), Iowa City (McGuire SUI 1745; Martin 89, 3959, 5141, 6523, 6524, 6525, 6526, 6527; Himmel SUI 1091; Baird SUI 1289; Emmons SUI 1097, SUI 1259, 832, Aug. 22 in 1946), North Liberty (Martin 1096), Pine Hollow (Martin 6521), Tiffin (Martin 1255), Turkey Creek (Martin 1929); Panama Canal Zone—Fort Sherman (Martin 6051); Colombia—Hacienda
Cincinnati (Martin 3349); all as S. fasciatum; Iowa—Cedar Valley (SUI 1263), Homestead (SUI 1963); China—Hainan (SUI 2319); Sumatra—Marbau (Toroes 369); all as S. lobatum.

**Exsiccata Examined**

Bartholomew, Fungi Columbiani 2590, 2884, both as Stereum versicolor, 2985, 3985, 4291, 4986, 5091, all as S. fasciatum; Ellis, Fungi Nova-Caesareenses 6, as S. purpureum; Ellis, N. Am. Fungi 514a, as S. versicolor, 514d, as S. versicolor var. petaliforme; Ellis and Everhart, N. Am. Fungi 1714, as S. purpureum; Ellis and Everhart, Fungi Columbiani 306, as S. versicolor; Lundell and Nannfeldt, Fungi Exs. Suecici 1336a, 1336b, both as S. fasciatum; Rabenhorst-Pazschke, Fungi Europaei et Extraeuropaei 4348, as S. fasciatum; Rabenhorst-Winter, Fungi Europaei 2934, as S. versicolor; Ravenel, Fungi Americani 220, as S. versicolor, 721, as S. fasciatum.

**Illustrations**

Blume and Nees von Esenbeck (1826, pl. 2, figs. 1 and 2); Burt (1920, text fig. 23; pl. 5, figs. 43–46); Coker (1921, pl. 22; pl 35, fig. 4); Emmons (1927, pl. 2, fig. 8); Graham (1944, pl. 5, fig. 13); Hennings (1897, text fig. 69, A and B); Henry (1949, pl. 1, fig. 1); Istvanfi (1896, pl. 158, fig. 3); Killermann (1928, text fig. 98, A and B); Lloyd (1925, pl. 323, fig. 3098); Overholts (1939, pl. 14, fig. 1; pl. 18, fig. 29); Pilát (1930a, t. 16, fig. 4); Talbot (1954, fig. 10).
Literature Cited

BANERJEE, S.

BATSCH, A. J. G. C.
1786. ELENCHI FUNGORUM CONTINUATIO PRIMA. 280 pp., illus. Halae.

BEAUMONT, A.

BERKELEY, G. H.
1930. STUDIES IN FRUIT DISEASES II. DISEASES OF PLUMS AND THEIR CONTROL. Canada Dept. Agr. Pam. (n.s.) 119, 12 pp., illus.

BERKELEY, M. J.
1873. NOTICES OF NORTH AMERICAN FUNGI. Grevillea 1: 161-166.
1875. NOTICES OF NORTH AMERICAN FUNGI. Grevillea 4: 1-16.

BERTOLINI, A.

BESSEY, C. E.

BIER, J. E.

BIJL, P. A. VAN DER.

BLUME, C., and NEES VON ESENBECK, T. F. L.

BODDIN, K. B.

BOURJOT, H., and GALZIN, A.

BOYCE, J. S.

BRESADOLA, J.


