

## STUDIES IN THE GENERA IRPEX AND STECCHERINUM

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(With 34 Text-figures and Plate 40)

In the present paper *Irpex* is maintained as a monotypic genus, while *Steccherinum* is accepted with 17 species. Of these *S. ethiopicum*, *S. galeritum*, *S. gilvum*, *S. lanestri*, and *S. willisii* are described as new species, *S. hydneum* is proposed as a new combination.

A considerable proportion of the paper is devoted to all the species (and a few subspecific taxa) that have been wrongly described in or transferred to *Irpex* and *Steccherinum*. Some of the specific epithets are transferred to other genera, such as *Beenakia* (p. 555), *Climacodon* (p. 546), *Dentipellis* (p. 551, 558) and *Hyphodontia* (p. 567).

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## INTRODUCTION

In the past the genera *Irpex* and *Steccherinum* have been given but scant attention except that both served as convenient repositories for species that were not wanted or seemed out of place elsewhere. With the generic boundaries so little fixed it is not surprising that in the course of time both attracted a considerable number of species. Although some moderation is noticeable in recent times, it is certainly true that there exist only the haziest of ideas about the exact number of species in either genus.

Hennings in 'Die natürlichen Pflanzenfamilien' (1898: 149) held the opinion that *Irpex* comprized "Gegen 70 bekannte Arten, von denen etwa 12 in Deutschland und Österreich vorkommen." In the second edition of this serial work Killermann (1928: 166) stated that the same genus contained "Etwa 50 Arten, einige in Mitteleuropa." This is also the number of species quoted by Ainsworth & Bisby (1943: 149). Gradually, however, it began to dawn that *Irpex* was not so large a genus after all, and the number of species accepted by Ainsworth (1971: 294) was subsequently reduced to 20.

Which are the criteria that mark a species as a member of *Irpex*? To answer this question it appeared necessary to analyse the type species, *Irpex lacteus*, and in order to carry out the analysis it was necessary to indicate a neotype for this species. Only then was it possible to decide whether or not all the species that had been referred to *Irpex* really belonged to this genus.

The situation in *Steccherinum* was somewhat different in that here, apart from analyzing all the species that had been wrongly placed, the literature had to be searched for possibly unrecognized members. To judge the pertinence of a species from an inadequate description is not easy. On the other hand, the indiscriminate borrowing of specimens for study is impossible. As a result the types of perhaps too many species were asked on loan that turned out to have no relation at all to *Steccherinum*, while most probably some unrecognized members of the genus still remain in their covers, uninvestigated.

The aim of this work has been mainly to clear the table of all the clutter mixed up with and overgrowing the few species which are true members of *Irpex* and *Steccherinum*. It may be regarded as highly unsatisfactory that in the process so many specific epithets landed in a vacuum, for they were not guided to their pertinent generic names. This is unfortunate but unavoidable.

The word "Studies" in the title of the present paper has been chosen intentionally, for the work is not a monograph. Too many of the collections seen have been left unidentified. It is inconceivable that these should represent undescribed species. Rather must it be assumed that they are unrecognized forms of known species, concealing their identity under a disguise that will remain impenetrable as long as the extent of the variability is not understood. It is felt that an author, recognizing his limitations, should leave it to his successor to try other keys to open locked doors.

I am deeply indebted to the directors and/or keepers of the following herbaria indicated by the usual symbols for the loan of type material or other valuable col-

lections: Amsterdam (AMD), Auckland (PDD), Beltsville (BPI), Cambridge, U.S.A. (FH), Chapel Hill (NCU), Firenze (FI), Gainesville (FLAS), Genève (G), Helsinki (H), Ithaca (CUP), Kew (K), København (C and CP), La Plata (LPS), Leningrad (LE), Montpellier (MPU), München (M), New York (NY), Padova (PAD), Paris (PC), Philadelphia (PH), Pôrto Alegre (PACA), Praha (PR), Providence (BRU), Stockholm (S), Tokyo (TNS), Uppsala (UPS), Zürich (Z). Grateful acknowledgment is also made to Dr. G. Bohus (Budapest), Mrs. M. Tortić (Zagreb), and Dr. G. Malençon (Valognes) for various information. Special thanks are given to Dr. O. Fidalgo (São Paulo) for generously providing Xerox copies of some of Rick's rare publications.

## GENERAL PART

*Macroscopic characters.* — Most of the macroscopically visible characters do not require special discussion. Their nature will be apparent from the specific descriptions. It is necessary, however, to point out their great variability, depending on age, environmental conditions, and sometimes the position of the basidiome relative to the substratum. Some little used characters, like the aspect of the ad-hymenial surface (i.e. the surface from which originate the spines) and of the sides of the spines, have been resorted to in an attempt to distinguish the species more easily but here again the changes that develop with age often introduce further difficulties. It is this wide variability of almost all characters that has resulted in the failure thus far to construct a satisfactory key.

Some words must be said about the terms used in describing the aspect of the spines. These terms have all been borrowed from Lawrence (1958: 746-747), who applied them to the various types of hairiness in vascular plants. It is perhaps superfluous to point out that the 'hairiness' of the spines in *Steccherinum* is brought about by the protruding cystidia.

Special mention should be made of the colour terminology. There are several colour charts available at present but their usefulness decreases proportionally with the diminishing of the colour area to be defined. Particularly the colour zones in *Steccherinum* may be so narrow as to reduce the colour-evaluation to mere approximation. In such cases the use of symbols or standardized terms would pretend a perfectly unjustified precision.

The colours indicated, like all other macroscopic features, refer to those of the dried material.

As a rule the colour of the context in dried material of both *Irpex* and *Steccherinum* is white to pallid. Deviating colours are likely to be regarded as of diagnostic value but this is seldom the case. The dark brown layer which in *S. ochraceum* separates the firmer context from the tomentum does not mark a new species but simply indicates the advanced age of the basidiome. On the other hand, the discolouration of the context of *S. reniforme* and the way it advances with age characteristically separate this species from *S. rawakense*.

*Chemical data.* — As far as known no chemical analyses exist of either *Irpex* or *Steccherinum*. Not a single species of these genera has been mentioned in the more recent works which, exclusively or partially, deal with fungal chemistry (Shibata & al., 1964; Birkinshaw, 1965; Turner, 1971). Yet from the way several species of *Steccherinum* discolour on drying or in the herbarium, whereas others remain practically unchanged, it is apparent that there must be certain chemical differences.

*Hyphal construction.* — Whereas there is no special need to discuss the hyphal structure in *Irpex*, something must be said of the construction in *Steccherinum*. The context in *Steccherinum* has been described as dimitic, consisting of generative and skeletal hyphae (Maas Geesteranus, 1962: 403). This description now turns out to be incomplete, for in certain species and in certain parts of their context a third kind of hyphae may be found, which would cause some authors to regard these species as trimitic. It is particularly in connection with recent developments of the concepts 'dimitic' and 'trimitic' that the context of *Steccherinum ochraceum* was reinvestigated in greater detail. The two collections chosen for the examination are (1) U.S.A., Michigan, Whitehouse Landing, 9 Sept. 1969, M. J. Larsen 3658 & M. A. Donk 14211 (Herb. Donk, L) and (2) Netherlands, Utrecht, Oud-Loosdrecht, 29 Oct. 1966, J. Daams (L). In both collections the basidiome consists of well-developed reflexed as well as effused portions.

COLLECTION 1: In the context of the pileate portion, more especially in the region where the hyphae are about to enter the spines, a reorganization appears to have taken place. Some of the generative hyphae become moderately thick-walled, while others develop very much branched, highly tortuous and kinked hyphae of limited growth. The thick-walled kind of these latter hyphae could very well be termed 'binding hyphae' (Corner, 1932a: 74) or 'ligative hyphae' (Pouzar, 1966a: 171). However, what name should be given to those that show an occasional clamp-connection, and to others which are equally twisted but thin-walled and filled with oleaginous matter? The skeletal hyphae in this region are very tortuous, too, while some are branched.

While much the same situation is found in the effused portion attached to the lateral side of the branch (and, accordingly, developed in a vertical position), the hyphal construction in the context on the underside of the branch shows a marked difference. Very few of the generative hyphae appear to have thickened cell-walls. There are no 'binding hyphae'. Only the skeletal hyphae present the usual aspect: they are tortuous on entering the spines and several are branched.

COLLECTION 2: In the region overlying the spines in the pileate portion the generative hyphae are both thin- and thick-walled. The 'binding hyphae' are particularly abundant and well-developed. Some are thin-walled and filled with oily matter, others are thick-walled to almost solid, while several of either kind possess clamps. The skeletal are thick-walled, tortuous, and several are branched.

Of the effused portion on the lateral side of the substratum an area devoid of spines was chosen for examination. 'Binding hyphae' appeared to be scarce, the skeletal very much less branched.

The above observations and some others not separately mentioned allow the following conclusions to be drawn: (i) the hyphal construction of the corresponding portion of the basidiome may differ from one collection to another in the same species; (ii) the hyphal construction in different portions of the same basidiome may show a very marked difference; (iii) the difference concerns more particularly the 'binding hyphae' (absent or present, scarce or abundant, thin- to thick-walled) and the skeletal (simple or branched); (iv) there is no fundamental difference between thin-walled oil-filled 'binding hyphae' and others that are thick-walled to solid; (v) the occasional presence of clamp-connections proves the relationship of these 'binding hyphae' to ordinary generative hyphae; (vi) the variation in hyphal construction would appear to be connected with the presence and relative position of the spines.

The 'binding hyphae', while apparently necessary for stabilizing the rigid position of the spines in *Steccherinum*, do not have the same structural importance as have the skeletal hyphae. In such cases where these 'binding hyphae' are scarce or absent their function seems adequately taken over by the skeletal.

The binding hyphae as described by Corner in *Polystictus xanthopus* (1932) and by van der Westhuizen in several other species (1971) do not seem to have this unstable quality. On the contrary, the latter author even found "that the hyphal complement and construction of the fruit-bodies, i.e. the placing of different types of hypha in the carpophores of different species, are constant for each species . . ." (p. 315).

Would this mean that there are different kinds of binding hyphae? The answer to this question may and will differ from mycologist to mycologist but one should do well to realize that the extremes are connected by gradated steps of an endless variety. The difficulty in connection with binding hyphae (their acceptance as a separate type of hyphae, the importance attached to their presence or absence, and the resultant creation of new genera) virtually results from the failure to recognize the plasticity of the two fundamental hyphal kinds: the generative and skeletal hyphae.

The definition of skeletal hyphae as formulated by Corner (1932a: 73) appears too rigid and should be replaced by the broader concept as given by van der Westhuizen (1963: 1497). Thus, skeletal hyphae are unbranched or branched hyphae with thick cell-walls (not infrequently so thick as to obliterate the cell-lumen), without septa (not counting the 'cloisons de retrait') and without clamp-connections, originating from generative hyphae, usually from a short lateral branch of the latter.<sup>1</sup>

The potentiality of skeletal to become ramified may be an unwelcome notion to some authors but it is impossible to escape the reality, and there is no exaggeration in van der Westhuizen's statement that the binding hyphae as described by Corner (1932a) "are much branched skeletal hyphae which lack directional growth" (p. 1497).

<sup>1</sup> Van der Westhuizen actually stated: "...as the modified terminal cells of short, lateral branches of thin-walled, nodose-septate hyphae." To this it may be remarked that generative hyphae are not necessarily always thin-walled, while it would be incorrect to assume that clampless species should be incapable of producing skeletal hyphae.

On the other hand, it should also be realized that generative hyphae are equally capable of producing very much ramified side-branches which resemble Corner's binding hyphae. Those of the thin-walled kind were called 'interweaving hyphae' (Corner, 1932b: 318 and 1950: fig. 8) or 'tendrils hyphae' (Maas Geesteranus, 1967b: 78) but no name was given to those that are thick-walled and clamped.

The diversity of hyphae which are neither genuine generative hyphae nor skeletal is so great and, as shown in the case above, their presence so much dependent on a variety of factors that they—whether they are called 'binding hyphae' or not—are evidently unfit for the characterization of the genus *Steccherinum*.

*Clamp-connections.* — Clamp-connections, found at the septa of the generative hyphae in the context, invariably correspond with the occurrence of a clamp at the base of the basidia. Clamps are present in all species of *Steccherinum*, absent in *Irpex*.

*Basidia.* — In both *Irpex* and *Steccherinum* the basidia are clavate, more rarely cylindrical, and generally 4-spored. According to the observations by Boidin (1958: 267), *Steccherinum fimbriatum* and *S. ochraceum* (both listed as *Mycocleptodon*) possess basidia of the chiasitic type.

*Spores.* — The spores in *Irpex* and *Steccherinum* are smooth and colourless. The ellipsoid shape is predominant, although more elongate and subglobose forms do occur. The spores are non-amyloid but stain a delicate blue in lactophenol-methylblue.

*Genetic characters.* — The sexual behaviour of *Steccherinum ochraceum* was studied by Kimura (1954: 35) and Takemaru & Fujioka (1970: 27) who showed that the fungus is heterothallic and has the tetrapolar type of interfertility. Boidin & Lanquetin (1965: 10) reported that *Irpex lacteus* is also tetrapolar, while Mme David (1969: 200) stated that *Irpex tulipiferae* "est donc une espèce holocénocytique et supposée homothalle. . ." This different behaviour puzzled mycologists and resulted in erroneous conclusions (Jahn, 1969: 136, and Boidin, 1971: 137). The source of the confusion is the study on the hyphal construction of a fungus originally misidentified as *Irpex lacteus* (Maas Geesteranus, 1963: 452) but now recognized to be a flat-toothed form of *Steccherinum ochraceum* (see pp. 457, 521). From later correspondence the conclusion was gradually reached that the material used by Dr. Boidin was not a true *Irpex* and this turned out to be correct on examination of the material. *Irpex lacteus* and *I. tulipiferae* represent the same species which in its nuclear behaviour ("a majority of binucleate spores and a mycelium without clamps and plurinucleate") is strictly different from *Steccherinum* as exemplified by *S. ochraceum* ("normal, with constant clamps and uninucleate spores," Boidin, 1971: 137).

*Cultural characters.* — *Irpex lacteus* (listed as *Polyporus tulipiferae* by Nobles, 1958: 915), *Steccherinum ciliolatum* and *S. ochraceum* (Gilbertson, 1971: 294), and *S. fimbriatum* (Boidin, 1958: 241) have been reported to give a strong oxidase reaction

on gallic and tannic acid media. Several species, *Steccherinum ciliolatum*, *S. fimbriatum*, *S. laeticolor*, and *S. ochraceum*, are known to be associated with 'white rot' (Gilbertson & Budington, 1970: 97).

These two features seem to be related. Nobles (1971: 192) stated that "these characters seem to hang together: tetrapolarity, oxidase production, white rots, and preference for hardwoods."

*Affinities.* — The relationships of both *Irpex* and *Steccherinum* have occupied the minds of several authors. Bourdot & Galzin (1928: 440) drew attention to the remarkable resemblance both externally and internally between *Steccherinum ochraceum* (as *Mycocleptodon*) and "*Poria eupora*," at the same time pointing out that "on ne constate jamais d'intermédiaire entre la forme hydnée et la forme porée." Eriksson (1958: 134) expressed himself, more succinctly, in a similar way, while Gilbertson (1971: 295) was more definite in stating "...strongly indicates that the species of *Steccherinum* and *Chaetoporus* listed form a natural group." The situation was broadly outlined by Malençon (1958: 319) who wrote: "Il n'est pas douteux d'ailleurs que *Porostereum* Pilát, *Mycocleptodon* Pat., *Lopharia* Kalchbr., ainsi que les *Poria eupora* (Karst.) Cooke, *Poria carneopallens* (Bk.) Cooke, et certains *Irpex* du type *lacteus* Fr. ne sont que les diverses expressions morphologiques d'un large phylum dont il y aurait intérêt à constituer une famille particulière." This view was at least in part put into practice by Parmasto (1968: 169–178) by the erection of his new family *Steccherinaceae*. Of the three subfamilies recognized, the *Steccherinoideae* embrace the genera *Steccherinum*, *Irpex*, and *Chaetoporus*. In a previous publication (Maas Geesteranus, 1971: 77) I adopted this family but I would like to add that from my acceptance it should not follow that I have any definite opinion on the subfamilies *Cystosteroideae* and *Fibroporioideae*.

The presence or lack of clamps is not usually considered a character of generic value but it seems advisable to treat this characteristic with special prudence in the case of *Irpex*. As far as can be seen the lack of clamps — and, coupled with it, the different genetic behaviour (Furtado, 1966: 125) — seems to be the only means by which *Irpex* can be separated from *Steccherinum*. It also seems the one character separating *Irpex* from certain species of *Chaetoporus* P. Karst., a genus recently reduced by Ryvarden (1972: 18) to the synonymy of *Junghuhnia* Corda. Moreover, disregard of the clamp-connection as a differential character is certain to lead to difficulties in separating *Irpex* from *Hirschioporus pargamensis* (Fr.) Bond. & Sing. and *Schizopora paradoxa* (Schrad. ex Fr.) Donk, while the way from the latter species to *Hyphodontia* John Erikss. seems open. It is true that an attempt was made to find additional characters to single out *Hyphodontia* and *Schizopora* as members of "a distinct series" (Donk, 1967: 72) but the amplitude of variation of the characters is too broad for the endeavour to be successful. The emphasis, therefore, upon the presence or absence of clamps, however artificial it may seem, is a necessary measure for the moment.

While the above sufficiently outlines the position of *Irpex*, it remains to demarcate *Steccherinum*. More particularly the boundary between *Steccherinum* and *Junghuhnia*

seemed to me to be difficult to draw on account of the irpicoid aspect of the hymenophore in some specimens of *J. pseudozilingiana* (Parm.) Ryv. It may be remembered that flattened or more or less irpicoid spines are by no means rare in species of *Steccherinum*, thus constituting a transition. However, I have been persuaded to accept *Junghuhnia* as a genus distinct from *Steccherinum* by the striking paucity of generative hyphae in the context and their very thin cell-walls. Even though *Junghuhnia* and *Steccherinum* may not be considered by Ryvarden (in letter) to be closely related, it cannot be denied that separation of both genera seems difficult and certainly requires more convincing differential characters than the two mentioned above.

Gilbertson (1971: 285–287) provided a key, with which to determine the resupinate genera of Aphyllophorales with hydnoaceous hymenophores. It is clear that in order to take care of the effused-reflexed and pileate species of *Steccherinum* the key would grow much longer and more complicated. It seems even doubtful whether the construction of such a key would be feasible without the co-operation of several mycologists.