Brooks, F. T.
———
———
——— and Bailey, M. A.
——— and Brenchley, G. H.
——— and Brenchley, G. H.
——— and Brenchley, G. H.
——— and Moore, W. C.
——— and Moore, W. C.
——— and Storey, H. H.
Brown, H. P.
1915. a timber rot accompanying Hymenochaete rubiginosa (Schrad.) Lév. Mycologia 7: 1-20, illus.
Burt, E. A.
———
———
Butler, E. J.
1918. fungi and disease in plants. 547 pp., illus. Calcutta.
Campbell, W. A., and Davidson, R. W.
Cleland, J. B.
1934-35. toadstools and mushrooms and other larger fungi of south australia. pts. 1-2, 362 pp., illus. Adelaide.
Clements, F. E., and shear, C. L.
1931. the genera of fungi. 496 pp., illus. New York.
Coker, W. C.
Cooke, M. C.
1879. on peniophora. Grevillea 8: 17-21, illus.
———
1892. handbook of australian fungi. 457 pp., illus. London.
———
1906. fungoid pests of cultivated plants. 278 pp., illus. London.
Coombe, J.
STEREUM AND ALLIED GENERA

Davidson, R. W.

— Campbell, W. A., and Lorenz, R. C.
1941. Association of Stereum murrayi with heart rot and cankers of living hardwoods. Phytopathology 31: 82-87, illus.

— Campbell, W. A., and Vaughn, D. B.

— Lombard, F. F., and Hirt, R. R.

Campbell, W. A., and Lorenz, R. C.
1941. Association of Stereum Murrayi with heart rot and cankers of living hardwoods. Phytopathology 31: 82-87, illus.

Campbell, W. A., and Vaughn, D. B.

Lombard, F. F., and Hirt, R. R.

Campbell, W. A., and Vaughn, D. B.

Eriksson, J.

Exell, A. W.

Fairman, C. E.

Freeman, E. M.
1905. Minnesota plant diseases. 432 pp., illus. Saint Paul.

Fries, E. M.
1821. Systema mycologicum. V. 1, 520 pp. Lundae.

Gardner, P. D.

Geniaux, C. M., and Kuenzel, J. G.

Gillet, C. C.

Gillot, X.

Hard, M. E. 1908. The mushroom, edible and otherwise. 609 pp., illus. Columbus.


Lloyd, C. G.


LONG, W. H.


Lundell, S., and Nannfeldt, J. A.


Maheu, J.


MAIRE, R.


MAIZE, E. R., SCHEFFER, T. C., and GREENWALD, H. P.


MASON, E. W.


MASSEE, G.


MIELKE, J. L., AND DAVIDSON, R. W.


MÖLLER, F. H.


OVERHOLTS, L. O.


Sprague, R., and Hord, H. H. V.

Sumstine, D. R.
1941. NOTES ON SOME NEW OR INTERESTING FUNGI. Mycologia 33: 17-22.

Sydow, H., and Sydow, P.

Talbot, P. H. B.

Teng, S. C.

Teodoro, N. G.

Tubef, K. F. von, and Smith, W. G.
1897. DISEASES OF PLANTS INDUCED BY CRYPTOGRAMIC PARASITES. 598 pp., illus. London, New York, and Bombay.

Velenovsky, J.
1922. CESKE Houby. Pts. 4-5. illus. Praze.

Wakefield, E. M., and Dennis, R. W. G.
1950. COMMON BRITISH FUNGI. 290 pp., illus. London.

Ward, H. M.

Wehmeyer, L. E.

Weir, J. R.

Willdenow, C. L.
1787. FLORAE BEROLINENSIS PRODROMUS. 439 pp., illus. Berolini.

Zeller, S. M.
Glossary

Although an attempt has been made to utilize standard terms in this study, it has been desirable also to follow established usage of authors who have previously studied the Thelephoraceae. Thus, although most of the terms in the glossary are universally applicable, some others are used in a special sense differing from ordinary usage.

ACANTHOPHYSIS (Bottle-brush paraphysis).—A sterile hymenial hyphal end that has a number of tinelike diverticules protruding from the surface.

BASIDIOCARP.—The entire multicellular hyphal association, usually in the form of a prosenchymatous to pseudoparenchymatous body, that bears basidia and basidiospores.

BASIDIOLE.—A basidiumlike hymenial element that lacks sterigmata either because it is young or because it is permanently sterile.