*Hyphenation of specific epithets.* — Article 23 of the Code leaves it free for authors to publish specific epithets consisting of two or more words united or hyphenated. This has resulted in the unfortunate inconsistency that two fairly similar epithets are spelled in two different ways, such as “albo-fuscus” and “alboluteus,” while in one instance even the same author used two different spellings for the same epithet (Ehrenberg, 1818: 30, fusco-violaceum and 32, fuscoviolaceum). However, Article 73 does not permit the situation to be changed.

## TAXONOMIC PART

### 1a. IRPEX Fr.

*Irpex* Fr., Syst. Orb. veg.: 81. 1825; Elench. Fung. 1: 142. 1828. — *Sistotrema* [Sect.] *Irpex* (Fr.) J. Schroet. in Cohn, Kryptfl. Schles. 3(1): 462. 1888. — *Coriolus* [Sect.] *Irpex* (Fr.) Pat., Essai tax. Hym.: 94. 1900. — Lectotype: *Hydnum lacteum* Fr. ex Fr. (cf. Donk, 1956a: 100; 1963: 154).

*Irpex* trib. *Apus* Fr., Elench. Fung. 1: 143. 1848. — Lectotype: *Irpex lacteus* Fr. ex Fr.

*Irpex* sect. *Apodes* P. Henn. in Nat. Pflfam. 1(1\*\*): 151. 1898; Killerm. in Nat. Pflfam., Ed. 2, 6: 168. 1928 (“Fr.”) — Lectotype: *Irpex lacteus* Fr. ex Fr.

MISAPPLIED NAME: *Xylodon* Pers. ex S. F. Gray sensu O.K., Rev. Gen. Pl. 3(2): 540. 1898 (“Ehrenb.”).

Basidiome effused, effused-reflexed, or pileate. Reflexed portion (or pileus) velutinous, woolly, or hirsute, light coloured. Hymenophore poroid, irpicoid or hydroid; hymenium light coloured. Context tough, inconspicuously zoned, whitish, dimitic, consisting of generative and skeletal hyphae. Generative hyphae not inflating, without clamp-connections. Basidia cylindrical to clavate, 4-spored, without basal clamp. Spores ellipsoid to somewhat allantoid, smooth, colourless, neither amyloid nor cyanophilous. Cystidia of tramal and subhymenial origin, protruding, thick-walled to almost solid, incrustated.

Arboricolous, lignicolous.

In Chapters 1b and 1c several species are shown to be identical with *Irpex lacteus*, while Chapter 1d deals with a great many more described in or at some time referred



to *Irpex*, although they now appear to have no relation whatever to this genus. In *Irpex*, thus pruned, only one species remains—the type species, of which one of the outstanding features is that the generative hyphae are devoid of clamp-connections.

## 1b. IRPEX LACTEUS (Fr. ex Fr.) Fr.

? *Hydnum occarium* Batsch, Elench. Fung.: 113. 1783; ex Fr., Syst. mycol. 1: 412. 1821. — Type: represented by Mich., Nova Pl. Gen.: pl. 64 fig. 3. 1729.

? *Hydnum pectiniforme* Batsch, Elench. Fung.: 113. 1783. — *Agarico-suber dentatum* Paul., Traité Champ. 2: Index [1]. 1793 (description on p. 78 as *Agaric épineux*; typonym). — *Xylometron spinosum* Paul., Traité Champ., Atlas [pl. 3] fig. 2. 1793–1835 (not seen) [= Lév., Paulet Iconogr. Champ.: pl. 3 fig. 2. 1855] (typonym). — *Hydnum pectinatum* Fr., Syst. mycol. 1: 412. 1821 (typonym). — Type: represented by Mich., Nova Pl. Gen.: pl. 64 fig. 4. 1729.

? *Hydnum orbiculatum* Pers., Syn. meth. Fung.: 559. 1801; ex Fr., Syst. mycol. 1: 412. 1821. — Type: represented by Mich., Nova Pl. Gen.: pl. 64 fig. 5. 1729.

*Sistotrema lacteum* Fr., Obs. mycol. 2: 266, pl. 6 fig. 1. 1818; *Hydnum lacteum* Fr. ex Fr., Syst. mycol. 1: 412. 1821. — *Irpex lacteus* (Fr. ex Fr.) Fr., Elench. Fung. 1: 145. 1828. — *Dryodon lacteus* (Fr. ex Fr.) Pat., Hym. Eur.: 146. 1887 (not validly published). — *Xylodon lacteus* (Fr. ex Fr.) O.K., Rev. Gen. Pl. 3 (2): 541. 1898. — *Coriolus lacteus* (Fr. ex Fr.) Pat., Essai tax. Hym.: 94. 1900. — *Irpiciporus lacteus* (Fr. ex Fr.) Murrill in N. Am. Fl. 9: 15. 1907. — *Trametes lactea* (Fr. ex Fr.) Pilát in Atlas Champ. Eur. 3: 258. 1939; 3: 322, fig. 137, pls. 215, 216. 1940; not *Trametes lactea* Fr. in Nova Acta reg. Soc. Sci. ups. III 1: 96. 1851. — *Daedaleus lacteus* (Fr. ex Fr.) E. Krause in Arch. Ver. Freunde NatGesch. Mecklenb., N.F. 1: 128. 1925. — *Hirschioporus lacteus* (Fr. ex Fr.) Teng, High. Fungi China: 484, 761. 1964. — Neotype (here chosen): "Fungi succici / *Irpex lacteus* (Fr.) Fr. / [translated:] on the sides of a felled, decayed beech trunk / Småland, Femsjö parish, Dullabergets östra del, ovanför Arvaviken / 1.X.1943 / Seth Lundell" (UPS).

*Boletus tulipiferae* Schw. in Schr. naturf. Ges. Leipzig 1: 99. 1822. — *Polyporus corticola* var. *tulipiferae* (Schw.) Fr., Elench. Fung. 1: 124. 1828. — *Irpex tulipiferae* (Schw.) Schw., Syn. Fung. Am. bor. (= in Trans. Am. phil. Soc., N.S. 4): 164. 1832. — *Polystictus tulipiferae* (Schw.) Cooke in Grevillea 15: 51. 1886. — *Poria corticola* f. *tulipiferae* (Schw.) Sacc., Syll. Fung. 6: 322. 1888. — *Coriolus tulipiferae* (Schw.) Pat., Essai tax. Hym.: 94. 1900. — *Irpiciporus tulipiferae* (Schw.) Murrill in Bull. Torrey bot. Club 32: 472. 1905. — *Polyporus tulipiferae* (Schw.) Lloyd, Mycol. Writ. 2 (Lett. 10): 4. 1906 (in synonymy, not validly published). — *Poria tulipiferae* (Schw.) Lloyd, Mycol. Writ. 2 (Lett. 10): 4. 1906 (in synonymy, not validly published). — *Polyporus tulipiferae* (Schw.) Overh. in Wash. Univ. Stud. 3(1): 29, pl. 3 fig. 11. 1915; in Univ. Mich. Stud. (sci. Ser.) 19: 329, figs. 15–18, 28, pl. 132. 1953. — *Irpex lacteus* "f. *tulipiferae*" (Schw.) Jahn in Westfäl. Pilzbr. 7: 136. 1969 (not validly published). — Type locality: U.S.A., North Carolina.

*Irpex sinuosus* Fr., Elench. Fung. 1: 145. 1828; Hym. eur.: 621. 1874. — *Xylodon sinuosus* (Fr.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — *Irpex lacteus* subsp. *I. sinuosus* (Fr.) Bourd. & Galz. in Bull. trimest. Soc. mycol. Fr. 41: 150. 1925; Hym. Fr.: 573. 1928. — *Irpex lacteus* var. *sinuosus* (Fr.) Pilát in Bull. trimest. Soc. mycol. Fr. 51: 359. 1936. — *Trametes lactea* f. *Irpex sinuosus* (Fr.) Pilát in Sb. nár. Mus. Praha 2(3): 61. 1940 (not validly published). — *Trametes lactea* f. *sinuosa* (Fr.) Pilát in Atlas Champ. Eur. 3: 323. 1940. — *Irpex lacteus* var. *canescens* f. *sinuosus* (Fr.) Nikol. in Trudy bot. Inst. Akad. Nauk. SSSR (II Spor. Rast.) 8: 186. 1953. — *Irpex lacteus* f. *sinuosus* (Fr.) Dom. in Fl. polska, Grzyby: 204. 1965 ("Pil."); preoccupied, see preceding). — Type: non-existing; type locality: Sweden.

*Irpex canescens* Fr., Elench. Fung. 1: 145 (Obs.). 1828; Epicr. Syst. mycol.: 522. 1838. — *Xylodon canescens* (Fr.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — *Coriolus canescens* (Fr.) Pat., Essai tax. Hym.: 94. 1900. — *Irpex lacteus* var. *canescens* (Fr.) Bres. in Annl. mycol. 1: 88.

1903. — *Irpex lacteus* f. "*I. canescens*" (Fr.) Bourd. & Galz. in Bull. trimest. Soc. mycol. Fr. **41**: 150. 1925; Hym. Fr.: 573. 1928. — *Agaricus canescens* (Fr.) E. Krause, Basidiomyc. rostoch., Suppl. 4: 141. 1932. — *Irpex lacteus* f. *canescens* (Fr.) Bond., Trut. Griby: 554. 1953 ("B. et G."). — Type: non-existing (Prof. Nannfeldt in letter); type locality: South Europe.

*Hydnum subresupinatum* Schw., Syn. Fung. Am. bor. (=in Trans. Am. phil. Soc., N.S. **4**): 163. 1832. — Part (?) of holotype: "*Hydnum subresupinatum* LvS / Beth. in ... [undecipherable]" (Herb. E. Fries, UPS).

*Hydnum morincola* Schw., Syn. Fung. Am. bor. (=in Trans. Am. phil. Soc., N.S. **4**): 164. 1832 (in synonymy, nomen nudum).

*Irpex pallescens* Fr., Epicr. Syst. mycol.: 522. 1838. — *Xylodon pallescens* (Fr.) O.K., Rev. Gen. Pl. **3**(2): 541. 1898. — Type locality: U.S.A., North Carolina.

*Polyporus chartaceus* Berk. & Curt. in Hook. J. Bot. **1**: 103. 1849. — *Polystictus chartaceus* (Berk. & Curt.) Cooke in Grevillea **14**: 84. 1886. — *Microporus chartaceus* (Berk. & Curt.) O.K., Rev. Gen. Pl. **3**(2): 495. 1898. — Holotype: "*Pol. chartaceus* B. & C. / *Pol. pinsitus* Fr. var. / No. 756. Car. Sup." (K).

*Irpex canescens* var. *effusus* Sacc., Mycoth. ven.: No. 30. 1874 (nomen nudum). — *Irpex canescens* f. *effusus* Sacc. in Michelia **1**: 107. 1877 (not validly published). — Type distribution: Sacc., Mycoth. ven., No. 30. 1874 (K).

*Irpex tulipiferae* f. *magnoliae-glauciae* Ellis in Thüm., Mycoth. univ.: Cent. 3, No. 205. 1875 (validly published?). — Type distribution: the same (AMD).

*Irpex hirsutus* Kalchbr. in Érték. Természettud. Kör. Magyar Tud. Akad. **8**(16): 17, pl. 2 fig. 1. "1878" [1879]. — *Irpex lacteus* subsp. *I. hirsutus* (Kalchbr.) P. Karst. in Bidr. Känn. Finl. Nat. Folk **37**: 56. 1882. — *Xylodon hirsutus* (Kalchbr.) O.K., Rev. Gen. Pl. **3**(2): 541. 1898. — Type: Martianoff 311, not seen.

*Irpex canescens* f. *resupinatus* Bizzoz. in Rabenh.—Winter, Fungi eur.: No. 2936. 1883 (validly published?). — Type distribution: the same (W).

*Irpex bresadolae* Schulzer in Hedwigia **24**: 146. 1885. — *Xylodon bresadolae* (Schulzer) O.K., Rev. Gen. Pl. **3**(2): 541. 1898. — Type: represented by the description and illustration under No. 1348 in Schulzer's manuscript, University Library, Zagreb (photocopy seen).

[*Polyporus cincinnati* Berk. in Herb.; Cooke in Grevillea **15**: 27. 1886 (in synonymy). — *Poria cincinnati* Berk.; Cooke in Grevillea **14**: 114. 1886 (nomen nudum); ex Cooke in Grevillea **15**: 27. 1886. — Holotype: [written on a piece of paper glued to the outside of the packet:] "*Polyporus / Cincinnati* B."; [written on the paper bearing two specimens:] "*Pol. tenuis*, Schwein. [followed by "(non)" in a different hand] / *Cincinnati* No. 230 / T. G. Lec" (K).

*Irpex rimosus* Peck in Rep. N.Y. St. Mus. nat. Hist. **43**: 22. 1890. — *Xylodon rimosus* (Peck) O.K., Rev. Gen. Pl. **3**(2): 541. 1898. — Type: not seen.

*Irpex canescens* (forma cyclomycetoidea) Bres. in Atti I.R. Accad. Sci. Agiati, Rovereto III **3**: 101. 1897. — "*Irpex lacteus* f. *cyclomycetoidea* Bres." (in synonymy) Bourd. & Galz. in Bull. trimest. Soc. mycol. Fr. **41**: 150. 1925; Hym. Fr.: 573. 1928. — *Trametes lactea* f. *cyclomycetoidea* Pilát in Atlas Champ. Eur. **3**: 323. 1940 ("Bres.," no Latin descr., not validly published). — *Irpex lacteus* var. *canescens* f. *cyclomycetoidea* (Pilát) Nikol. in Trudy bot. Inst. Akad. Nauk SSSR (II Spor. Rast.) **8**: 187. 1953 ("Bres.," not validly published).

*Irpex raduloides* Pilát in Bull. trimest. Soc. mycol. Fr. **52**: 308, fig. 9, pl. 7 fig. 2. 1937. — *Trametes raduloides* (Pilát) Pilát in Atlas Champ. Eur. **3**: 258. 1939; **3**: 325, fig. 140, pl. 218 fig. a. 1940. — *Irpex lacteus* f. *raduloides* (Pilát) Nikol. in Nov. Sist. niz. Rast.: 170. 1964. — Holotype: "*Irpex raduloides* Pilát sp. n. / *Acer manshuricum* / Asia orientalis. Schkotowo / 28 V [19]35. Nedorjezowa" (PR 25032); part of holotype (UPS).

MISAPPLICATION: *Polystictus laceratus* Berk. sensu Spig. in An. Mus. nac. Hist. nat. B. Aires **6**: 166. 1898.

Basidiomes effused, effused-reflexed, or frankly pileate, rarely single, more often gregarious or confluent and forming extensive patches or growing imbricately; in pileate forms broadly sessile or attached with narrowed vertex. Reflexed portion or

pileus up to about 20 mm radius and wide, wider by lateral confluence, horizontal or pendent, flange-like, dimidiate, conchate, or flabelliform, concentrically zoned and shallowly grooved, velutinous, velutinous with hirsute zones, entirely hirsute, woolly-hirsute, or woolly-hirsute with one or more zones matted down concentrically and these somewhat shiny, dingy yellowish pallid to ochraceous; margin velutinous, woolly, fimbriate or matted. Margin of effused portion almost byssoid to velutinous, firmly attached to substratum or easily separable, concolorous or paler. Adhymenial surface finely porous to subceraceous, yellowish flesh colour, apparently becoming more brownish with age. Hymenophore very variable, poroid, irpicoid, or hydroid, with numerous intergrading forms. Irpicoid plates or hydroid spines up to 5 mm long and 1 mm or more broad, coarse, straight or flexuous, fluted to ribbed or smooth, finely puberulous, often appearing almost glabrous, concolorous with adhymenial surface, with entire or incised tip. Context up to c. 1 mm thick, somewhat duplex, leathery, inconspicuously zoned, whitish.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 3.5–5.4  $\mu\text{m}$  wide, not inflating, thin- to moderately thick-walled (cell-walls up to 1.5  $\mu\text{m}$  thick), branched, septate, without clamp-connections. Skeletal hyphae 3.6–7.2  $\mu\text{m}$  wide, thick-walled to almost solid. Context of dissepiments or spines similar. Basidia 18–25  $\times$  3–6  $\mu\text{m}$ , cylindrical to clavate, 4-spored, without basal clamp. Spores (4.9–)5.4–6.3  $\times$  (2.2–)2.5–3.1  $\mu\text{m}$ , ellipsoid, adaxially flattened or concave, straight or somewhat curved and allantoid, smooth, colourless, with small oblique apiculus. Cystidia up to 7.2  $\mu\text{m}$  wide, scattered to evenly distributed, protruding, of tramal and subhymenial origin, thick-walled to almost solid, incrusting, cylindrical to more or less fusiform in distal part, occasionally with submoniliform tip, usually with obtuse apex (but sometimes also acute in subhymenial cystidia).

**HABITAT.** — On dead wood or damaged parts of a wide variety of deciduous trees; also stated to occur on wood of coniferous species (Domański, 1965: 203; Overholts, 1953: 330).

**DISTRIBUTION.** — Collections have been examined from some North European countries and U.S.A.

**EXSICCATES.** — Brenckle, *Fungi dakot.* 122 (*I. lacteus*, L). Ellis, *N. Am. Fungi* 103 (*I. tulipiferae*, L); 319 (*I. lacteus*, L). Ellis & Everh., *N. Am. Fungi*, Second ser. 2016a, b (*I. sinuosus*, L); 2310 (*I. sinuosus*, L). *Fungi eston. exs.*, Fasc. 1, 27 (*I. sinuosus*, W). Litschauer & Lohweg, *Fungi sel. exs. europ.* 84 (*I. sinuosus*, W). Lundell & Nannfeldt, *Fungi exs. succ.*, praes. upsal. 161 (*I. lacteus*, W, UPS); 739a, b (*I. lacteus*, W); 1015 (*I. lacteus*, W). Petrak. *Mycoth. gen.* 1826 (*I. lacteus*, W). Rabenhorst, *Fungi europ.* 116 (*I. sinuosus*, W, L). Rabenhorst-Winter, *Fungi europ.* 2726 (*I. tulipiferae*, L); 2936 (*I. canescens*, W). Romell, *Fungi exs. praes. scand.* 20 (*I. lacteus*, W). Smarods, *Fungi latv. exs.* 471 (*I. lacteus*, W). De Thümen, *Mycoth. univ.* 205 (*I. tulipiferae* f. *Magnoliae glaucae*, L); 1208 (*I. lacteus*, L, W).

**REPRESENTATIVE HABIT ILLUSTRATIONS.** — Domański & Orlicz in *Acta mycol.* 5: fig. 1. 1969. Jahn in *Westfäl. Pilzbr.* 7: 144, pl. 10. 1969. Nannfeldt & Du Rietz, *Vilda växter i Norden*, 2nd ed., pl. 119. 1952. Nikolajeva in *Fl. sporov. Rast. SSSR* 6(2): figs. 116–119. 1961. Pilát in *Atlas Champ. Eur.* 3: pl. 215. 1940.

#### 1C. TYPES OF THE SYNONYMS: DESCRIPTIONS AND COMMENTS

This chapter comprizes discussions of the taxa enumerated in the synonymy of *Irpex lacteus* or descriptions of their types. The taxa are arranged alphabetically according to their specific epithet.

## IRPEX CANESCENS Fr. (p. 451)

It may be pointed out that Fries in his first description (1828: 145) described the spines as "connexis transversim planis," and in the second (1838: 522) as transversely disposed but not regularly concentric [like in] *Cyclomyces*. In his opinion Bulliard's illustration (1791: pl. 537 fig. M) represented this species. The picture shows a fungus which seems little more than a mere growth form of *Irpex lacteus*.

## POLYPORUS CHARTACEUS Berk. &amp; Curt. (p. 452)

Holotype covering several cm<sup>2</sup> of twig fragments. Basidiome effused-reflexed. Reflexed portion up to 6 mm radius, strongly curved inwards, concentrically zoned, woolly-hirsute, glabrescent in places or in concentric areas, somewhat shiny, dingy yellowish grey, with occasional concentric lines of a browner colour. Hymenophore consisting of isolated plates near margin or poroid; dissepiments farther from margin very soon longer, up to 2 mm, passing into spines and plates, which are terete, flattened, fluted, canaliculate, simple or confluent, lacerate or branched, yellow-brown, with entire or incised tip. Context pallid.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 3.6–5.4  $\mu$ m wide, not inflating, thin-walled to moderately thick-walled, branched, septate, without clamp-connections. Skeletal hyphae 4.5–7.2  $\mu$ m wide, thick-walled to almost solid. Context of 'spines' similar. Basidia approximately 18–22  $\times$  5–6.5  $\mu$ m, immature, clavate, without basal clamp. Spores 5.4–6.5  $\times$  2.7–3.1  $\mu$ m, ellipsoid, occasionally slightly curved, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia up to 5  $\mu$ m wide, scattered, projecting beyond hymenium, thick-walled to solid, incrusting, fusiform in distal part or tapering towards obtuse apex.

Although two different interpretations of this fungus had already been offered previously (Fries, 1851: 85 and Murrill, 1906: 653), the correct identification was that given by Bresadola (1926: 79). This author tersely stated "=*Irpex tulipiferae* Schw.," which is identical with *I. lacteus*.

## PORIA CININNATI Berk. ex Cooke (p. 452)

Holotype covering several cm<sup>2</sup> of two fragments of bark. Basidiome largely effused, with very narrow reflexed margin to one side. Reflexed portion hirsute to hispid, yellowish brownish. Effused portion shallowly and very regularly poroid. Pores 0.4–0.8 mm wide, simple to more or less compound, angular, pale yellow-brown. Context pallid.

Context dimitic, consisting of generative and skeletal hyphae, and hyphae of somewhat intermediate nature. Generative hyphae 3.6–4.5  $\mu$ m wide, not inflating, thin- to thick-walled, branched, septate, without clamp-connections. Skeletal hyphae 3.6–7.2  $\mu$ m wide, thick-walled to solid. Intermediate hyphae thick-walled to solid, but regularly branched. Context of the dissepiments similar, skeletal narrower. Basidia and spores not yet developed. Cystidia scanty, but characteristically developed, the apical portion incrusting.

Although the type consists of very young material, its macroscopic aspect and microscopic details are in complete accordance with those of *Irpex lacteus*. Bresadola (1926: 80) identified *Poria cincinnati* with *I. tulipiferae*, and the same was said by Lowe (1959: 111).

It is practically certain that Berkeley had not intended to use "cincinnati" as a specific epithet for this species. First, the word was written somewhat below and at some distance from "Polyporus" and, secondly, Berkeley was no doubt too well versed in Latin not to know that "cincinnati" was not an adjective.

TRAMETES LACTEA f. CYCLOMYCETOIDEA Pilát (p. 452)

The synonymy of 'f. *cyclomycetoidea*' is a most illustrative example of an incidental remark developing, in successive steps, into an epithet. All that Bresadola actually did was indicating, between brackets, that to his mind *Irpex canescens* was a cyclomycetoid form of *I. lacteus*, a view obviously suggested by Fries himself (1838: 522). The authors first to make the error of regarding '*cyclomycetoidea*' as an epithet were Bourdot & Galzin, even if it is true that they referred to it only in synonymy. Pilát, however, formally treated '*cyclomycetoidea*' as the epithet of a form, but according to Art. 36 of the Code of 1972 the epithet has not been validly published.

SISTOTREMA LACTEUM Fr. (p. 451)

Basidiomes of neotype effused to effused-reflexed, covering several cm<sup>2</sup> on three large and two smaller pieces of bark of *Fagus*. Reflexed portion up to 12 mm radius, 20 mm wide, patent, curved inwards towards margin, concentrically zoned and shallowly grooved, woolly-hirsute, somewhat shiny, dingy yellowish pallid to dingy ochraceous; margin velutinous, woolly, fimbriate, or matted. Margin of effused portion almost byssoid and firmly attached to substratum, or finely velutinous and easily separable. Adhymenial surface finely porous to subceraceous, yellowish flesh colour. Hymenophore poroid to poroid-irpicoid in older parts. Dissepiments elongated up to 2.5 mm, forming fluted plates or flattened spines, finely puberulous, yellowish flesh colour, with entire or incised tip. Context about 1 mm thick, somewhat duplex, leathery, dingy whitish.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 2.7-6.3  $\mu$ m wide, not inflating, thin- to fairly thick-walled (cell-walls up to 1.5  $\mu$ m thick), branched, septate, without clamp-connections. Skeletal hyphae 3.6-6.3  $\mu$ m wide, thick-walled to almost solid. Context of dissepiments similar. Basidia 16-19  $\times$  3.6-4.5  $\mu$ m, immature, cylindrical-clavate, without basal clamp. Spores not seen. Cystidia up to 7.2  $\mu$ m wide, scattered to evenly distributed, protruding, thick-walled, incrusted, cylindrical to somewhat fusiform in distal part, with obtuse apex.

IRPEX PALLESCENS Fr. (p. 452)

There is no type material of this species, of which Fries stated that it had been collected "Ad truncos *Liriodendri* Americae borealis. Schweini[t]z!" The diagnosis given suggests *Irpex lacteus*. Murrill (1907: 15) held the same view.

IRPEX RADULOIDES Pilát (p. 452)

In his description of *Irpex raduloides*, Pilát explicitly stated that the hymenium was made up only of basidia, adding that there were no cystidia. Contrary to this statement, Domański (1964: 174) indicated the presence of numerous cystidia in the

hymenium at the base of some spines. Both authors may have made perfectly correct observations, for most probably the distribution of cystidia over the spine is very irregular. In the two spines examined by me cystidia were indisputably present but scanty, 6–9  $\mu\text{m}$  wide, incrustated with small crystals. The spores, 5.8–6.3  $\times$  2–2.5  $\mu\text{m}$ , were highly characteristic of *I. lacteus* on account of their allantoid shape.

IRPEX RIMOSUS Peck (p. 452)

Gilbertson (1963a: 668) identified this species with *Polyporus tulipiferae* (Schw.) Overh., which in the present paper is regarded as a synonym of *Irpex lacteus*.

IRPEX SINUOSUS Fr. (p. 451)

Under the name *Irpex sinuosus* there are three collections in Herb. E. Fries (UPS). The collection authenticated by Fries' handwriting was originally identified by him as *Hydnum diaphanum* Schrad. Bresadola who re-examined the material identified it as *Irpex sinuosus*. The labels to the two other collections are written in a hand unknown to me. One of them reads '*Irpex inuosus* Fr. / Ostrogoth.: Reymyra. H. v. Post.,' the second "*Irpex sinuosus* Fr. / Uplandia: Rasbo. C. P. Laestadius."

From the evidence supplied by these labels it is clear that none of the three collections can be indicated as type of *Irpex sinuosus*. However, since they agree with the description given by Fries, I am prepared to accept them as representative of Fries' conception of that species. At the same time my impression is that they are little more than growth forms of *Irpex lacteus*, a view which had already been expressed by Bresadola (1897: 101).

The material called *Hydnum diaphanum* by Fries is in poor condition, consisting of little else than crowded, flexuous, horny-transparent spines (hence the specific epithets '*diaphanum*' and '*sinuosus*') covering a piece of bark. The basidia are collapsed, the spores measure 4.9–6.3  $\times$  2.2–2.7  $\mu\text{m}$ , cystidia were not seen.

HYDNUM SUBRESUPINATUM Schw. (p. 452)

Basidiome c. 45  $\times$  10 mm, effused-reflexed, reflexed portions for the greater part broken off or eaten by insects. Hymenophore hydroid or irpicoid near reflexed part of basidiome (made up of subulate, terete or flattened spines or gyrose-lamellate plates up to 2.5 mm long), poroid near effused part; general colour dingy ochraceous to warm yellow-brown.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 2.7–4.5  $\mu\text{m}$  wide, not inflating, thin-walled, branched, septate, without clamp-connections. Skeletal hyphae 4.5–5.8  $\mu\text{m}$  wide, thick-walled to almost solid. Spores 4.5–5.4  $\times$  2.7  $\mu\text{m}$ , immature, ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia up to c. 7  $\mu\text{m}$  wide, very numerous, evenly distributed except at tip of spine, protruding, incrustated, cylindrical to somewhat fusiform in distal part, with obtuse apex.

BOLETUS TULIPIFERAE Schw. (p. 451)

Although the type of this species cannot be located and the original description is in no way sufficient for its recognition, there is surprisingly little difference of opinion

as to its identity. Bresadola (1897: 101) placed the species in the synonymy of *Irpex lacteus*, succinctly commenting between brackets that it was the polyporoid form. Overholts (1953: 329-330) was equally convinced that von Schweinitz' species and *I. lacteus* are identical but, since he preferred to maintain the species in the genus *Polyporus*, he could for nomenclatural reasons not use the specific epithet 'lacteus'. Unfortunately some confusion was created by my own paper (Maas Geesteranus, 1963: 452), in which the hyphal structure of *Irpex lacteus* was treated at some length, but was only recently detected by me to be based on two misidentified collections. These (Maas Geesteranus 11560 and 11866), it should be emphasized, represent unusually broad-toothed specimens of *Steccherinum ochraceum*, which fooled the determinant. As a result *Irpex tulipiferae* received renewed attention as the species differing from alleged *I. lacteus* in its lack of clamp-connections and different cultural behaviour (David, 1969: 199; Jahn, 1969: 136; Boidin in letter). *Irpex tulipiferae* and *I. lacteus*, however, are one and the same clampless species, and all the North American material of *I. tulipiferae* thus far seen represents true *I. lacteus*.

For a description of the hymenial elements in a typical North American collection, see Darley & Christensen (1945).

#### 1d. EXCLUDED OR INSUFFICIENTLY KNOWN TAXA

In the course of time numerous species have been described in, or transferred to, the genus *Irpex*. The following notes, whenever possible based on examination of type material, are presented to show (sometimes, it is true, on rather slender evidence) that there is no affinity with this genus.

**a f r i c a n u s**. — *Irpex africanus* van der Byl in *Annale Univ. Stellenbosch* **12**(A1): 5. 1934. — Type: not seen.

This is a true polyporaceous species which cannot be maintained in the genus *Irpex* on account of the glabrous and somewhat shiny upper surface of its pileus and the cinnamon colour of its context.

**a l b o - f u s c u s**. — *Coriolus albo-fuscus* Pat. in *Bull. trimest. Soc. mycol. Fr.* **23**: 81. 1907. — *Irpex albo-fuscus* (Pat.) Sacc. & Trott. in *Syll. Fung.* **21**: 376. 1912. — Type: not seen.

Patouillard gave a most illustrative description of the spines by stating that they were "réunis par des veines étendues principalement dans le sens circulaire," a disposition not known in *Irpex lacteus*. Although Patouillard's description yields no further differences, the one indicated has considerable weight in my eyes. The aspect of the initial stages of the hymenophore may show a certain diversity, but if there is a very fundamental difference, I am inclined to take the latter as the expression of generic difference. Thus, I consider *C. albo-fuscus* to be unrelated to *Irpex*.

*alboluteus*. — *Irpex alboluteus* Rick in *Iheringia* (Bot.) No. 5: 189. 1959. — Type: not seen.

Such characters like the very soft context (“valde mollis”), the long and very crowded (“densissimis... egregie stipatis”) spines, and the glabrous cystidia, suggest that *I. alboluteus* is not a true *Irpex*.

*ambiguus*. — *Irpex ambiguus* Peck in Rep. N.Y. St. Mus. nat. Hist. 40: 55. 1887. — *Xylodon ambiguus* (Peck) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Type: not seen.

The context was said to be very thin, flocculose-pruinose, and the spines minute. Neither character is consistent with the genus *Irpex*. Gilbertson (1963a: 660) identified the species with *Odontia spathulata* (Schr. ex Fr.) Litsch.

*anomalous*. — *Irpex anomalous* Wettst. in Sber. kais. Akad. Wiss. math.-naturw. Cl. 94(1): 62. 1887. — Type: represented by Wettst., *ibid.*: pl. 1 figs. 1-9. 1887.

This is a synonym of *Sistotrema confluens* Pers. ex Fr. (see Maas Geesteranus, 1959: 141).

*arborescens*. — *Irpex arborescens* Rick in *Iheringia* (Bot.) No. 5: 191. 1959. — Type: not seen.

The specific epithet refers to a conspicuous character of the spines which are said to be “sub lente forte lateraliter ramificati.” This feature and the lack of cystidia are incompatible with the genus *Irpex*.

*archeri*. — *Irpex archeri* Berk. *apud* Hook. fil., Fl. Tasm. 2: 257. “1860” [1859]. — *Xylodon archeri* (Berk. *apud* Hook. fil.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Holotype: Tasmania, Archer (K).

Basidiome c. 26 × 13 mm, effused. Subiculum woolly-tomentose to matted, avellaneous, lighter towards margin. Hymenophore hard to describe, coralloid according to the pencil sketch accompanying the specimen, dry sparassoid-poroid with dissepiments variously incised or branched so as to resemble irpicoid plates, yellow-brown.

Subiculum monomitic, consisting of generative hyphae. Generative hyphae 2.7-4.5 μm wide, not inflating, thick-walled to solid, branched, septate, with clamp-connections. Context of dissepiments dimitic, consisting of generative and skeletal hyphae. Generative hyphae 1.8-3.6 μm wide, not inflating, thin-walled to moderately thick-walled, branched, septate, with clamp-connections. Skeletal hyphae 1.8-5.4 μm wide, thick-walled. Hymenial elements poorly preserved. Spores 4.5-5.4 × 2.7-3.1 μm, ellipsoid, adaxially somewhat flattened, smooth, colourless, with oblique apiculus. Cystidia up to about 30 μm long, 5-6.5 μm wide, of subhymenial origin, fusiform or lageniform or catenulate, thick-walled (?).

This species differs from true *Irpex* in the monomitic construction of the subiculum, its thick-walled generative hyphae, and the peculiar hymenophore.



*argillaceo-cinnamomeus*. — *Irpex obliquus* var. *argillaceo-cinnamomeus* Rodw. & Clel. in Pap. Proc. R. Soc. Tasman. 1929: 15. 1930. — Type: not seen.

The authors apparently considered this to be a colour variety of a species, the more typical forms of which they had come to know through the identifications by Miss E. M. Wakefield. If their interpretation of the variety is correct, var. *argillaceo-cinnamomeus* is not an *Irpex*.

*atropurpureus*. — *Irpex atropurpureus* Speg. in An. Soc. cient. argent. 12: 27. 1881. — *Xylodon atropurpureus* (Speg.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Type: not seen.

Two of the characters described by Spegazzini suggest that his fungus cannot be an *Irpex*. These are the colour of the basidiome ("pulchre et intense atropurpureus") and the aspect of the adhymental surface ("primitus hymenio undulato hinc inde ob matrix inaequalitatem scrupuloso v. subbulloso, dense ac minute subcanaliculato-reticulato . . .").

*ayresii*. — *Hydnum ayresii* Berk. apud Cooke in Grevillea 20: 2. 1891. — Holotype: "*Hydnum Ayresii*, B. / [illegible] / April 1857" (K).

Basidiome c. 50 × 30 mm, effused, imperfectly poroid near margin, irpicoid towards centre, almost entirely dull brown. Spines up to 0.7 mm long, 0.1–0.2 mm broad, subulate, cylindrical or flattened or connate and much broader, irpicoid, smooth, dull brown, with blunt, finely pubescent tip. Context soft, brownish. Margin indistinct or byssoid, yellowish brown.

Context monomitic, consisting of generative hyphae. Hyphae 3.6–4.5  $\mu$ m wide, occasionally with inflated portions up to 9–11  $\mu$ m wide, thin- to thick-walled (cell-walls up to 1.5  $\mu$ m thick, brown), branched (very often from a clamp), septate, with clamp-connections. Context of spines similar. Basidia about 19 × 5.5  $\mu$ m, clavate, with basal clamp. Spores not seen with certainty. Gloecystidia 5.4–10.7  $\mu$ m wide in widest part, obclavate to fusiform, thin-walled, originating in context of spine.

A slip of paper attached to the type packet bears the annotation "cfr *Irpex modestus*." Van der Byl (1934: 4) was more affirmative in simply eliminating *H. ayresii*, between brackets, as a synonym of *I. modestus*.

From the redescription given above it is clear that *H. ayresii* has no relation to *Irpex*.

*barbiformis*. — *Irpex ambiguus* var. *barbiformis* Rick in Iheringia (Bot.) No. 5: 188. 1959. — Type: not seen.

Some of the features mentioned by Rick are the spines that disappear on drying, the undulating cystidia, and the long, ovate, capitate basidia. On account of these characteristics Rick's taxon cannot possibly be maintained in *Irpex*.

*bowmanii*. — *Daedalea bowmanii* Berk. in J. Linn. Soc. (Bot.) 13: 166. 1873. — *Striglia bowmanii* (Berk.) O.K., Rev. Gen. Pl. 2: 871. 1891. — *Coriolus bowmanii*

(Berk.) G. H. Cunn. in Proc. Linn. Soc. N.S.W. 75: 219. 1950. — Holotype: "*Daedalea bowmani* B. / Herberts Creek. E. M. Bowman" (K).