CARTILAGINOUS.—Having a tough, gristly consistency.

CESPITOSE-IMBRICATE.—(Of basidiocarps). With the edges overlapping in the manner of shingles.

CLAVATE.—Club-shaped, with the diameter slightly but rather regularly increasing from base to apex.

CONTEXT.—The hyphal mass occupying the region between the superior surface and the subhymenium in basidiocarps lacking lamellae, pores, or spines, and also the similar mass in the cap but not in the lamellae, pores, or spines of basidiocarps having the latter structures.

CORIACEOUS.—Having a leathery consistency.

CUTICULAR LAYER.—A noticeably compacted region constituting the differentiated superior surface layer of some basidiocarps.

CYSTIDIOLE.—A simple hymenial cell of approximately the same diameter as the basidium but remaining sterile and protruding beyond the hymenial surface.

CYSTIDIUM.—An enlarged, conical, prismatic or cylindrical sterile end of a nonvascular hypha, characteristically hyaline or pale-colored but sometimes brown and distinguished then from a seta by origin, form, or failure to darken in potassium hydroxide solution, borne usually in the hymenium but sometimes remaining submerged or appearing at other surfaces of the basidiocarp.

DENDROPHYSIS.—A sterile hyphal end in the context or hymenium characterized by irregular treelike branching.

DIMIDIATE.—With a small part of the basidiocarp resupinate and the greater part bent away from the substratum.

EFFUSED-REFLEXED.—With part of the basidiocarp resupinate and a smaller part bent away from the substratum.

EXserted.—Protruding beyond the general level of the hymenial surface.

FLABELLIFORM.—Fan-shaped.

GLOEO CySTIDIUM.—A sterile hyphal end considerably modified for either a short or a relatively long distance from the apex so that it is broader than the hypha from which it originates, thin-walled, characteristically nonseptate, usually of irregular form, often long and tortuous, with the base broader than the apex, usually bearing highly refractile hyaline or yellowish contents, originating in the context, trama, or subhymenium as a rule, and seldom protruding beyond the hymenial surface.

HYMENIUM.—A more or less continuous layer constituted by hyphal ends oriented vertically to the surface at which they occur and of which many or all may bear basidiospores.

IMBRICATE.—Overlying one another as a series of shelves.

INFUNDIBULIFORM.—Funnel-shaped.

LATERALLY sessile.—Attached directly by one edge and lacking a narrowed point of attachment, stipe, or any other intermediary structure.
STEREUM AND ALLIED GENERA

Ligneous.—Woody.
Lignicolous.—Living on wood.
Lumen.—The central cavity of a hypha or of its cells.
Merismatoid.—With the basidiocarp erect and with a much-branched apex, and thus having the appearance of a compound structure.
Petaliform.—Having the form of a petal. Similar to flabelliform but not as broad.
Pileocystidium.—A cystidium borne at the superior surface of the basidiocarp.
Plicate.—Folded in pleats similar to those of a fan.
Pseudocystidium.—The hymenial end of a vascular hypha.
Pseudodendrophysis.—An ordinary unmodified hypha of the hymenium with greatly foreshortened branching and thus superficially resembling a dendrophysis.
Reflexed.—Bent away from the substratum.
Resupinate.—With none of the morphologically superior surface of the basidiocarp free from the substratum, being entirely appressed, and thus with the hymenium facing away from the substratum.
Seta.—A brown, spinelike, sterile hyphal end appearing in various parts of xanthochroic basidiocarps. It never is very conspicuously incrusted, usually is thick-walled, and darkens conspicuously when moistened with potassium hydroxide solution.
Stratose.—With the thickened hymenial region having several definite layers, presumably representing (in addition to the present functioning basidial layer) previous hymenial surfaces each of which, in turn, has been overgrown by a more recent layer.
Sulcate.—Grooved or furrowed.
Terrestrial.—Growing on the ground.
Umbo.—As the term is used among the thelephores, a little knob or nipple of mycelium that originates from the substratum, gives rise to the sporocarp, and thereafter remains the point of attachment of the upper surface of the sporocarp with the substratum. This method of attachment is known as being umbonate-affixed.
Vascular hypha.—A tubelike hypha that is nonseptate or sparingly septate and which also is conspicuous because of its large diameter or distinctive contents or both.
Vesicle.—An inflated, pyriform to subglobose, bladderlike sterile hyphal end that usually is situated in the context or trama, or more rarely in the hymenium. It may bear hyaline or yellowish and refractile contents, or may appear empty.
### Index of Fungus Names