Holotype consisting of three unequally large basidiomes, the largest measuring about  $65 \times 18$  mm. Basidiome effused, margin in places detached from substratum and somewhat reflexed. Reflexed part, as far as visible, fibrillose, pale grey-brown; fibrils at the extreme margin whitish. Adhymenial surface thickly pulverulent, pale grey-brown. Hymenophore poroid. Dissepiments up to 2 mm long, locally interrupted, resembling flattened spines, pale grey-brown. Context less than 0.5 mm thick, pliable, pale grey-brown.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae  $1.8-2.7 \mu\text{m}$  wide, not inflating, thin-walled, anastomosing, branched, septate, with clamp-connections. Skeletal hyphae  $2.7-5 \mu\text{m}$  wide, thick-walled to solid, very pale brownish. Context of spines similar. Basidia collapsed. Spores not seen. Cystidia  $13.5-21.5 \times 3.6-6.3 \mu\text{m}$ , of subhymenial origin, lageniform to fusiform, with acute tip or mucronate, thick-walled, incrustated. Projecting tips of skeletal also incrustated, but this may be caused by the poison treatment.

Cunningham (1965: 266), who compared this species to *Polyporus tulipiferae* (in this paper regarded as identical with *Irpex lacteus*), described it as "a white resupinate polypore." *Daedalea bowmanii* is not white. It is pale grey-brown in all parts, even the walls of the skeletal being visibly coloured. It is not related to *Irpex*.

*b r e v i d e n s*. — *Irpex brevidens* Pat. apud Pat. & Lagerh. in Bull. Herb. Boissier 3: 55. 1895. — *Xylodon brevidens* (Pat. apud Pat. & Lagerh.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Type: not seen.

This was said to be a delicate fungus with an almost hypochnoid context and a hymenium lacking cystidia. Hence it is here excluded from the genus *Irpex*.

*b r e v i s*. — *Irpex brevis* Berk. apud Hook. fil., Fl. Novae Zel. 2(2): 181. 1855. — *Xylodon brevis* (Berk. apud Hook. fil.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Holotype: "*Irpex brevis* Berk. / Bay of Isl[and]s, New Zeal[and]" (K).

Basidiomes pileate, solitary or distantly imbricate. Pileus up to 10 mm radius, about 15 mm wide, sessile with short effused portion, horizontal to pendulous, flabelliform, not or obscurely concentrically grooved, more or less radiately wrinkled, glabrous except for very thin tomentum remaining in one specimen, finely radiately innate-fibrillose, date brown to reddish brown, radiately streaked with dingy ochraceous patches, shiny; margin strongly curved inwards, lacerate, running out into spines. Adhymenial surface smooth, dingy ochraceous. Spines up to 3 mm long, 0.2-1 mm broad, decurrent, crowded, subulate, terete to angular or flattened and more or less fused to flexuous plates, sparingly pruinose, dingy ochraceous or brownish yellow, tip acute, entire or lacerate. Context less than 1 mm thick, tough, whitish.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae  $2.7-3.6 \mu\text{m}$  wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletal hyphae  $2.7-6.3 \mu\text{m}$  wide, thick-walled to solid. Context of spines similar, skeletal up to  $7.2 \mu\text{m}$  wide. Basidia and spores not seen. 'Cystidia' not different from skeletal hyphae except for occasional accumulations of crystals covering distal portion, not protruding.

The narrow, somewhat shiny subicular zone surrounding the point of attachment of the pileus, the aspect of the pileus itself, the initial growth of the hymenophore, the

presence of clamp-connections, the course and the shape of the 'cystidia' are all features so much different from what is known in *Irpex lacteus* that I am inclined to attribute generic significance to these differences. In other words, *I. brevis* is unacceptable as a true *Irpex*.

Lloyd (1917: 625) suggested the conspecificity of *Irpex brevis*, *I. consors*, *I. decurrens* and, with some doubt, also *Hydnum merulioides*. The last-named species has been shown to be identical with *Gyrodontium versicolor* (Maas Geesteranus, 1964: 187). *Irpex consors* and *I. decurrens* are actually the same species, but I am reluctant also to accept *I. brevis*, for the argumentation of which I may refer to *I. consors*.

*caespitosus*. — *Irpex caespitosus* Berk. in J. Linn. Soc. (Bot.) 10: 326. 1868 (nomen nudum). — Unnumbered collection: "Cuba / *Irpex caespitosa* Berk. & Curt." (K).

Context monomitic, made up of generative and tendril hyphae. Generative hyphae up to 5.4  $\mu\text{m}$  wide, not inflating, thin- to thick-walled (cell-wall up to 2  $\mu\text{m}$  thick), monopodially branched or furcate, obscurely or clearly septate, without clamp-connections. Basidia 28.5–32  $\times$  4.5–6.5  $\mu\text{m}$ , slender-clavate, 4-spored (?), without basal clamp, some sterigmata seen up to 3.6  $\mu$  long. Spores 5.4–6.3  $\times$  3.6–4.9  $\mu\text{m}$ , obovoid to subglobose, adaxially flattened, smooth, colourless, non-amyloid, with oblique apiculus. Cystidia none.

The material partially redescribed above is not the type. Berkeley mentioned the number 508 and stated that the specimens had been destroyed by insects, which is definitely not the case with the two specimens investigated. The remnants of No. 508 are glued to the sheet which bears *Irpex cubensis*. There is a possibility that the collection indicated above came from the same locality and was sent in a later shipment. As is clear from the microscopic details given, however, it has no relation whatever to the genus *Irpex*.

On the sheet there is a pencilled note which reads: "Cf. *Hyd. plumarium* B. & C. / H. J. Banker." *Hydnum plumarium* Berk. & Curt. (1868) was placed in synonymy with *Hydnopolyporus palmatus* by Fidalgo (1963: 715). The macroscopic description of this latter species corresponds fairly well with the two basidiomes of *Irpex caespitosus*, while the hyphal construction is quite similar but the difference lies in the microscopic details. The basidia in *H. palmatus* are shorter (18–24  $\mu\text{m}$  long) and the spores smaller (3.5–5  $\times$  2.5–3.5  $\mu\text{m}$ ). From this the conclusion seems justified to regard *I. caespitosus* as probably congeneric with *H. palmatus* but whether it is also conspecific cannot be decided at present. The variable spore sizes mentioned by Fidalgo (1963: 719) may be explained by the acceptance (i) of a single species with varying spore sizes or (ii) of two as yet unseparated species, one of which could be *I. caespitosus*. In view of this uncertainty, the genus *Hydnopolyporus* seems well worth a revision which should also include *H. hartmannii* (Mont.) Reid and *Thelephora pulvinulata* Speg. (Reid, 1962: 151, 158).

Lloyd (1919: 852, fig. 1426) named a collection he had received from Cochin China *Irpex caespitosus* (Lloyd Mycol. Coll. 23150). This collection, which has a

dimitic hyphal construction and generative hyphae with clamp-connections, is neither *I. caespitosus* nor an *Irpex*.

*caespitosus*. — *Irpex caespitosus* Schulzer in Verh. zool.-bot. Ges. Wien 16: 40, 1866.

This is a nomen nudum.

*calcareus*. — *Hydnum calcareum* Cooke & Masee apud Cooke in Grevillea 21: 38, 1892. — *Irpex calcareus* (Cooke & Masee apud Cooke) Wakef. in Bull. misc. Inf. R. bot. Gdns Kew: 367, 1915. — *Odontia calcarea* (Cooke & Masee apud Cooke) G. H. Cunn. in Trans. R. Soc. N.Z. 86: 70, 1959. — Type: not seen.

In his redescription of the species Reid (1956: 639) stated the hyphal structure to be monomitic. This at once excludes the species from *Irpex*.

*candidus*. — *Sistotrema candidum* Ehrenb., Sylv. mycol. berol.: 19, 30, 1818. — *Hydnum candidum* Ehrenb. ex Schlechtend., Fl. berol. 2: 197, 1824; not *Hydnum candidum* Willd. in Mag. Bot. (ed. Römer & Usteri) 2(4): 14, pl. 3 fig. 7, 1788; not *Hydnum candidum* Schmidt ex Fr., Syst. mycol. 1: 400, 1821. — *Sistotrema candidum* (Ehrenb. ex Schlechtend.) Pers., Mycol. eur. 2: 199, 1825. — *Irpex candidus* (Ehrenb. ex Schlechtend.) Weinm., Hym.-Gasteromyc.: 376, 1836. — Type locality: Germany, Berlin.

Fries (1871: 622) admitting his want of knowledge of the present species said: "Species mihi non rite cognita." I adhere to this view, for the original description actually gives too little information. Bresadola (1897: 100), however, recognized the fungus as a developmental stage of *Irpex violaceus* (Pers.) Quél. ("status resupinatus in prima evolutione"), which is a synonym of *Hirschioporus fusco-violaceus* (Ehrenb. ex Fr.) Donk. Recently Domański & al. (1967: 236) formally accepted the fungus as a form of the latter species but attributed the recombination erroneously to Bourd. & Galz. According to Ryvar den (1972a: 237), the correct place of the species is in *Trichaptum* Murrill.

*carneo-albus*. — *Irpex carneo-albus* Fr., Epicr. Syst. mycol.: 521, 1838. — *Xylodon carneo-albus* (Fr.) O.K., Rev. Gen. Pl. 3(2): 541, 1898. — Type locality: Sweden, Femsjö.

Fries stressed the azonate condition of the pileus, mentioned that he had found the species once, covering all the trunks in a burned coniferous wood, and stated that the subulate spines were serially aligned at the base and whitish flesh-colour. These characteristics combined form an obstacle for the maintenance of this species in *Irpex*.

*carneo-isabellinus*. — *Irpex palmatus* var. *carneo-isabellinus* Rick in Iheringia (Bot.) No. 5: 187, 1959. — Type: not seen.

Rick described this taxon as a variety to the species he called *Irpex palmatus* (Berk.)

Speg. Whether the latter corresponds to the species originally published by Berkeley is of no consequence in this relation. The main point is that he described the species as being fleshy and having the teeth distributed in clusters, very variable, but always short, compressed, and obtuse. These features are not *Irpex*-like.

*carneus*. — *Sistotrema carneum* Fr., Obs. mycol. 2: 268. 1818; *Hydnum carneum* Fr. ex Fr., Syst. mycol. 1: 420. 1821. — *Irpex carneus* (Fr. ex Fr.) Fr., Elench. Fung. 1: 148. 1828. — *Radulum carneum* (Fr. ex Fr.) Fuck., Symb. mycol. (= in Jb. Nassau. Ver. Naturk. 23-24): 23. 1870. — Type locality: Sweden.

The specific epithet, the colour of the basidiome, and the entire margin suggest that the species is not related to *Irpex*. Pilát (1925: 307) tentatively considered the species to be the same as *Phlebia merismoides* Fr. ex Fr., a synonym of *Phlebia radiata* Fr. (see e.g. Cooke, 1956: 391).

*cartilagineus*. — *Irpex cartilagineus* Speg. in An. Soc. cient. argent. 10: 130. 1880. — *Xylodon cartilagineus* (Speg.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Type: not seen.

In a later publication (1925: 389) Spegazzini withdrew the name, pointing out that the species was the same as *Trametes rigida* Berk. & Mont. According to Wright (1966: 532), however, *I. cartilagineus* is the same species as *Phaeotrametes decipiens* (Berk.) Wright.

*castaneus*. — *Merulius castaneus* Lloyd, Mycol. Writ. 4: 555, figs. 761, 762. 1916. — *Irpex castaneus* (Lloyd) Lloyd, Mycol. Writ. 6: 1060, fig. 1989. 1921. — *Cystidiophorus castaneus* (Lloyd) Imazeki apud Imazeki & Hongo, Col. Ill. Fungi Jap. 2: 125, fig. 244, pl. 40 fig. 244. 1965. — Lectotype: "*Merulius castaneus* / Mikawa, Japan / J. Umemura No. 120" (Lloyd Mycol. Coll. 55391, BPI).

Lloyd's original description accentuates that the context is made up of "deeply colored, rigid hyphae." This information, together with the monomitic hyphal structure of the context (according to a note left with the material by J. H. Ginns, Jr.), constitutes sufficient proof that the species does not belong to *Irpex*.

*cerasi*. — *Odontia cerasi* Pers., Obs. mycol. 2: 16. 1799. — *Polyporus cerasi* Pers. ex Fr., Syst. mycol. 1: 382. 1821 (misapplied). — *Irpex cerasi* (Pers. ex Fr.) Fr., Elench. Fung. 1: 146. 1828 (misapplied). — Type locality: Germany.

As pointed out by Donk (1967: 86) Fries at first misapplied the name used by Persoon. *Polyporus cerasi* and *Irpex cerasi* actually refer to *Schizophora paradoxa* (Schrad. ex Fr.) Donk, whereas the true *Odontia cerasi* is stated to be the same as *Hyphoderma radula* (Fr. ex Fr.) Donk.

*cerasicola*. — *Irpex cerasicola* Schulzer in Verh. zool.-bot. Ges. Wien 16 (Abh.): 41. 1866.

This is a nomen nudum.

*cervicolor*. — *Irpex sinuosus* var. *cervicolor* Berk. & Br. in J. Linn. Soc. (Bot.) 14: 60. 1873. — Holotype: "77. *Irpex sinuosus* Fr. var. *cervicolor* / Peradenia. G. H. K. T[hwaites] / Nov. 1867" (K).

Holotype consisting of two orbicular basidiomes 13 and 23 mm across. Pileus sessile, closely appressed to substratum, surface matted tomentose, yellow-brown, margin straight or somewhat curved inwards. Hymenophore hydroid-irpicoid-poroid. Spines up to 2 mm long, crowded, subulate, terete or flattened to fluted and gradually passing into dissepiments, pulverulent, yellow-brown, with acute or incised tip. Context about 1.5 mm thick, soft, yellow-brown with cinnamon shade, context of spines curry yellow.

Context of pileus monomitic, consisting of generative hyphae. Generative hyphae 3-5.4  $\mu\text{m}$  wide, not inflating, thin-walled to fairly thick-walled (cell-walls up to 1.5  $\mu\text{m}$  thick), branched, septate, with clamp-connections, but also with intercalary septa lacking clamps. Context of spines dimitic, made up of generative and skeletal hyphae, exuding very intense yellow colour when placed in drop of KOH solution. Generative hyphae 2.7-3.6  $\mu\text{m}$  wide, not inflating, thin-walled to moderately thick-walled, branched, septate, with clamp-connections. Skeletal hyphae 2.7-7.2  $\mu\text{m}$  wide, thick-walled to nearly solid. Basidia collapsed. Spores 4-4.5  $\times$  2.9-3.1  $\mu\text{m}$ , ellipsoid, adaxially flattened, smooth, colourless (?), with small oblique apiculus, strongly amyloid (staining dark blue in Melzer solution). Cystidia none.

The characters described above constitute a most remarkable set indeed, separating this fungus at once from true *Irpex*.

Petch & Bisby (1950: 44) regarded the present variety as identical with *Irpex flavus* Kl. but this species has non-amyloid spores, to name only one of the important differences.

*cervino-gilvus*. — *Irpex cervino-gilvus* Lloyd (?).

Lloyd (1923: 1188) listed this name in an enumeration of Philippine fungi received from H. A. Lee. It is not impossible that Lloyd intended this binomial as a recombination based on Junghuhn's *Polyporus cervino-gilvus*, of which he had seen the type material in Leiden (1911, Lett. 37: 2) but there is nothing to prove the assumption. There is no mention of this fungus in Teodoro's book (1937), nor was any clue found that could disclose the identity of the author. Hence, the name is considered to have been proposed by Lloyd, but it is a nomen nudum since it lacks a description. *Polyporus cervino-gilvus*, it may be noted, has recently been transferred to *Oxyporus* by Ryvarden (1973: 3).

*cervinus*. — *Irpex cervinus* Rick in Egatea 17: 211. 1932. — Type: not seen.

Rick described the teeth as crowded, regular, subulate, rough, flaccid, of a pronounced brown colour, becoming darker brown when bruised, and the spores 3  $\times$  3.5  $\mu\text{m}$  diameter, very regular. These characters would seem to separate this species from true *Irpex*.

*cinerascens*. — *Boletus cinerascens* Schw. in Schr. naturf. Ges. Leipzig 1: 99. 1822. — *Irpex cinerascens* (Schw.) Schw., Syn. Fung. Am. bor. (= in Trans. Am. phil.

Soc., N.S. 4): 164. 1832. — Holotype: "582-9-Syn. Fung. / *Irpex cinerascens* Schw. / Salem" [not in von Schweinitz' hand] (PH).

This is a true polyporaceous fungus, with thin red-brown context, made up of thin-walled colourless generative hyphae and solid brown-walled skeletal.

Overholts placed it in the synonymy of *Daedalea farinacea* (Fr.) Overh. (1953: 128).

*cingulatus*. — *Irpex cingulatus* Lloyd, Mycol. Writ. 5: 795, fig. 1197. 1918. — Holotype: "*Irpex cingulatus* / Sydney, N.S.W., Aust., Dr. J. B. Cleland" (Lloyd Mycol. Coll. 24154, BPI).

Holotype consisting of tightly packed, imbricate, and laterally fused pilei. Pileus about 15 mm radius, horizontal, convex, concentrically zoned and shallowly grooved, radiately wrinkled, glabrous or zoned with subtomentose areas, somewhat shiny, ochraceous yellow with zones of warmer yellow-brown, towards margin bordered with black band, extreme margin thickly tomentose, pale ochraceous. Hymenophore poroid-irpicoid; dissepiments locally so deeply incised as to form plates and spines, up to 3.5 mm long, coarse, smooth, fluted or interconnected, glabrous or pruinose, yellow-brown. Context c. 1 mm thick, woody, pale dingy ochraceous.

Context dimittic, consisting of generative, tendril, and skeletal hyphae. Generative hyphae 2.7-4.5  $\mu\text{m}$  wide, not inflating, thin-walled, branched, septate, with clamp-connections. Tendril hyphae thin-walled. Skeletal hyphae 3.6-8  $\mu\text{m}$  wide, thin- to thick-walled near margin, often solid farther back. Context of dissepiments consisting of generative and skeletal hyphae. Basidia c.  $18 \times 4.5 \mu\text{m}$ , immature, slender-clavate, with basal clamp. Spores not seen. Cystidia up to 55  $\mu\text{m}$  long, 9  $\mu\text{m}$  wide, of subhymenial origin, abundant, fusiform or slender-lageniform, often with long and slender neck, usually solid, not incrusted.

This is not an *Irpex*. Cunningham identified *I. cingulatus* first with *Irpex brevis* (1949: 3), later with *Irpex zonatus* (1965: 74). He was in error.