In the indexes to genera and species, the names of the principal recognized entities are printed in boldface. Those appearing in formal lists of synonymy are printed in italics. All others are printed in standard type. Page numbers referring to formal treatment of principal entities are in boldface. Those referring to names in formal lists of synonymy are in italics. All others are in standard type.

### Index to Genera

<table>
<thead>
<tr>
<th>Page</th>
<th>Malachodermum (Stereum subgen. Malachoder- mum)</th>
<th>18, 18</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>Peniophora...........................................</td>
<td>1, 15, 16, 18, 25, 37, 34, 45</td>
</tr>
<tr>
<td>23</td>
<td>Peniophora sect. Cystoideae....................</td>
<td>16, 25</td>
</tr>
<tr>
<td>10</td>
<td>Podoscypha...........................................</td>
<td>10</td>
</tr>
<tr>
<td>24</td>
<td>Stereum.............................................</td>
<td>24</td>
</tr>
<tr>
<td>24</td>
<td>Stereophorina.......................................</td>
<td>24</td>
</tr>
<tr>
<td>32</td>
<td>Stereogloeocystidium.............................</td>
<td>24</td>
</tr>
<tr>
<td>56</td>
<td>Stereogloeocystidium (Stereum subgen. Stereo- gloeocystidium)</td>
<td>24</td>
</tr>
<tr>
<td>31</td>
<td>Stereogloeocystidium (Stereum subgen. Stereo- gloeocystidium)</td>
<td>24</td>
</tr>
<tr>
<td>43</td>
<td>Stereogloeocystidium.............................</td>
<td>24</td>
</tr>
</tbody>
</table>

### Index to Species

<table>
<thead>
<tr>
<th>Page</th>
<th>balansae (Stereum)...............................</th>
<th>48</th>
</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>balansae (Stereum balansae forma reflexum)</td>
<td>48</td>
</tr>
<tr>
<td>43</td>
<td>berkeleyi (Peniophora)..........................</td>
<td>43</td>
</tr>
<tr>
<td>40</td>
<td>betoloni (Stereum)...............................</td>
<td>40</td>
</tr>
<tr>
<td>24</td>
<td>bicol (Lloydella).................................</td>
<td>19, 19</td>
</tr>
<tr>
<td>19</td>
<td>bicol (Lloydella).................................</td>
<td>19, 20</td>
</tr>
<tr>
<td>18, 19</td>
<td>bicol (Thelephora).............................</td>
<td>18, 19</td>
</tr>
<tr>
<td>36</td>
<td>bironatum (Stereum).............................</td>
<td>36</td>
</tr>
<tr>
<td>48</td>
<td>bunaeris (Hymenochea)...........................</td>
<td>48</td>
</tr>
<tr>
<td>24</td>
<td>bunaeris (Hymenochea)...........................</td>
<td>24</td>
</tr>
<tr>
<td>24</td>
<td>bunaeris (Hymenochea)...........................</td>
<td>24</td>
</tr>
<tr>
<td>33</td>
<td>ambigus (Tricholoma).........................</td>
<td>33</td>
</tr>
<tr>
<td>65</td>
<td>ambigus (Tricholoma)...........................</td>
<td>65</td>
</tr>
<tr>
<td>33</td>
<td>ambigus (Xerocomus)............................</td>
<td>33</td>
</tr>
<tr>
<td>33</td>
<td>amoenum (Stereum)................................</td>
<td>33</td>
</tr>
<tr>
<td>55</td>
<td>spectabilis (Stereum spectabilis var. specta- bila)</td>
<td>55</td>
</tr>
<tr>
<td>23</td>
<td>anthochaera (Thelephora)......................</td>
<td>23</td>
</tr>
<tr>
<td>53</td>
<td>applanatum (Stereum)...........................</td>
<td>53</td>
</tr>
<tr>
<td>56</td>
<td>areolata (Stereum areolata forma areolata)</td>
<td>56</td>
</tr>
<tr>
<td>43</td>
<td>areolata (Corticium)............................</td>
<td>43</td>
</tr>
<tr>
<td>33</td>
<td>atkinsonii (Peniophora).......................</td>
<td>33</td>
</tr>
<tr>
<td>12</td>
<td>atrocominata (Stereum purpureum forma atro- cominata)</td>
<td>12</td>
</tr>
<tr>
<td>12</td>
<td>atrocominata (Stereum purpureum var. atro- cominata)</td>
<td>12</td>
</tr>
<tr>
<td>62</td>
<td>aurantiacum (Stereum)...........................</td>
<td>62</td>
</tr>
<tr>
<td>51</td>
<td>aurantiacum (Stereum aurantiacum)............</td>
<td>51</td>
</tr>
<tr>
<td>58</td>
<td>azonum (Stereum)................................</td>
<td>58</td>
</tr>
<tr>
<td>58</td>
<td>badium (Stereum hirsutum forma badium)........</td>
<td>58</td>
</tr>
</tbody>
</table>

71
<table>
<thead>
<tr>
<th>INDEX</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>occidentale (Stereum)</td>
<td>52</td>
</tr>
<tr>
<td>occidentalis (Lloydella)</td>
<td>44</td>
</tr>
<tr>
<td>occidentalis (Stereum)</td>
<td>43</td>
</tr>
<tr>
<td>ochracea (Thelephora)</td>
<td>61</td>
</tr>
<tr>
<td>ochracea (Thelephora ochracea β cassior)</td>
<td>61</td>
</tr>
<tr>
<td>ochraceo-cassio (Thelephora)</td>
<td>67</td>
</tr>
<tr>
<td>ochraceum (Thelephora)</td>
<td>65</td>
</tr>
<tr>
<td>ochraceum (Stereum hirsutum var. S. ochraceum)</td>
<td>65</td>
</tr>
<tr>
<td>ochraceum (Thelephora ochroleuca subsp. T. sericea)</td>
<td>65</td>
</tr>
<tr>
<td>ostrea (Stereum)</td>
<td>3</td>
</tr>
<tr>
<td>ostrea (Stereum ostrea forma violacea)</td>
<td>53</td>
</tr>
<tr>
<td>ostrea (Stereum ostrea var. concolor)</td>
<td>57</td>
</tr>
<tr>
<td>ostrea (Thelephora)</td>
<td>57</td>
</tr>
<tr>
<td>pantorum (Stereum)</td>
<td>21, 22</td>
</tr>
<tr>
<td>papyprium (Stereum)</td>
<td>32</td>
</tr>
<tr>
<td>pas pucupera (Hymenochea)</td>
<td>47</td>
</tr>
<tr>
<td>pas pucupera (Fenitophora)</td>
<td>76</td>
</tr>
<tr>
<td>perlatum (Stereum)</td>
<td>67</td>
</tr>
<tr>
<td>personianum (Stereum)</td>
<td>55</td>
</tr>
<tr>
<td>petaliforme (Stereum versicolor var. petaliforme)</td>
<td>60</td>
</tr>
<tr>
<td>pezizoides (Tubularecula)</td>
<td>57</td>
</tr>
<tr>
<td>pezizoides (Corticium)</td>
<td>56</td>
</tr>
</tbody>
</table>
| pilosulcicum (Stereum hirsutum forma pilosulci-
| culum) | 54 |
| pilosulcicum (Stereum hirsutum var. pilosulu-
| culum) | 54 |
| pinae (Thelephora purpurea γ pinae) | 41 |
| pinites (Stereum) | 41 |
| plicatum (Stereum) | 58 |
| plicatum (Stereum spadiceum var. plicatum) | 59 |
| polonianum (Thelephora) | 15 |
| polygonia (Thelephora) | 15 |
| princeps (Stereum) | 37 |
| pulchella (Thelephora hirsuta β pulchella) | 64 |
| pulchella (Stereum hirsutum var. pulchellum) | 64 |
| pulverulenta (Thelephora) | 40 |
| pulvulinentum (Stereum) | 39, 40 |
| purpurea (Remaniellia) | 51, 22 |
| purpurea (Hymenochea) | 41 |
| purpurea (Remaniellia) | 41 |
| purpurea (Fenitophora) | 21 |
| purpurea (Stereum crassum var. purpurea) | 21 |
| purpurea (Thelephora) | 41, 43 |
| purpurea (Thelephora purpurea β betulina) | 41 |
| purpurea (Thelephora purpurea var. disciformis) | 41 |
| purpurea (Thelephora purpurea var. exspinosus) | 41 |
| purpurea (Thelephora purpurea γ pinae) | 41 |