*cinnamomeus*. — *Irpex cinnamomeus* Fr., Epicr. Syst. mycol.: 524. 1838. — *Hydnochaete cinnamomea* (Fr.) Pat., Essai tax. Hym.: 99. 1900. — Type locality: North America.

Little if anything can be deduced from the original description. Murrill (1907: 3) recognized the species as being the same as his *Hydnoporia fuscescens* (Schw.) Murrill, a species with brown context hyphae and brown cystidia. Banker (1914: 234) having studied the collections of both Fries and von Schweinitz, summarized the situation as follows. He placed *Sistotrema olivaceum*, *S. fuscescens*, and *Irpex cinnamomeus* in the synonymy of *Hydnochaete olivaceum* (Schw.) Banker. Overholts (1953: 129) was of the opinion that *I. cinnamomeus* was correctly placed in the genus *Irpex*. Cooke (1960: 186) held the view that *I. cinnamomeus* should be synonymized with "*Hydnum squalidum* Fr.," which obviously is in error for *Hydnum squalinum* Fr., see Fries (1828: 139). The material under this name in Herb. E. Fries (UPS) was revised by Dr. L. Romell who regarded it as referable to *Daedalea unicolor*, now called *Cerrena unicolor* (Bull. ex Fr.) Murrill. Christiansen (1960: 177), however, hesitatingly placed *H. squalinum* under *Mycocacia*.

*citrinus*. — *Irpex citrinus* Rabenh. in Hedwigia 17: 113. 1878. — Type locality: Matamma (Gallabat), Africa.

To judge from the bright colour of the basidiome and the geographical position of the type locality it would seem correct to assume that the present species is identical with the very common *Irpex flavus* Klotzsch. Rabenhorst himself was struck by the resemblance. However, if his description of the spores is correct ("sporis . . . globosis vel subglobosis"), *I. citrinus* must be a different species. Perhaps it is only correct to assume that *I. citrinus* and *I. flavus* are congeneric. If they are, *I. citrinus* like *I. flavus* (which see) is not an *Irpex*.

*citrinus*. — *Irpex citrinus* Bres. apud Bres. & Sacc. in Bull. Soc. r. Bot. Belg. 38: 156. 1899. — Holotype: "*Irpex citrinus* Bres. n. sp. Resupinatum, . . . [followed by a description] / Congo Dewèvre" (Herb. Bres., S; a very small fragment, labelled isotype, has not been further considered). — Part of holotype: "*Irpex citrinus* Bres. n. sp. / Coquilhatville jan. 1896 / leg. Alf. Dewèvre / Congo / Det. Bresadola" / Herb. Sacc., PAD).

Basidiome covering some cm<sup>2</sup> of two bits of bark, effused. Subiculum thin, almost arachnoid, dingy citrine. Adhymenial surface waxy, yellow-brown to orange-brown, giving rise to network of lines or raised narrow ribs of darker orange-brown to red-brown. Spines 0.5–1.5 × 0.1–0.3 mm, springing from these ribs, distant, subulate, rarely terete, mostly flattened, occasionally confluent to form dissepiment-like partitions, orange-brown to dark brown.

Context monomitic, made up of generative hyphae. Generative hyphae 2.7–4.5 μm wide, slightly inflating, thin- to moderately thick-walled, branched, septate, without clamp-connections. Basidia approximately 12.5 × 3.6–4.5 μm, immature, clavate, without basal clamp. Spores 6.3–7.2 × 2.7–3.6 μm, elongate-ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus, not amyloid. Cystidia absent.

The above description has been drawn up from the specimen in PAD which was received some time prior to the arrival of the type from S. The latter is the larger specimen but otherwise identical; it yielded slightly larger spores: 6.3–8.1 × 2.7–3.8 μm.

This is not an *Irpex*.

*colliculosus*. — *Irpex colliculosus* Berk. & Br. in J. Linn. Soc. (Bot.) 14: 61. 1873. — *Xylodon colliculosus* (Berk. & Br.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — [Part of?] holotype: "No. 366 / *Irpex colliculosus* / [illegible] / [in pencil:] Dup." (K).

Material consisting of six loose bits which may well represent an entire basidiome each, largest measuring c. 15 × 8 mm. Subiculum subtomentose, avellaneous, margin dingy whitish. Hymenophore spongy or sparassoid, made up of variously shaped and branched plate-like outgrowths, more or less extensively fused so as to resemble badly torn dissepiments of a polypore, avellaneous; margins finely fimbriate, whitish. Context brownish.

Context monomitic throughout, consisting of generative hyphae. Generative hyphae 3–6.3 μm wide, more or less inflating, with thin or somewhat thickened



brownish cell-walls, branched, septate, with clamp-connections. Basidia  $18-27 \times 6-7 \mu\text{m}$ , immature, clavate, with basal clamp. Spores possibly of alien origin. Cystidia  $7-11 \mu\text{m}$  wide, cylindrical or lageniform, with  $4.5-7 \mu\text{m}$  wide neck, thin-walled.

The microscopic characters separate this species from *Irpex*.

*concentricus*. — *Irpex sinuosus* var. *concentricus*.

This varietal epithet was mentioned by Pilát (1940: 323) and may have been used for a North American collection from Newfield, N. J., collected by J. B. Ellis. According to the stencilled list edited by Cash (1953), however, no such epithet was published by Ellis.

*concrescens*. — *Irpex concrescens* Lloyd, Mycol. Writ. 4 (Lett. 60): 9, 1915. — Type: not seen.

This was shown by Gilbertson (1963b: 147) to be a synonym of *Poria ambigua* Bres.

*confluens*. — *Irpex confluens* (Pers. ex Fr.) Kummer, Führ. Pilzk.: 49, 1871. — Holotype: "*Sistotrema confluens*. Prope Gottingam lectum" (L 910.270-681).

This is not an *Irpex*, the correct name of the species being *Sistotrema confluens* Pers. ex Fr.

*conjunctus*. — *Irpex conjunctus* Britz., Hym.kunde 3: 12, fig. 188, 1897 (not seen); in Bot. Zbl. 71: 88, 1897. — Type locality: Germany?

The spores, which are said to be  $8 \times 2.3 \mu\text{m}$  and curved, possibly separate the species from the genus *Irpex*.

*consors*. — *Irpex consors* Berk. in J. Linn. Soc. (Bot.) 16: 51, 1877. — *Xylodon consors* (Berk.) O.K., Rev. Gen. Pl. 3(2): 541, 1898. — *Irpiciporus consors* (Berk.) Murrill in Mycologia 1: 166, 1909. — *Coriolus consors* (Berk.) Imaz. in Bull. Tokyo Sci. Mus. 6: 80, 1943. — *Polystictus consors* (Berk.) Teng, High. Fungi China: 494-762, 1964. — Holotype: "*Irpex consors* B. / Kobi Japan / Challenger" (K).

Of the three packets glued to the type sheet, the lowermost has been used for the redescription.

Basidiome covering approximately 115-45 mm, effused-reflexed, effused portion by far the larger, reflexed portions distantly imbricate. Pileus up to 6 or 7 mm radius, 6-8 mm wide, much wider by confluence, flabelliform, more or less horizontal, plane to convex, thinly tomentose, glabrescent, innately fibrillose, more or less radiately rugulose, occasionally shallowly concentrically furrowed, somewhat shiny, yellow-brown to reddish brown, concentrically zoned with darker or even blackish bands; margin straight or curved inwards, acute, even. Adhymenial surface waxy, somewhat shiny, yellow-brown. Spines  $3-4 \times 0.2-0.5 \text{ mm}$ , decurrent, crowded, subulate, occasionally terete but more often flattened, or plate-like, or channelled to tubuliform, pruinose, concolorous with the adhymenial surface, darker to reddish brown towards the tip, with entire or incised, glabrous or white-pubescent tip. Context about 0.5 mm thick, indistinctly zoned, tough, whitish.

Context of pileus dimitic, consisting of generative and skeletal hyphae. Generative hyphae 2.7–3.6  $\mu\text{m}$  wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletal hyphae 2.7–5.8  $\mu\text{m}$  wide, thick-walled to solid. Context of spines similar, hyphae somewhat narrower, skeletal not curved outwards to form cystidia. Basidia 14–15  $\times$  4.5–5.5  $\mu\text{m}$ , immature, clavate, with basal clamp, occasionally mixed with subglobose terminal cells of oleiferous hyphae, up to 8  $\mu\text{m}$  wide. Spores 5.2–6.2  $\times$  2.7–3.6  $\mu\text{m}$ , ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia not seen.

*Irpex consors* is not a true *Irpex*.

The type sheet bears the pencilled annotation by Miss E. M. Wakefield: "cfr. *decurrens* B." This is correct, *Irpex consors* and *I. decurrens* are two names for the same species but *I. consors* is the older name.

Itô (1955: 262) placed several more names in the synonymy of *Coriolus/Irpex consors*, such as *Irpex brevis*, *I. kusanoi* (with a question mark), and *Irpiciporus japonicus*.

In regard to *I. brevis*, it certainly resembles *I. consors* but the different aspect of the margin of its pileus and the incrustated tips of its skeletal in the spines seem to be a significant warning. If Cunningham's redescription (1965: 72) actually refers to *I. brevis*, its narrower spores (4–4.5  $\times$  1.5–2  $\mu\text{m}$ ) give additional weight to the view that the two species are distinct.

The correctness of including *Irpex kusanoi* in the synonymy of *I. consors* will probably remain a matter of doubt as long as authentic material cannot be located.

*Irpex consors* is one of the species considered identical with *I. zonatus* by Cunningham (1965: 74, 75) but I cannot subscribe to this view. The two species are easily distinguished already by the different aspect of both the pileus and the hymenophore. It is unfortunate that the poor quality of the types of both species — an all too common complaint — prevents me from adding a few more microscopic details.

A satisfactory illustration of *I. consors* was published by Lloyd (1917: 625, fig. 887).

*c o r i a c e u s*. — *Irpex coriaceus* Berk. & Rav. *apud* Berk. in Grevillea 1: 101. 1873. — *Xylodon coriaceus* (Berk. & Rav. *apud* Berk.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — *Trametes coriacea* (Berk. & Rav. *apud* Berk.) Pat. *apud* Duss, Enum. méth. Champ. Guadeloupe Martinique: 31. 1903. — Holotype: "[in pencil:] *Irpex coriacea* Berk. / [in ink:] No. 1111 / *Polyporus* / Winter on fallen logs & stumps / S[outh] C[arolina]. H. W. R[avenel]" (K).

Bresadola (1896: 287) placed the name of the present species, together with *Irpex griseo-fuscus* Mont. and *Hydnum trachyodon* Lév., under the synonymy of what he called *Irpex portoricensis* (Spreng. *apud* Fr.) Bres.

I have seen no material of the last-named species, but if Bresadola's statement is correct, *Irpex portoricensis* is not an *Irpex*. The context of *I. coriaceus* is dimitic (if not trimitic), made up of colourless, thin-walled, clamped generative hyphae 1.8–2.7  $\mu\text{m}$  wide, and brown, thick-walled to solid skeletal 3.6–4.5  $\mu\text{m}$  wide. The mere mention of the skeletal having brown cell-walls excludes the species from being a member of the genus *Irpex*.

Overholts (1953: 128) regarded *I. coriaceus* as a synonym of his *Daedalea farinacea* (Fr.) Overh., basing this statement on Ravenel, *Fungi Carol. exs.* 3: 21.

*corticoides*. — *Irpex corticoides* Rick in *Iheringia* (Bot.) No. 5: 187. 1959. — Type: not seen.

The *Corticium*-like appearance combined with the slender, sharp, and flaccid spines, and the shape of the spores which are stated to be spherical or ovoid or angular, are all characters alien to *Irpex*.

*crassitatus*. — *Irpex crassitatus* Lloyd, *Mycol. Writ.* 6: 909, pl. 141 fig. 1611. 1920. — Holotype: "*Irpex crassitatus* / Ft Dodge, Iowa/O. M. Oleson" (Lloyd *Mycol. Coll.* 24166, BPI).

Instead of a full description the following features may suffice for a characterization of the fungus. Pilei imbricate, ochraceous, thick-fleshed. Hymenophore poroid-irpicoid, with coarse, sinuous plates. Context soft above, firmer below, dingy white, monomitic (thick-walled generative hyphae and thin-walled tendril hyphae). Basidia uncommonly large,  $34-40 \times 7-9 \mu\text{m}$ . Spores  $5.4-6.3 \times 4.5-5.4 \mu\text{m}$ , subglobose, with large oil drop. Cystidia none.

The identity of this species with its barbarous name is unmistakable: *Spongipellis pachyodon* (Pers.) Kotl. & Pouz.

*crassus*. — *Irpex crassus* Berk. & Curt. in *Hook. J. Bot.* 1: 236. 1849. — *Xylodon crassus* (Berk. & Curt.) O.K., *Rev. Gen. Pl.* 3(2): 541. 1898. — Type: not seen.

Murrill (1905: 471) placed *I. crassus* in the synonymy of his *Irpiciporus mollis* (Berk. & Curt.) Murrill, while Bresadola (1920: 70) referred the species to *Irpex pachyodon*. Both names concern the same species which is correctly named *Spongipellis pachyodon* (Pers.) Kotl. & Pouz.

*crispatus*. — *Irpex crispatus* Berk. *apud* Cooke in *Grevillea* 19: 109. 1891. — *Xylodon crispatus* (Berk. *apud* Cooke) O.K., *Rev. Gen. Pl.* 3(2): 541. 1898. — Holotype: "No. 145 / *Irpex crispatus* B. & C. / Venezuela" (K).

Two basidiomes forming patches of different size ( $50 \times 40$  mm and  $10 \times 10$  mm) on same piece of bark, larger one adjoining a pileate portion of same species (and, very probably, originated from same mycelium, apparently unobserved by the author). Pileus 7 mm radius, 10 mm wide, flabelliform, narrowed behind to short stipe-like base with which it is attached to substratum, plano-convex, finely radiately rugulose (probably from drying), woolly-tomentose, dingy ochraceous; margin straight, entire, pubescent, concolorous. (The remainder of the description is drawn up from the effused portion:) Adhymenial surface tomentose to matted and somewhat shiny, soft, porous, very pale ochraceous. Spines up to 1.5 mm long, up to 1 mm broad by confluence, distant, rarely subulate and terete, mostly plate-like, variously curled, contorted, and lacerate, fluted at base or frankly interconnected by elevated ridges, thus looking like torn dissepiments of a polyporoid fungus, glabrous, very pale ochraceous, brownish towards tip. Context very thin, soft, whitish.

Context monomitic or perhaps imperfectly dimitic. Generative hyphae up to

5.4–7.2  $\mu\text{m}$  wide, flaccid, several more or less inflating, thin- to moderately thick-walled, branched, septate, without clamp-connections, often somewhat constricted at septa, conspicuously filled with oily matter. Skeletal hyphae (or perhaps rather skeletal-like, sclerified generative hyphae) 4.5–6.3  $\mu\text{m}$  wide, thick-walled to nearly solid, flaccid, not infrequently septate and branched. Context of spines similar, probably somewhat more clearly dimitic. Basidia and spores not seen. Cystidia 5.4–6.3  $\mu\text{m}$  wide, largely occurring near tip of 'spine', little protruding, incrustated, cylindrical to somewhat fusiform in the distal part, with obtuse or acute apex.

The general aspect of the basidiome, the morphological characters and, more especially, the microscopic details available, all show that the present species does not have any relation to the genus *Irpex*.

*c r i s p u s*. — [*Hydnum octavum* Schaeff., Fung. Icon. 2: pl. 147 fig. 1. 1763. —] *Hydnum crispum* Schaeff., Fung. Icon. 4: 97. 1774 (pr. p.); ex Fr., Syst. mycol. 1: 413. 1821; not *Hydnum crispum* Scop., Fl. carniol., ed. 2, 2: 473. 1772. — *Irpex crispus* (Schaeff. ex Fr.) Fr., Epicr. Syst. mycol.: 521. 1838. — Type locality: Germany, Bavaria.

A few lines in relation with this epithet have been written on an earlier occasion (Maas Geesteranus, 1960: 353), but its transfer by Fries to the genus *Irpex* requires some additional words. It was Fries himself (1874: 620) who subsequently dropped the species as being dubious: "*Hydnum crispum* Schaeff. t. 147. f. 1 hujus quoque generis [= *Irpex*] videtur, sed ambiguum, quare omittitur."

*c u b e n s i s*. — *Irpex cubensis* Berk. & Curt. in J. Linn. Soc. (Bot.) 10: 326. 1868. — *Xylodon cubensis* (Berk. & Curt.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — *Coriolus cubensis* (Berk. & Curt.) Pat. apud Duss, Enum. méth. Champ. Guadeloupe Martinique: 31. 1903. — *Irpiciporus cubensis* (Berk. & Curt.) Murrill in N. Am. Fl. 9: 15. 1907. — Holotype: "No. 240 *Irpex cubensis* B. & C. / Cuba. C. Wright" (K).

The holotype consists of a portion of a single pileus glued to a piece of paper so that most of the abhymenial surface is out of sight. Pileus (as far as it remains) 8 mm radius, 12 mm wide, flabelliform, glabrous, innately fibrillose, somewhat concentrically zoned, dingy ochraceous to yellowish brownish; margin curved inwards, running out into spines. Adhymenial surface waxy, somewhat shiny, yellow-brown. Spines 1–1.5  $\times$  0.1–0.3 mm, crowded to subsistant, subulate, terete to flattened or channelled, glabrous, smooth or uneven, concolorous with the adhymenial surface, with entire or incised, whitish tip. Context tough, whitish.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 1.8–2.7  $\mu\text{m}$  wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletal hyphae 3.6–6.3  $\mu\text{m}$  wide, thick-walled to solid. Not infrequently 8–12.5  $\mu\text{m}$  wide cells seen in context, which are clavate to globose, representing swollen terminals of oleiferous hyphae. Context of spines similar, skeletal not curved outwards to form cystidia. Basidia about 4.5  $\mu\text{m}$  wide, immature, occasionally mixed with swollen terminal cells of oleiferous hyphae. Spores not seen. Cystidia not seen.

So little remains of the type that a few fibers taken off the pileus and one spine had to suffice for the description of the microscopic details, which in consequence are far from complete. Yet it is obvious that the present species was wrongly placed in *Irpex*.

The strongly swollen, oil-filled hyphal ends in the context of the pileus and in the hymenium are a very conspicuous feature of the specimen examined but it remains to be seen whether they are truly characteristic of the species.

Cunningham (1965: 75) observed that he had examined the type of *I. cubensis* in Kew herbarium and had found it to be the same as *I. zonatus*. The examination must have been very superficial; the two species are not identical.