| purpureum (Stereum) | 1, 2, 4, 9, 41, 42, 60 |
| purpureum (Stereum purpureum forma atrom- 
| ginaturn) | 48 |
| purpureum (Stereum purpureum var. atrom- 
| ginaturn) | 48 |
| purpureum (Stereum purpureum var. *S. liliaceurn*) | 48 |
| purpureum (Stereum purpureum forma resu- 
| pinata) | 43 |
| purpureum (Stereum purpureum var. violaceum) | 41 |
| ramaleis (Stereum) | 3, 30, 51 |
| ramealis (Stereum (Malachodermum) roso-
| carneum var. ramealis) | 18 |
| ramealis (Thelephora) | 80 |
| ramealis (Thelephora ramealis) | 80 |
| ramealis (Thelephora ramealis forma e. ramealis) | 80 |
| ramosa (Stereum hirsutum forma ramosa) | 54 |
| reflexa (Arzileuracia) | 55 |
| reflexa (Stereum) | 55 |
| reflexa (Stereum spadiceum forma reflexa) | 55 |
| reflexa (Stereum tuberculatum) | 55 |
| reyniera (Corticiellia) | 55 |
| resupinata (Stereum gausapatum forma resu- 
| pinata) | 58 |
| resupinata (Stereum hirsutum forma resupi- 
| nata) | 58 |
| rigens (Stereum) | 48 |
| rigens (Stereum sanguinolentum forma rigens) | 48 |
| rigens (Stereum sanguinolentum var. rigens) | 48 |
| rigens (Stereum sanguinolentum var. *S. rigens*) | 48 |
| roso-carneum (Thelephora) | 21, 22 |
| roso-carneum (Lactilium) | 19, 22, 23 |
| roso-carneum (Stereum (Malachodermum) roso-
| carneum) | 22 |
| roso-carneum (Stereum (Malachodermum) roso-
| carneum var. ramaleis) | 18 |
| roseus (Alneuridiscus) | 22 |
| rufa (Cryptochea) | 9, 15, 16, 17 |
| rufa (Thelephora) | 15, 16, 17 |
| rufun-marginata (Thelephora) | 15, 17 |
| rufum (Stereum) | 15, 16, 17 |
| rufus (Xerocarpus) | 16 |
| rugosulcicum (Stereum) | 41, 42, 43 |
| rugosum (Stereum) | 57, 51, 53 |
| rugosum (Stereum rupinvar. aurantium) | 38 |
| sanguinolentum (Thelephora) | 48 |
| sanguinolentum (Thelephora sarricia sanguinolentum) | 48 |
| sanguinolentum (Stereum) | 1, 2, 3, 4, 10, 26, 48, 49, 53 |
| sanguinolentum (Stereum sanguinolentum forma 
| alpina) | 48 |
| sanguinolentum (Stereum sanguinolentum forma 
| rigens) | 48 |
| sanguinolentum (Stereum sanguinolentum var. 
| rigens) | 48 |
| scabrieta (Hymenochea) | 20, 22 |
| scabrieta (Lloydella) | 20 |
| scabrieta (Remaniellia) | 20 |
| sendaiense (Stereum) | 22 |
| septum (Stereum) | 36, 37 |
| sericea (Thelephora) | 18 |
| sericea (Thelephora ochroleuca subsp. T. sericea) | 18 |
| sericea (Thelephora sarricia sanguinolentum) | 18 |
| sericeum (Stereum) | 45, 46, 47 |