*daedaleiformis*. — *Irpex daedaleiformis* Vel., České houby: 743. 1922. — Type: not seen; type locality: Prague, Hvězda forest.

According to Pilát (1925: 304) this is a daedaloid form of *Irpex deformis*, a species now currently identified with *Schizophora paradoxa* (Schrad. ex Fr.) Donk.

*decolorans*. — [*Irpex decolor* Berk. & Curt. in Herb.] *Irpex decolorans* Cooke in Grevillea 19: 109. 1891. — *Xylodon decolor* "(Berk. & Curt.)" O.K., Rev. Gen. Pl. 3(2): 541. 1898 (not validly published). — Holotype: "*Irpex decolor* B. & C. / 835. [in pencil:] Cuba / White. On rotting logs" (K).

Context monomitic. Generative hyphae 3–7.2  $\mu\text{m}$  wide, somewhat inflating, thin- to moderately thick-walled, branched, septate, with clamp-connections.

From this partial redescription the hymenial details have been omitted but the data supplied are quite sufficient to show that *Irpex decolorans* has no relation whatever to genuine *Irpex*.

*decumbens*. — *Irpex decumbens* Rick in Egatea 17: 211. 1932. — Type: not seen.

The spines were said to be elongate-lamellate, decumbent, entire, thin, and the spores 3  $\mu\text{m}$  diameter and spherical. The evidence is admittedly slight, but at least some of these characters do not seem to fit in with *Irpex*.

*decurrens*. — *Irpex decurrens* Berk. apud Cooke in Grevillea 19: 109. 1891. — *Xylodon decurrens* (Berk. apud Cooke) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Holotype: "*Irpex decurrens* B. / 16. Dickins. Japan" (K).

Holotype consisting of several fragments of a decrepit and badly soiled fungus glued to two pieces of paper and accompanied by a pencil sketch of the habit. Basidiome effused-reflexed, effused portion much larger than reflexed, more or less imbricate pilei. Pileus about 8–10 mm radius, 5–8 mm wide, wider by confluence, flabelliform, strongly curved inwards, glabrous, finely radiately rugulose, with a few inconspicuous concentric depressions, dull, dingy yellow-brown at base, blackened towards margin, much covered with dirt but still visibly concentrically zoned; margin curved inwards, acute, even. Adhymenial surface waxy, somewhat shiny, yellow-brown. Spines  $4.5 \times 0.2$ –0.6 mm, decurrent, crowded, subulate and terete or, more frequently, flattened to plate-like, or channelled to tubuliform, pruinose, concolorous with adhymenial surface, reddish brown to blackened towards tip, with entire or incised, glabrous or white-pubescent tip. Context tough, whitish.

Context of pileus dimitic, consisting of generative and skeletal hyphae. Generative

hyphae 2.7–4.5  $\mu\text{m}$  wide, not inflating, thin- to moderately thick-walled, branched, septate, with clamp-connections. Skeletal hyphae 3.6–8  $\mu\text{m}$  wide, thick-walled to solid. Context of spines similar, skeletal not curved outwards to form cystidia. Basidia 14–18  $\times$  4.5–5.5  $\mu\text{m}$ , immature or collapsed, clavate, with basal clamp, very occasionally mixed with very much swollen terminal cell of oleiferous hypha, up to 9  $\mu\text{m}$  wide. Spores 4.5–5.4  $\times$  3.4–3.8  $\mu\text{m}$ , ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia not seen.

An earlier name for this fungus is *Irpex consors*, or perhaps *I. brevis*.

**d e f o r m i s.** — *Irpex deformis* Fr., Elench. Fung. 1: 147. 1828. — Type locality: ? Sweden.

This was identified by Donk with *Schizopora paradoxa* (Schrad. ex Fr.) Donk (1967: 104). Domański who at first (1965: 51) preferred to maintain the epithet as the name of a form, later merged it in the synonymy of *S. paradoxa*.

**d e n d r o i d e s.** — *Irpex spathulatus* var. *dendroides* Pilát in Anns mycol. 23: 303. 1925. — Type: not seen.

The author stated that his variety was identical with “die Hauptart” in microscopic respect, differing from it in the greyer colour and the longer and more branched spines. The microscopic details of what Pilát regarded as “die Hauptart” give the impression of a fungus having a monomitic hyphal structure. This characteristic prevents variety *dendroides* from being included in *Irpex*.

Later (1939: 276) Pilát came to the conclusion that his fungus was the same as what he called *Trametes abietina* var. *Sistotrema hollii* (Schmidt) Bourd. & Galz.

Domański & al. (1967: 236) placed the variety in the synonymy of one of the forms of *Hirschioporus fusco-violaceus* (Ehrenb. ex Fr.) Donk.

**d e p a u p e r a t u s.** — *Irpex depauperatus* Berk. & Br. in J. Linn. Soc. (Bot.) 14: 61. 1873. — *Xylodon depauperatus* (Berk. & Br.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Holotype: “*Irpex depauperatus* B. & Br./No. 981/[Ceylon,] Cent. Province/Dec. 1868” (K).

Basidiome effused, covering several strips of decomposed wood, consisting of no more than a very thin, arachnoid layer bearing hymenium and scattered spines. Adhymenial surface reticulately cracked, porous, very pale dingy sulphureous. Spines up to 0.3 mm long, distant, simple and terete or fused and forming straight or flexuous or furcate plates or ridges, yellowish flesh coloured, with fimbriate whitish tip.

Context monomitic. Generative hyphae 2.7–5  $\mu\text{m}$  wide, not inflating but occasionally somewhat swollen near septa, thick-walled (cell-wall up to 1.8  $\mu\text{m}$  thick, remarkably roughened externally by crystals), branched (side-branches often set at wide angle), septate, without clamp-connections. Context of spines and plates similar, hyphae narrower. Basidia 12.5–14.5  $\times$  2.7–4.5  $\mu\text{m}$ , immature, clavate, without basal clamp, some seen with 4 incipient sterigmata. Spores 4–4.5  $\times$  1.8–2.1  $\mu\text{m}$ , slender-ellipsoid, somewhat curved, adaxially flattened, smooth, colourless, with small apiculus, not amyloid. Cystidia none, but tip of spine sterile and made up of tufts and strands of firmly adhering hyphae up to 3  $\mu\text{m}$  wide.

This is not a member of the genus *Irpex*.

*depauperatus*. — *Irpex depauperatus* Masee in Bull. misc. Inf. R. bot. Gdns Kew: 157. 1901. — *Irpex tasmanicus* H. Syd. & P. Syd. in Annl. mycol. 1: 177. 1903 (name change). — Type: not seen.

Bodman (1953: 213) referred this species with some hesitation to *Heterochaete delicatum* (Kl. ex Berk.) Bres., but according to Reid (1957: 129) it is the same as *Eichleriella spinulosa* (Berk. & Curt.) Berk.

*destruens*. — *Irpex destruens* Petch in Ann. R. bot. Gdns Peradeniya 4: 300. 1909. — Type locality: Ceylon, Uda Pussellawa.

Petch mentioned Uda Pussellawa, Ceylon, as the locality whence came this species, whereas the three collections sent from Kew (Nos. 2357, 2961, 3906) were all from Hakgala. It is not clear, therefore, whether any of these can be taken to represent the type, although they certainly are authentic.

Context of basidiome monomitic at least at margin, consisting of generative hyphae. Hyphae 3–5.4  $\mu\text{m}$  wide, not inflating, thin-walled, branched, septate, with clamp-connections. Context of dissepiments dimitic, made up of generative and skeletal hyphae. Generative hyphae up to 3.6  $\mu\text{m}$  wide, with clamp-connections. Skeletal hyphae 3.6–5.8  $\mu\text{m}$  wide, thick-walled to solid, not curved outwards. Basidia and spores not seen. Cystidia absent.

No. 2357 was chosen for examination and from the microscopic details seen it follows that the species has no relation to true *Irpex*.

*discolor*. — *Irpex discolor* Berk. & Curt. apud Berk. in Grevillea 1: 145. 1873. — *Xylodon discolor* (Berk. & Curt. apud Berk.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — *Gloeodontia discolor* (Berk. & Curt. apud Berk.) Boidin in Cah. Maboké 4: 22. 1966. — Holotype: "No. 2939 / *Irpex discolor* B. & C. / Car. Inf. underside of carious logs / -Ravenel" (K).

*Irpex discolor* was made by Boidin (l.c.) the type of his new genus *Gloeodontia*.

For a redescription of this species, based on the isotype in Herb. Curtis (FH), the reader is referred to Gilbertson (1965: 852).

Unfortunately the material in Herb. Kew, originally glued to a single piece of paper, has been divided into two portions. One portion remained in its place and shows good spores which are clearly amyloid and verrucose, but precisely the two fragments that were removed and put in a separate packet labelled "Holotype" are badly weathered. They are practically useless since the hymenial elements are collapsed into unrecognizability, while the spores are mere shadows of their former selves.

*dregeanus*. — *Corticium dregeanum* Berk. in Lond. J. Bot. 5: 3. 1846. — *Hymenochaete dregeana* (Berk.) Masee in J. Linn. Soc. (Bot.) 27: 114. 1890. — *Lopharia dregeana* (Berk.) Talbot in Bothalia 6: 57, pl. 42. 1951. — *Irpex dregeanus* (Berk.) Talbot in Bothalia 6: 344. 1954. — Type: not seen.

A detailed redescription of the fungus was given by Talbot (1951) who described

the hyphae as "hyaline, thick-walled with very narrow lumen." His Pl. 42 also seems to show thick-walled hyphae of a single kind. Confirmation of this assumption can be obtained by tapping another source.

In his next paper Talbot (1954) mentioned his discovery of the irpicoid forms of *Lopharia dregeana* being conspecific with *Irpex vellereus*. Reid (1956: 637-638) did not agree with this view but was prepared to recognize a "very close relationship" between the two species, the only differences noted being in the size of the spores and the width of the cystidia. Since Reid described the context of *Irpex vellereus* as "apparently monomitic, consisting of thick-walled . . . hyphae, 4-9  $\mu$  wide, lacking clamps at the septa, and with narrow lumina," it follows that *L. dregeana*, too, is a fungus of monomitic hyphal construction. This being so, *L. dregeana* cannot be associated with *Irpex*, a genus characterized by dimitic hyphal construction of the context.

*durescens*. — *Hydnum durescens* Cooke in Grevillea 9: 98. 1881. — *Irpex durescens* (Cooke) Cooke in Grevillea 13: 4. 1884; Sacc., Syll. Fung. 6: 485. 1888 (preoccupied). — *Xylodon durescens* (Cooke) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Holotype: "Sp. nov. / [in pencil:] allied to *H. glabrescens* / *Hydnum* [durellum crossed out] *durescens* Cke / Fernando Po? / No. 9 Gustav Mann" (K).

Holotype consisting of two unequally large pileate basidiomes. Pileus of larger basidiome c. 50 mm radius, c. 90 mm wide, sessile with narrowed base, flabelliform, horizontal, somewhat plano-convex, concentrically zoned by closely spaced slightly raised lines and narrow grooves, radiately uneven and wrinkled, finely fibrillose-tomentose, yellow-brown with cinnamon shade (dusted over with white bloom resulting from mercuric chloride treatment). Adhymenial surface subtomentose, pale brown. Spines up to 3 mm long, 0.2-0.5 mm broad, broader when fused, crowded, subulate, more or less terete to flattened, pale brownish, with entire, acute tip. Context tough, pale brownish.

Context of pileus trimitic, consisting of generative, skeletal, and binding hyphae. Generative hyphae 2.7-3.5  $\mu$ m wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletal hyphae 2.7-8  $\mu$ m wide, thick-walled to solid, cell-walls pale yellow-brown. Binding hyphae up to 5-6  $\mu$ m wide, thick-walled to solid, very much twisted and branched in a freakish manner, mostly transversely. Basidia 13.5-16  $\times$  4.5  $\mu$ m, immature, clavate, with basal clamp. Spores not seen. Cystidia 3.6-7.2  $\mu$ m wide, occurring in great abundance, protruding, not incrusting, thick-walled to solid, majority tapering to sharp point.

This is obviously not an *Irpex*.

*effusus*. — *Irpex effusus* P. Henn. in Hedwigia 36: 198. 1897. — Type locality: Brazil.

This fungus was said to form "dünne, abziehbare Häute mit hängenden breiten häutigen Stacheln. . . ." These characters are so different from what is known of *Irpex lacteus* that any relation of the Brazilian fungus to this genus must be denied.

*elongatus*. — *Polyporus elongatus* Berk. in Lond. J. Bot. 1: 149. 1842. — *Polystictus elongatus* (Berk.) Fr. in Nova Acta r. Soc. Sci. upsal. III 1: 78. 1851. —



*Coriolus elongatus* (Berk.) Pat., Essai tax. Hym.: 94. 1900. — *Irpex elongatus* [Berk?] Lloyd, Mycol. Writ. 7: 1231, pl. 260 fig. 2576. 1923 (not validly published). — Type: not seen.

Berkeley described his fungus as follows: "Pileus 2-2½ inches long, springing from a common effused crust, cuneiform, much attenuated behind." This is a habit so completely different from what is known in *Irpex lacteus* that a generic separation on this character alone would not seem unreasonable. In support of this assumption Berkeley's description yields a second character ("pores minute, but visible to the naked eye. . .") that is totally unlike the aspect in *Irpex*.

The binomial *Irpex elongatus* introduced by Lloyd looks like a recombination, but in reality it is one of his strangely contorted name-juggles and not validly published. While referring to *I. formosus* Sacc., he stated that it was only a hymenial form of *Polystictus elongatus*.

*epiphyllus*. — *Irpex epiphyllus* Schw., Syn. Fung. Am. bor. (= in Trans. Am. phil. Soc., N.S. 4): 164. 1832. — Type: not seen.

This was said by Bresadola (1908: 39) to be a resupinate form of *Trametes cervina* (Schw.) Bres., with the hymenophore torn and dentate from old age.

*farinaceus*. — *Irpex farinaceus* Fr. in Linnæa 5: 523. 1830. — *Xyloдон farinaceus* (Fr.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — *Cerrenella farinacea* (Fr.) Murrill in N. Am. Fl. 9: 74. 1908. — *Daedalea farinacea* (Fr.) Overh. in Bull. Torrey bot. Club 65: 174. 1938. — *Antrodia farinacea* (Fr.) Teng, High. Fungi China: 495, 759. 1964. — Type locality: Brazil.

This is probably not an *Irpex* since the context is said to be rusty brown (Overholts, 1953: 129), but the evidence is admittedly slight.

*ferreirae*. — *Hydnum ferreirae* Bres. & Torrend *apud* Torrend, Fungi sel. exs., ser. 1-4, No. 35. 1910 (nomen nudum; published again, as it seems, in a separate list added to Broteria 10, 1912). — Authentic material: "Torrend, Mycoth. ocean. 35, *Irpex ferreirae* Bres. et Torrend / ad ligna decidua / Timor / M. Ferreira / IV [19]09" (Z).

Material consisting of two fragments, one of which represents the margin of a basidiome. Basidiome several cm long and broad, effused. Margin thick, woolly-tomentose, dingy yellowish, locally flushed with some brownish shade. Hymenophore shallowly poroid near margin, poroid-hydroid towards centre; dissepiments gradually passing into irregularly shaped plates or spines. Spines up to 1 mm long, coarse, finely pubescent, warm yellow-brown to subfulvous, with blunt, whitish tip. Context soft, woolly, pallid.

Context monomitic, consisting of generative hyphae. Generative hyphae 4.5-5.4 µm wide, not inflating, moderately to fairly thick-walled (cell-wall up to 1.8 µm thick), branched, septate, without clamp-connections. Context of spines similar, generative hyphae up to 6.3 µm wide, curved outwards to form cystidia. Basidia and spores not yet developed. Cystidia 2.7-4.5 µm wide, very abundant, protruding, thick-walled to solid, cylindrical or tapering towards obtuse apex, incrustated.

In microscopic respect this fungus corresponds so well to the redescription which Reid (1956: 637) gave of *Irpex vellereus*, a species later recognized to be identical with *I. griseo-fuscescens* (Reid, 1963: 273), that there seems little danger in regarding *Hydnum ferreirae* as yet another synonym.

*fimbriiformis*. — *Irpex fimbriiformis* Berk. & Curt. *apud* Berk. in Grevillea **1**: 145. 1873. — *Xylodon fimbriiformis* (Berk. & Curt. *apud* Berk.) O.K., *Rev. Gen. Pl.* **3**(2): 541. 1898. — Type: not seen.

Gilbertson (1965: 854) placed this name in synonymy with *Odontia stipata* (Fr.) Quél., a name he later (1971: 300) recombined as *Hyphodontia stipata* (Fr.) Gilbertson.

*flavus*. — *Irpex flavus* Kl. in *Linnaea* **8**: 488. 1833. — *Xylodon flavus* (Kl.) O.K., *Rev. Gen. Pl.* **3**(2): 541. 1898. — *Hirschioporus flavus* (Kl.) Teng, *High. Fungi China*: 485, 761. 1964. — *Flavodon flavus* (Kl.) Ryv. in *Norw. J. Bot.* **20**: 3. 1973. — Holotype: "*Irpex flavus* Kl. / N[orth] A[merica] Dr. Richardson. Ex herb. Hook". (K).

Holotype consisting of several isolated or confluent patches on four different bits of twigs, largest patch measuring 64 × 14 mm. Basidiome effused to effused-reflexed. Reflexed part 1 or 1.5 mm radius, velutinous to woolly, dingy yellow or brownish yellow, margin and effused part similar. Hymenophore irpicoid or poroid. Dissepiments up to 1 mm long, tomentose, yellow-brown. Context up to 1 mm thick, homogeneous, fibrillose, rather loosely constructed, soft, yellow-brown.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 2.7–4.5 μm wide, not inflating, thin-walled, branched, septate, without clamp-connections. Skeletal hyphae 2.7–7.2 μm wide, with thick, yellow cell-walls or almost solid, covered with crystalline matter. Context of dissepiments similar. Basidia, spores, cystidia not yet developed.

The soft, almost spongy, rather loosely constructed context and the yellow cell-walls separate this species from *Irpex lacteus*. Whether these characters will also prove sufficient to maintain a generic separation seems questionable. There must be others although we are not yet aware of them. In any case Ryvarden's decision (1973: 3) to segregate a new genus, *Flavodon*, for the accommodation of *I. flavus* seems preferable to accepting this species as a true *Irpex*. Acceptance in *Irpex* might well result in an ever spreading wave of disturbances in other groups, which would go far beyond the scope and responsibility of the present paper.

It is most unfortunate that present-day's growing ignorance of the basic languages Greek and Latin results, among other things, in the knocking together of such a mongrel as the generic name *Flavodon*.

*flavus*. — *Polyporus flavus* Jungh. in *Verh. Batav. Genootsch. Kunst. Wetensch.* **17**: 46, pl. 10 fig. 25. 1838; not *Polyporus flavus* P. Karst., *Sydv. Finl. Polypor.*: 40. 1859 (not seen). — *Polystictus flavus* (Jungh.) Fr. in *Nova Acta r. Soc. Sci. upsal.* **III** **1**: 85. 1851. — *Irpex flavus* (Jungh.) Kalchbr. in *Grevillea* **10**: 57. 1881. — *Trametes flava* (Jungh.) Pat., *Essai tax. Hym.*: 93. 1900. — *Trichaptum flavum* (Jungh.) G. H.

Cunn. in Bull. N.Z. Dep. scient. industr. Res. **164**: 101. 1965. — Lectotype: "*Polyporus flavus*. eff. / Majo. Djocjok." (L 910.219-535); syntype: "*Polyporus flavus*, var. pileis dimidiatis subliberis / Mai. Gocong Sebu Rongkap" (L 910.219-589).

Lectotype (depicted in Fig. 25a) consisting of some effused-reflexed basidiomes, forming confluent patch about 70×20 mm. Reflexed part up to 2 mm radius, velutinous to woolly, dingy yellow (locally with curry yellow shade) or yellow-brown, margin and effused part similar. Hymenophore irpicoid-poroid. Dissepiments partially elongated to form irpicoid teeth or plates, up to 2 mm long, tomentose, yellow-brown. Context about 0.5 mm thick, homogeneous, fibrillose, rather loosely constructed, soft, curry yellow to yellow-brown.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 3-4.5  $\mu$ m wide, not inflating, thin- to moderately thick-walled, branched, septate, without clamp-connections. Skeletal hyphae 3-5.4  $\mu$ m wide, with thick, yellow cell-walls or almost solid, covered with crystalline matter. Context of dissepiments similar, generative hyphae narrower and thin-walled. Basidia 18-22.5×3.6-4.5  $\mu$ m, immature, clavate, without basal clamp. Spores not seen. Cystidia 3.6-4.5  $\mu$ m wide, of tramal and subhymenial origin, evenly distributed over spine, abundant, somewhat projecting beyond hymenium, incrustated, cylindrical or somewhat tapering towards obtuse apex.

Junghuhn himself was uncertain as to the identity of his species with *Irpex flavus* Kl., but Bresadola (1910: 586) was convinced they were the same. The latter is here shown to be correct. His opinion, however, seems to have been overlooked or ignored. Lloyd (1911: 3) expressed his disbelief in their identity because *I. flavus* Kl. was supposed to have been collected in arctic regions. This assumption, although perhaps not boldly adhered to in modern literature, lingered on until quite recently.

*foliaceo-dentatus*. — *Irpex foliaceo-dentatus* Nikol. in Bot. Mater. Otd. spor. rast. bot. Inst. **6**: 85. 1949. — *Coriolus foliaceo-dentatus* (Nikol.) Domański in Acta Soc. Bot. Pol. **39**: 701. 1970. — Type: not seen.

Domański assigned this species to the genus *Coriolus* because he found the context to be trimitic. Taking the term literally, Domański is correct but, judging from his illustration (1970: 704, fig. 2e), one of the 'binding hyphae' merely represents a branched skeletal, while the other is clearly a generative hypha with a clamp. As discussed on p. 447, many of the binding hyphae described in literature are nothing but branched skeletals. This implies that a context is definitely not trimitic if its 'binding hyphae' are of the above type. *Irpex foliaceo-dentatus* may be a *Coriolus* on other grounds but it is impossible to believe in the value of its alleged trimity. It may suffice here to point out that apparently *I. foliaceo-dentatus* fails to produce cystidia, and it is on account of this negative character that I reject the present species as a member of the genus *Irpex*. An additional feature, which may well prove to be of importance but does not seem to have been evaluated, is the very different aspect of the incipient dissepiments in *I. foliaceo-dentatus*.

*fomentarius*. — *Irpex fomentarius* Mont., Syll. Gen. Spec. cryptog.: 174. 1856. — *Xylodon fomentarius* (Mont.) O.K., Rev. Gen. Pl. **3**(2): 541. 1898. — Type: not seen.

Two features in the description of the present species do not tally with *Irpex*. They are the colour of the subiculum, stated to be dark brown, and the peculiar fact that the hymenophore (called pileus in the description) is separable from the subiculum.

*formosus*. — *Irpex formosus* Sacc. *apud* Sacc. & Berl. in *Atti R. Ist. veneto Sci. VI* 3: 724. 1885. — *Xylodon formosus* (Sacc. *apud* Sacc. & Berl.) O.K., *Rev. Gen. Pl.* 3(2): 541. 1898. — Holotype: "*Irpex formosus* / Mexico (Galcotti) / Bommer / [in a different hand:] ab I. zonato B. et I. incrustante B. et Mont. dentibus creberrimis, minutis" (Herb. Sacc., PAD).

Holotype consisting of two well preserved basidiomes, one slightly larger than the other. Pileus approximately 65×45 mm, laterally attached by stipe-like base, patent, flabelliform, deeply divided into slender segments, concentrically zoned, fairly coarsely radiately wrinkled, with hirsute-tomentose zones near base, glabrescent towards margin, somewhat shiny, ochraceous yellow-brown, with numerous but little conspicuous darker zones, margin lacerate. Hymenophore poroid at extreme margin, pores radiately elongate, dissepiments backwards very soon passing into tumbled mass of spines. Spines up to 1.5 mm long, subulate, terete, flattened, fluted, canaliculate, simple, lacerate, branched, or confluent, yellow-brown, with entire, acute tip. Context thin, pliable, pallid.

Context dimittic, consisting of generative and skeletal hyphae. Generative hyphae 2.7–3.6  $\mu\text{m}$  wide, not inflating, thin- to moderately thick-walled, branched, septate, with clamp-connections. Skeletal hyphae 3.6–6.3  $\mu\text{m}$  wide, thick-walled to solid. Context of spines similar, generative hyphae often thick-walled to solid. Basidia about 5  $\mu\text{m}$  wide, very immature, clavate, with basal clamp. Spores not seen. Cystidia 18–27×4–5.5  $\mu\text{m}$ , all of subhymenial origin, very numerous, not incrustated, cylindrical, fusiform or somewhat torulose, thick-walled to solid, with more or less acute apex.

The great number of thick-walled cystidia of this species and their origin are certainly reminiscent of the strikingly similar situation in *Steccherinum veniforme*. So much so in fact that it becomes necessary to investigate the possible relationship between the two species. Admission of *I. formosus* to *Steccherinum*, it may be pointed out, would introduce a character thus far barred from this genus, and it would be one with far-reaching consequences. While the construction of the hymenophore may be considered not to play an important role in some genera, it probably does in *Steccherinum*. In this genus the incipient hymenophore is not genuinely poroid, exceptions to this rule being unknown. Fortunately, there are additional characters to help keep *I. formosus* separated from *Steccherinum*. These are (i) the remarkable, coarsely wrinkled upper surface of the pileus, (ii) the lack of tramal cystidia in the spines, (iii) the absence of crystals to the hymenial cystidia (although it must be admitted that ii and iii are not entirely dependable).

The same three characters are here used to exclude *I. formosus* from *Irpex*, and they are supported by a fourth — the presence of clamps —, for the discussion of which the reader is referred to p. 449.

Lloyd (1923: 1231) held the view that *I. formosus* was "only a hymenial form of *Polystictus elongatus*." Considering the description Berkeley published of the latter, Lloyd's supposition is erroneous.

*furfuraceo-velutinus*. — *Irpex furfuraceo-velutinus* Rick in *Iheringia* (Bot.) No. 5: 188. 1959. — Holotype: "No. 16597 / *Irpex furfuraceo-velutinus* Rick / S. Leopoldo, 1939, Rick" (PACA).

Holotype, covering uniformly a piece of wood approximately measuring 85 × 30 mm, consists of closely packed, short hyphae perpendicular to surface, yellowish cinnamon, here and there with some spine-like excrescences.

Context monomitic. Generative hyphae 3.6–6.3 μm wide, with occasional abrupt swellings or more or less inflating, thick-walled (cell-wall up to 1.3 μm thick), branched, septate, with occasional clamp-connections.

Although some structures were seen that might correspond to the cystidia described by Rick the examination was not pursued, since the few data obtained and described above suffice to remove *I. furfuraceo-velutinus* from *Irpex*.

*fuscescens*. — *Irpex fuscescens* Schw., Syn. Fung. Am. bor. (= in *Trans. Am. phil. Soc.*, N.S. 4): 164. 1832. — Holotype: "580-7 — Syn. Fung. / *I. cinnamomeus* — Epic. 19. / *Irpex fuscescens*-Schw. / Beth." (PH).

With the type there is an annotation label signed by H. Burdsall, Jr., stating that the material is identical with *Hydnochaete olivaceum*. I agree with his identification but have a different opinion as to the status of *Irpex fuscescens*. Instead of a nomenclatural synonym (Burdsall, 1971: 240) *Irpex fuscescens* is a taxonomical synonym of *Sistotrema fuscescens* (see p. 552).

*fusco-violaceus*. — *Sistotrema fusco-violaceum* Ehrenb., Sylv. mycol. berol.: 30. 1818. — *Hydnum fusco-violaceum* Ehrenb. ex Fr., Syst. mycol. 1: 421. 1821. — *Irpex fusco-violaceus* (Ehrenb. ex Fr.) Fr., Elench. Fung. 1: 144. 1828. — *Hirschioporus fusco-violaceus* (Ehrenb. ex Fr.) Donk in *Meded. Nederl. mycol. Ver.* 22: 169. 1933. — *Trametes abietina* var. *fusco-violacea* (Ehrenb. ex Fr.) Pilát in *Atlas Champ. Eur.* 3: 275. 1939. — Type locality: Germany, Berlin.

This species, until recently generally recognized as a member of the genus *Hirschioporus*, has now been brought in relation with *Trichaptum* by Ryvarden (1972a: 237).

*galzinii*. — *Irpex galzinii* Bres. in *Annls mycol.* 6: 42. 1908. — *Trametes galzinii* (Bres.) Pilát in *Atlas Champ. Eur.* 3: 258. 1939; 3: 325. 1940. — *Coriolus galzinii* (Bres.) Bond. & Sing. in *Annls mycol.* 39: 59. 1941. — Type: not seen.

Bourdot & Galzin (1928: 574) slightly emended the description of Bresadola and from both accounts it can be inferred that *I. galzinii* is a fungus of monomitic hyphal construction lacking cystidia. Hence, it is not an *Irpex*.

*glaberrimus*. — *Sistotrema glaberrimum* Pers., Mycol. eur. 2: 214. 1825. — *Irpex glaberrimus* (Pers.) Fr., Hym. eur.: 621. 1874. — *Xylodon glaberrimus* (Pers.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Type locality: France, Vienne.

It is unfortunate that there is no type left, for it is practically impossible to judge

the relationship of the species from the short description. It would seem, however, that the strikingly contrasting colours of pileus and spines, and the completely glabrous upper surface of the pileus are characteristics separating the present species from *Irpex*.

*gleditschiae*. — *Irpex canescens* f. *gleditschiae* Sacc., Mycotheca veneta, Cent. 14, No. 1404. 1880 (nomen nudum).

The name of this form, printed without a description on the label of the exsiccatum indicated above, was not validly published. The material seen (W) was destroyed by insects.

*gracillimus*. — *Irpex gracillimus* Pilát in Anns mycol. 23: 307. 1925. — Type: not seen.

Pilát based this species on material erroneously called *Irpex obliquus* by Velenovský. The description makes no mention of the context hyphae being of two different kinds or of the presence of cystidia. It is not difficult to see that the species does not belong to *Irpex*.

*griseo-fuscens*. — *Hydnum griseo-fuscens* Reichardt in Verh. zool.-bot. Ges. Wien 16: 374. 1866. — *Irpex griseo-fuscens* (Reichardt) D. Reid in Kew Bull. 17: 273. 1963. — Type: not seen.

Reid (l.c.) found that the type specimen "represented the pileate condition of the fungus previously described . . . as *Irpex vellereus* Berk. & Br." As is shown on p. 501, however, *Irpex vellereus* is not an *Irpex*.

*griseo-fuscus*. — *Irpex griseo-fuscus* Mont. in Anns Sci. nat. (Bot.) IV 1: 137. 1854. — *Xylodon griseo-fuscus* (Mont.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Type: not seen.

The very dark context, stated to be brownish black, separates the species from *Irpex*. Bresadola (1896: 287) considered *I. griseo-fuscus*, *I. coriaceus*, and *Hydnum trachyodon* to be synonymous with *Irpex portoricensis* (Spreng. apud Fr.) Bres. Murrill (1908: 74), however, referred them all to *Cerenella farinacea* (Fr.) Murrill.

*grossus*. — *Irpex grossus* Kalchbr. in Grevillea 10: 57. 1881. — *Xylodon grossus* (Kalchbr.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Type: not seen.

Bresadola first referred *I. grossus* to *Trametes favus* (Bull.) Bres. (1908: 39), a name he later (1920: 70) corrected to *Trametes gallica* Fr. The pileus of the latter species was described by Bourdot & Galzin (1928: 692) as dark brown and the context as cinnamon brown, both colours being unknown in *Irpex*.

As an aside, Ryvarden (1972a: 230) very recently transferred *Polyporus gallicus* Fr. to the genus *Corioloopsis*.

*heterodon*. — *Irpex heterodon* Sacc. in Atti Soc. veneto-trent. Sci. nat. 2: 107, pl. 7 figs. 16–19. 1873. — *Xylodon heterodon* (Sacc.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Holotype: "*Sistotrema pachyodon* (Pers.) Fr. [crossed out] / *Irpex heterodon* Sacc. / M[onte]llo ad quercum / [18]72 Dec." (Herb. Sacc., PAD).

The holotype consists of several fragments, all badly moulded and thickly dusted with some white preservative. Pileus fragments up to about 18 mm radius, flabelliform, lobed, plano-convex, not concentrically zoned, radiately fibrillose, more tomentose towards margin, yellow-brown to pale fulvous. Hymenophore lamellate at margin, consisting of radiately aligned, somewhat distant and rather coarse dissepiments which farther back become increasingly lacerate, towards base of pileus passing into spines up to 12 mm long, cylindrical or strongly flattened, dark brown. Context up to 1.5 mm thick, pale wood brown.

Context monomitic, made up of generative hyphae. Generative hyphae 2.7–5  $\mu$ m wide, not inflating, thin-walled, branched, septate, with clamp-connections. Context of spines similar, hyphae narrower. Basidia 26–32  $\times$  5–6.5  $\mu$ m, immature, clavate, with basal clamp. Spores 5.4–5.8  $\times$  4.5–5.4  $\mu$ m, subglobose, smooth, colourless, with somewhat thickened spore-wall and large oil-drop, with conspicuous apiculus, not amyloid. Cystidia lacking.

Bresadola (1897: 101) had already recognized the identity of this species with *Irpex pachyodon*. This is correct.

*hexagonoides*. — *Irpex hexagonoides* Kalchbr. apud Kalchbr. & Cooke in Grevillea 9: 1. 1880. — *Xylodon hexagonoides* (Kalchbr. apud Kalchbr. & Cooke) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Type locality: Australia, Richmond River.

According to information received from Kew Herbarium it appears "common experience that species with which Kalchbrenner's name is associated are not represented here [Kew], nor have we been successful in locating his types elsewhere." This being so Kalchbrenner's species must remain a nomen dubium as his description does not contain a single clue for identification.

*holoporus*. — *Polyporus holoporus* Pers., Mycol. eur. 2: 107. 1825. — *Irpex holoporus* (Pers.) Sacc. & Trav. in Syll. Fung. 19: 981. 1910. — Type locality: Germany.

There is no type material of this species in Herb. Persoon, the two fragments extant having been sent him by Desmazières. Moreover, on a label stuck to the sheet which bears the specimens Persoon himself expressed his uncertainty as to their identity.

Persoon referred to "Tab. VI fig. 3 et 4" for an illustration of his species but it should be observed that this plate is part of the first volume of the *Mycologia europaea* published in 1822.

This plate and the description explain the specific epithet, for the basidiome consists almost entirely of tubes, "subiculo vix ullo."

Although the deeply incised dissepiments persuaded Saccardo & Traverso to think that *P. holoporus* belonged to *Irpex*, the habit of the fungus clearly belies this affinity.

*h y d n e u s*. — *Irpex hydneus* Rick in Iheringia (Bot.) No. 5: 190. 1959.

See under *Steccherinum hydneum*.

*h y d n i f o r m i s*. — *Irpex hydniiformis* Vel., České houby: 741, fig. 133 (2). 1922.  
— Type: not seen.

The description, the illustration, and the habitat suggest that the fungus represents *Abortiporus biennis* (Bull. ex Fr.) Sing.

It may be of interest to note that a collection filed as *Irpex hydniiformis* in the Botanical Institute at Graz ("Flora Mährens, Brünn, Löscher Wald, 10. 1936, I. Hruby", GZU) turns out to be *Abortiporus biennis*.

*h y p o g a e u s*. — *Irpex hypogaeus* Fuck. in Jb. nassau. Ver. Naturk. 27-28 (=Symb. mycol., Nachtr. 2): 88. 1873. — Type: not seen.

Bresadola (1920: 70) in a list of reidentifications synonymized *I. hypogaeus* with *Sebacina laciniata* (Bull.) Bres. In a recent paper Donk (1966: 177, 319) pointed out that Bresadola had misapplied this name, the true identity of the fungus being *Sebacina incrustans* (Pers. ex Fr.) Tul.

*i n c r u s t a n s*. — *Irpex incrustans* Mont. & Berk. in Lond. J. Bot. 3: 334. 1844. — *Xylodon incrustans* (Mont. & Berk.) O.K., Rev. Gen. Pl. 3 (2): 541. 1898. — Holotype: "*Irpex incrustans*, n.s. / Brit. Guiana. ex Herb. Hook" (K).

The type sheet contains two packets, one marked Herb. Berk. 1879 and labelled as indicated above, the other "Herbarium Hookerianum 1867 / *Irpex incrustans* Mont. & Berk. / Brit. Guiana." The contents of both packets must have come from the same collection, they are identical. The material from Herb. Hookerianum 1867 is almost completely destroyed, the other in excellent condition on account of its having been poisoned, although not too badly so.