| selsor (Stereum hirsutum forma selsor) | 50 |
| simulans (Hymenochea) | 34 |
| simuana (Thelephora) | 36 |
| siparium (Corticiellia) | 47 |
| siparium (Stereum) | 47 |
| spadiceum (Stereum) | 58, 53 |
| spadiceum (Stereum spadiceum β lacerum) | 58 |
| spadiceum (Stereum spadiceum var. plicatum) | 58 |
| sprucei (Stereum) | 58 |
| stefidis (Thelephora) | 29, 23 |
| striata (Lloydella) | 91, 45 |
| striata (Thelephora) | 91, 45 |
| striata (Thelephora crispa subsp. T. striata) | 45 |
| striata (Thelephora crispa subsp. T. striata) | 45 |
| striatulum (Stereum hirsutum forma striato- 
| falicium) | 54 |
| striatulum (Stereum) | 9, 26, 32, 45, 46, 51 |
| subpaleata (Lloydella) | 36 |
| subpaleatum (Stereum) | 36 |
| subpaleatum (Corticiellia) | 37 |
| subzonata (Thelephora) | 54 |
| subzonata (Corticiellia) | 54 |
| supina (Lloydella) | 54 |
| sulcatum (Stereum) | 2, 4, 8, 25, 38, 39 |
| sullivanti (Thelephora) | 18 |
| tenuissimum (Stereum (Malachodermum) nu- 
| nissimum) | 18 |
| tjilobenias (Hymenochea) | 36 |
| tuberculosum (Stereum) | 39, 40, 41 |
| tuberculosum (Stereum murrati forma tuberculo-
| sum) | 39, 40 |
| tuberculosum (Stereum murrati var. tuberculo-
| sum) | 39 |
| tuberculosum (Stereum murrati var. tuberculo-
<p>| sum) | 41 |
| turpilum (Stereum) | 44 |
| umbria (Peniophoraceae) | 44 |
| umbria (Stereum) | 5, 20, 22 |
| undulata (Cotylidia) | 8, 11, 15, 14 |
| undulata (Cotylidia var. C.) | 13 |
| undulata (Podoscypha) | 13, 14, 15 |
| undulata (Stereum) | 13, 14 |
| undulatis (Corticiellia) | 11, 13 |</p>
<table>
<thead>
<tr>
<th>Page</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>varicolor (Stereum)</td>
<td>65</td>
</tr>
<tr>
<td>versicolor (Stereum)</td>
<td>53, 59, 60</td>
</tr>
<tr>
<td>versicolor (Stereum versicolor var. S. illyprium)</td>
<td>58</td>
</tr>
<tr>
<td>versicolor (Stereum versicolor var. petaliforme)</td>
<td>60</td>
</tr>
<tr>
<td>versicolor (Thelephora versicolor var. caucasia)</td>
<td>57</td>
</tr>
<tr>
<td>versicolor (Thelephora versicolor &amp; T. fasciata)</td>
<td>57</td>
</tr>
<tr>
<td>versiforme (Stereum)</td>
<td>5, 9, 23, 25, 27, 28, 29, 30</td>
</tr>
<tr>
<td>versiforme (Stereum versiforme forma erumpens)</td>
<td>29</td>
</tr>
<tr>
<td>versiformis (Peniophora)</td>
<td>27</td>
</tr>
<tr>
<td>vinosa (Hymenochaete (Veluticeps) vinosa)</td>
<td>20</td>
</tr>
<tr>
<td>vinosa (Lloydella)</td>
<td>20, 22</td>
</tr>
<tr>
<td>vinosa (Peniophora)</td>
<td>20</td>
</tr>
<tr>
<td>vinosa (Thelephora)</td>
<td>20</td>
</tr>
<tr>
<td>violaceum (Stereum purpureum var. violaceum)</td>
<td>41</td>
</tr>
<tr>
<td>vittlo (Stereum)</td>
<td>18</td>
</tr>
<tr>
<td>vortiosa (Thelephora)</td>
<td>41</td>
</tr>
<tr>
<td>vorticosum (Stereum)</td>
<td>41</td>
</tr>
<tr>
<td>willegi (Stereum)</td>
<td>18, 12</td>
</tr>
<tr>
<td>willegi (Thelephora)</td>
<td>18</td>
</tr>
<tr>
<td>yao-chanica (Licentia)</td>
<td>44</td>
</tr>
</tbody>
</table>
Habit: A, Cotilydia aculeata. × 1; B, C. diaphana. × 1; C, C. undulata. × 2.25; D, C. undulata. × 1; E, Cryptochaete rufa. × 1.
Habit: A, Laxizetum bicolor; B, L. crassum; C and D, L. roseo-carneum; E, Stereum albobadium; F, S. versiforme. All \( \times 1 \).
Habit: A, Stereum erumpens; B, S. radiatum; C, S. abietinum; D, S. chailletii. All × 1.
Habit: A, Stereum frustulatum; B, S. subpileatum; C, S. sulcatum; D, S. murrai. All × 1.
Habit: A and B, Stereum purpureum; C, S. cinerascens. All × 1.
Habit: A, Stereum striatum; B, S. ochraceo-flavum; C, S. sanguinolentum; D and E, S. complicatum. All \( \times 1 \).
Habit: A, Stereum gausapatum; B, S. hirsutum; C and D, S. ostrea. All × 1.
Vertical sections through basidiocarps: A, Cotylydia aculeata. × 90; B, C. diaphana × 90; C, Cryptochaete rufa. × 75; D, Laxitextum bicolor. × 68; E, L. crassum × 66; F, L. roseo-carneum. × 83; G, Stereum versiforme. × 90.
Vertical sections through basidiocarps: A, Stereum erumpens. × 83; B, S. radiatum. × 92; C, S. chailletii. × 65; D, S. murratii. × 67; E, S. sulcatum. × 65; F, S. murratii. × 65; G, S. purpureum. × 67.
Camera lucida drawings: A, Cryptochaete rufa; B, Laxitectum roseo-carneum; C, L. crassum; D, Stereum sulcatum. All × 1,000.
Camera lucida drawings: A, Cotelydia diaphana; B, C. undulata; C, Stereum chailletii; D, S. striatum; E, S. radiatum. All $\times 1,000$. 
Camera lucida drawings: A, Cotilydia aculeata; B, Stereum cinerascens; C, S. frustulatum; D, C. undulata; E, S. abietinum. All $\times 1,000$. 
Camera lucida drawings: A, Stereum versiforme; B, S. erumpens; C, S. murrattii; D, S. alboadum. All × 1,000.
Camera lucida drawings: A, Laxitextum bicolor; B, Stereum subpileatum; C, S. purpureum; D, S. gausapatum. All $\times 1,000$. 
Camera lucida drawings: A, Stereum hirsutum; B, S. ostrea; C, S. sanguinolentum; D, S. complicatum; E, S. ostrea; F, S. ochraceo-flavum. All $\times$ 1,000.