Basidiome effused-reflexed, almost entirely covering a forked twig 95 mm long. Reflexed portion up to about 20 mm radius and wide, much wider by confluence, flabelliform, concentrically zoned and shallowly sulcate, radiately fibrillose, fairly coarsely fibrillose at margin, somewhat more matted farther back, slightly shiny, deep ochraceous yellow, yellow-brown at margin. Hymenophore originally poroid, at margin in places also lamellar, for the greater part with dissepiments drawn out to form spines. Spines up to 2 mm long, 0.2-0.3 mm broad, broader when confluent, subulate, terete to flattened, waxy, glabrous, yellow-brown. Context about 1 mm thick, spongy, ochraceous.

Context monomitic, consisting of generative hyphae. Generative hyphae 3.6-7.2  $\mu$ m wide, not inflating, moderately thick-walled to thick-walled (cell-walls up to 1.8  $\mu$ m thick), branched, septate, without clamp-connections. Context of spines similar, many of the hyphae nearly solid. Basidia 24-27  $\times$  4.5-6.5  $\mu$ m, immature, slender-clavate, without basal clamp. Spores not seen. Cystidia up to 7  $\mu$ m wide, numerous, evenly distributed over spine, formed by more or less thick-walled to solid generative hyphae, of which swollen apex is obliquely bent outwards, incrustated.

The monomitic hyphal structure separates this species from the genus *Irpex*.



*irpicinus*. — *Sistotrema irpicinum* Berk. & Br. in Herb.; Cooke in Grevillea 10: 135. 1882 (nomen nudum); in Trans. Linn. Soc. Lond. (Bot.) II 2: 62, pl. 13 figs. 2, 3. 1883. — *Irpex irpicinus* (Berk. & Br.) D. Reid in Kew Bull. 17: 271, fig. 4. 1963. — Holotype: "*Sistotrema irpicinum* B. & Br. / *Irpex* / No. 313 Brisbane F. M. Bailey" (K).

The redescription given by Reid indicates that the type is a fungus with monomitic hyphal construction, hence it is not properly placed in *Irpex*.

*iyoenis*. — *Irpex iyoensis* Yasuda in Bot. Mag., Tokyo 31: 49. 1917 (nomen nudum); 31: 154 & fig. 1917. — *Fomes iyoensis* (Yasuda) Lloyd, Mycol. Writ. 5 (Lett. 65): 13. 1917 (recombination or separate species?). — Type: not seen.

Yasuda's description of the hymenium mentions the presence of subulate, thick-walled, brown cystidia which project beyond the basidia. Clearly this is a member of the Hymenochaetaceae. Ito (1955: 352) placed the species in the synonymy of *Hydnochaete ravenelii* (Berk.) Pat.

*japonicus*. — *Irpiciporus japonicus* Murrill in Mycologia 1: 166. 1909. — *Irpex japonicus* (Murrill) Sacc. & Trott. in Syll. Fung. 21: 377. 1912. — Type: not seen.

Two of the characteristics described by Murrill ("surface . . . glabrous, with silky luster" and "cystidia none") do not tally with *Irpex*. Imazeki (1939: 308-309) decided that *I. japonicus* was a synonym of *Irpex consors*, while later (1943: 80) he transferred the species to *Coriolus*.

*javensis*. — *Hymenogramme javensis* Mont. & Berk. in Lond. J. Bot. 3: 330, pl. 14. 1844. — *Grammothele javensis* (Mont. & Berk.) Lloyd, Mycol. Writ. 7: 1232, pl. 261 figs. 2580, 2581. 1923. — Type: not seen.

MISAPPLICATION: *Irpex javensis* (Mont. & Berk.) Lloyd *sensu* Lloyd, Mycol. Writ. 7: 1338, pl. 324 figs. 3106, 3107. 1925.

The original description of *Hymenogramme javensis* gives so much detailed information on the hymenophore that it is impossible to find any resemblance between it and Lloyd's Fig. 3107. *Irpex javensis* in the sense attributed to it by Lloyd is a gross misapplication, while the material (Lloyd Mycol. Coll. 23153, BPI) on account of its monomitic hyphal construction is not an *Irpex*. The type of *Hymenogramme javensis*, it may be added for the sake of completeness, was recently restudied by Ryvarden (1972b: 18) who tentatively thought of a connection with *Merulius*.

*johnstonii*. — *Irpex johnstonii* Berk., Outl. Brit. Fung.: 262. 1860. — *Xylodon johnstonii* (Berk.) O.K., Rev. Gen. Pl. 3(2): 541. 1898 ("Fr."). — Type: not seen.

MISAPPLICATION: *Irpex johnstonii sensu* Vel., Česká houby: 742. 1922 (= *Irpex spathulatus* Fr., according to Pilát, 1925: 302).

Berkeley stated that *I. johnstonii* had been found by Dr. Johnston at Berwick. Instead of these two names, in the type folder at Kew Herbarium two different

names appear on the piece of paper that bears a specimen. Berkeley further stated that the spines were disposed in rows. In the specimen at Kew the spines are disposed completely without any definite orientation. From this I conclude that the specimen preserved as "*Irpex johnstonii* B." is not the type.

Fries (1874: 621) who listed *I. johnstonii* in his book must have seen dried material (v.s.) but there is none in his herbarium at Uppsala.

Although little can be said as to the relationship of *I. johnstonii*, such characters as the naked circumference and the pure, unchangeable white colour of the basidiome seem to preclude the species from being identical with *Irpex lacteus* and, possibly, *Steccherinum* as well.

Pilát (1925: 302) was first of the opinion that the binomial as used by Velenovský (1922: 742) was a misapplication and in reality referred to *Irpex spathulatus* (Schrad. ex Fr.) Fr. Having changed his mind, he later (1939: 273) placed both *I. johnstonii* and *I. spathulatus* in the synonymy of *Hirschioporus abietinus* (Dicks. ex Fr.) Donk, a species now to be named *Trichaptum abietinum* (Ryvarden, 1972a: 237).

*kusanoi*. — *Irpex kusanoi* P. Henn. & Shirai *apud* P. Henn. in Bot. Jb. **28**: 267. 1900. — *Hydnum kusanoi* (P. Henn. & Shirai *apud* P. Henn.) P. Henn. in Bot. Jb. **37**: 160. 1905. — Type locality: Japan.

Ito (1955: 262) questioningly referred this to *Coriolus consors* (Berk.) Imaz. With the type material destroyed in Berlin, it is difficult to express a definite opinion. The original description offers no clue.

*labyrinthiformis*. — *Irpex obliquus* f. *labyrinthiformis* Rodw. & Clel. in Pap. Proc. R. Soc. Tasman. **1929**: 14. 1930. — Type: not seen.

The authors considered this a growth form of *I. obliquus*, thus it is a form of *Schizopora paradoxa* (Schrad. ex Fr.) Donk.

*laeticolor*. — *Hydnum laeticolor* Berk. & Curt. *apud* Berk. in Grevillea **1**: 99. 1873. — *Irpex laeticolor* (Berk. & Curt. *apud* Berk.) Morg. in J. Cincinn. Soc. nat. Hist. **10**: 15. 1887 ("lacticolor").

This is a true *Steccherinum*, see p. 513.

*lamelliformis*. — *Irpex lamelliformis* Lloyd, Mycol. Writ. **5**: 715, fig. 1073. 1917; **7**: 1358, pl. 337 fig. 3206. 1925. — Type: not seen.

Lloyd (1917: 715) observed that the fungus reminded him of *Polystictus abietinus*. Here he was near the truth. Ito (1955: 258) referred the species to *Hirschioporus fusco-violaceus* (Schrad. ex Fr.) Donk.

*lamellosus*. — *Irpex? lamellosus* Pat. *apud* Pat. & Lagerh. in Bull. Herb. Boissier **3**: 56. 1895. — *Xylodon lamellosus* (Pat. *apud* Pat. & Lagerh.) O.K., Rev.

Gen. Pl. 3(2): 541. 1898. — *Spathulina lamellosa* (Pat. apud Pat. & Lagerh.) Pat., Essai tax. Hym.: 74. 1900. — Type: not seen.

After Patouillard in his original publication had observed that the present species might just as well be removed from *Irpex* to form a separate genus, he erected *Spathulina*, which thus far remains monotypic.

*lenzitoïdes*. — *Irpex fusco-violaceus* var. *lenzitoïdes* Peck in Bull. nat. Hist. Soc. New Brunswick 21: 118. 1903 (not seen; nomen nudum?).

According to Macrae & Aoshima (1967: 924) this taxon is identical with *Hirschio-porus laricinus* (P. Karst.) Teramoto, a species recently renamed *Trichaptum laricinum* by Ryvarden (1972a: 237).

*lepidocarpus*. — *Xylodon lepidocarpus* P. Karst. in Trav. Soc. imp. russe Géogr. 8: 62. 1905 (not seen). — *Irpex lepidocarpus* (P. Karst.) Sacc. & Trott. in Syll. Fung. 21: 378. 1912. — Type: not seen.

Although little can be deduced from the description (as given by Saccardo & Trotter), it would seem that the present species may be effectively separated from the genus *Irpex* on account of its spines which are said to be, among other things, setiform, flaccid, and seriate.

*longisporus*. — *Irpex longisporus* Rick in Iheringia (Bot.) No. 5: 190. 1959 (not validly published). — Type: not seen.

Rick observed that his species should be compared with *Hexagonia heterospora*, of which it was doubtless an irpicoid form. In view of this statement the publication is not valid.

The discolouration of the basidiome when rubbed (“...albus, tritus ferrugineus...”) and the unusually long spores (16  $\mu\text{m}$ ) exclude the species from *Irpex*.

*longus*. — *Irpex longus* Rick in Iheringia (Bot.) No. 5: 188. 1959. — Type: not seen.

The spores are said to be yellowish, globose, and rough. These data suffice to remove the species from *Irpex*.

*macrodonioides*. — *Hydnum macrodonioides* Torrend, Fungi sel. exs., ser. 1-4, No. 36. 1910 (nomen nudum; Z).

Basidiome fragment 45  $\times$  25 mm, covering very much decayed wood, effused, locally showing patches of fluffy, whitish subiculum. Adhymenial surface felted in places, somewhat waxy in others, ochraceous. Hymenophore irpicoid to poroid, consisting of isolated spines up to 2 mm long or variously confluent plates, smooth, deep ochraceous or warm yellow-brown. Context thin, white.

Context monomitic, consisting of generative hyphae. Generative hyphae 2.5-10.7  $\mu\text{m}$  wide, not inflating, thick-walled (cell-wall 1.8-2.7  $\mu\text{m}$  thick), frequently

anastomosing and branched, septate, without clamp-connections. Context of spines similar, but cell-walls less thick. Basidia  $16-18 \times 4.5-5.5 \mu\text{m}$ , immature, clavate, without basal clamp. Spores  $4.5-4.9 \times 2-2.4 \mu\text{m}$ , ellipsoid, occasionally slightly curved, adaxially flattened, smooth, colourless, not amyloid, with small oblique apiculus. Cystidia  $3.5-5 \mu\text{m}$  wide, rather inconspicuous, usually little protruding, cylindrical, solid, with obtuse apex.

This is not a species of *Irpex*. Torrend (1912: 33) later withdrew the species, identifying it "presque sûrement" with *Hydnum barbirussa* Kunze, of which he gave a description drawn up from recently collected material. Whether his identification is correct is not a matter of concern in this context. All that can be said is that the measurements given by Torrend for the basidia and spores of his recent collection differ markedly from those of his exsiccate No. 36.

**m a x i m u s.** — *Irpex maximus* Mont. in *Annl. Sci. nat. (Bot.)* II 8: 364. 1837. — *Xylodon maximus* (Mont.) O.K., *Rev. Gen. Pl.* 3(2): 541. 1898. — *Coriolus maximus* (Mont.) Murrill in *Bull. Torrey bot. Club* 34: 467. 1907. — *Polyporus maximus* (Mont.) Overh. *apud* Seaver & Chard., *Sci. Surv. Porto Rico and Virgin Isl.* 8(1): 164. 1926. — Type: not seen.

The original description offers no clue which might be used to prove or disprove the relationship between this fungus and *Irpex*. However, Overholts (1953: 349) mentioned that the hymenium lacks cystidia but has abundant hyphal pegs instead. This character excludes *I. maximus* from the genus *Irpex*.

Fidalgo & Fidalgo (1967: 897), discussing *I. maximus* in connection with a tropical polypore, pointed out that its "context is always separated into two portions by a distinct, thin, dark line." This feature is equally alien to *Irpex*.

Bakshi (1971: 67), borrowing the description of an earlier author (whose publication is not available to me), mentioned sharply pointed and often curved setae, which would place *Irpex maximus* among the Hymenochaetaceae. Quite recently, however, Ryvarden (1972a: 236) transferred the species to *Sclerodepsis*, which is a genus of Polyporaceae.

**merulioides.** — *Hydnum merulioides* Berk. & Br. in *Trans. Linn. Soc. Lond. (Bot.)* II 2: 63, pl. 13 fig. 4. 1883. — *Irpex merulioides* (Berk. & Br.) Lloyd, *Mycol. Writ.* 4 (Lett. 51): 3. 1914 ("meruloides," without reference to basionym). — Holotype: "*Hydnum merulioides* B. & Br. / Brisbane No. 246. F. M. Bailey" (K).

This species was placed in the synonymy of *Gyrodontium versicolor* (Berk. & Br.) Maas G. (1964: 187-190).

**microdon.** — *Irpex microdon* Rick in *Iheringia (Bot.)* No. 5: 187. 1959. — Type: not seen.

Unfortunately this species was overlooked and the type not asked on loan but scrutiny of the description brought to light some instructive information.

The basidiome is said to be "laxe sed tenaciter contextus," the hyphae of the context are described "laxis, vix 4 my latis," whereas the cystidiferous hyphae are stated to be "omnibus 10 my latis, incrustatis." This shows the context of the basidiome to be monomitic, of the hymenophore probably dimitic with skeletal.

A fungus with the above hyphal construction would not be acceptable in *Irpex*.

*m i k h n o i*. — *Xylodon mikhnoi* P. Karst. in Trav. Soc. imp. russe Géogr. 8: 62. 1905 (not seen). — *Irpex mikhnoi* (P. Karst.) Sacc. & Trott. in Syll. Fung. 21: 378. 1912. — Type: not seen.

To judge the possible relation of *X. mikhnoi* is even more difficult than in the case of *X. lepidocarpus*. Properly speaking there is only one character in the description (the setiform spines) that separates the former from *Irpex*.

*m i y a b e i*. — *Irpex miyabei* Lloyd, Mycol. Writ. 7: 1175, pl. 228 fig. 2336. 1923. — Holotype: "*Irpex miyabei* / On *Acer pictus* / Sapporo, Japan / Kingo Miyabe [the true collector probably being G. Karube], 1912" (Lloyd Mycol. Coll. 9661, BPI).

Holotype consisting of several isolated basidiomes, the largest measuring c.  $30 \times 15$  mm. Basidiome effused or effused-reflexed. Reflexed portion up to 6 mm radius and 10 mm wide, flange-like, hirsute, shiny, pale dingy ochraceous. Margin of effused portion (as far as not damaged) easily separable from substratum, membranous or horny. Adhymenial surface subtomentose to subceraceous, dingy salmon to orange-brown. Hymenophore irpicoid but locally grading to more hydroid or poroid forms. Irpicoid plates or hydroid spines up to 2 mm long and 1 mm broad, coarse, straight, fluted or smooth, glabrous or looking somewhat pruinose, concolorous with adhymenial surface, with entire or incised tip. Context up to c. 0.5 mm thick, tough, dingy whitish.

Context monomitic, consisting of generative hyphae. Generative hyphae 2.7–7.2  $\mu$ m wide, not inflating, thin- to fairly thick-walled (cell-walls up to 1.8  $\mu$ m thick), branched, septate, without clamp-connections. Context of spines or plates similar. Basidia 30–34  $\times$  8.5  $\mu$ m, immature, cylindrical to clavate, some seen with 4 incipient sterigmata, without basal clamp. Spores (belonging to specimen investigated?) 5.4–5.6  $\times$  3.6–4.5  $\mu$ m, ellipsoid, adaxially somewhat flattened, smooth, colourless, with small oblique apiculus. Cystidia up to 7.2  $\mu$ m wide, evenly distributed, protruding, thick-walled, incrustated, cylindrical to somewhat fusiform in distal part, tapering to obtuse apex.

Ito (1955: 254) placed this species as a doubtful synonym of *Irpex lacteus*, but it is definitely not related to the genus *Irpex*. It is not certain where it should be placed; it could be a member of *Phanerochaete* P. Karst. as emended by Donk (1962: 223).

*m o d e s t u s*. — *Irpex modestus* Berk. apud Cooke in Grevillea 19: 109. 1891. — *Xylodon modestus* (Berk. apud Cooke) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Holotype: "[in pencil:] *Irpex modestus* / Mauritius Ayres / [in ink and in a different hand:] Fungus No. 21 / On [illegible] above Port Louis / [illegible] April 1857" (K).

A pencilled note on the sheet reads: "See *Hydnum Ayresii*. — same collection!" I must confess that I have no recollection of that species returned to Kew Herbarium

now many months ago but the redescription drawn up after its type tallies in every detail with the material of *I. modestus*. I have no hesitation in following van der Byl (1934: 4) who placed *H. ayresii* in the synonymy of *Irpex modestus*. From the redescription given under *H. ayresii* it is obvious that *I. modestus* is not an *Irpex*.

*mollis*. — *Hydnum molle* Schw., Syn. Fung. Am. bor. (=in Trans. Am. phil. Soc., N.S. 4): 162. 1832; not *Hydnum molle* Fr., Summa Veg. Scand. 2: 564. 1849. — Holotype: "*Hydnum / Apus / molle / Lehigh Mt. / L v S*" (PH).

Lehigh Mt., it should be explained here, is a mountain NW of and not far from Bethlehem, U.S.A., which is the place von Schweinitz indicated as the locality where his species was found. Therefore, rather than contradicting each other, the former name is a more restricted indication of the exact locality than is the latter.

Banker (1906: 135) apparently did not see the type but the brief description led him into thinking that the species belonged "to the genus *Irpex* of the family Polyporaceae."

Banker was correct as far as his suggestion of a polyporaceous fungus was concerned but *H. molle* is not a member of *Irpex*. The context of the pileus is monomitic, consisting of clamped hyphae with easily gelatinized (and often strongly swollen) cell-walls, while the hymenophore is made up of compacted, very narrow tubes, about 2 mm long.

*mollis*. — *Irpex mollis* Berk. & Curt. in Hook. J. Bot. 1: 236. 1849. — *Xylodon mollis* (Berk. & Curt.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — *Irpiciporus mollis* (Berk. & Curt.) Murrill in Bull. Torrey bot. Club 32: 471. 1905. — Holotype: "*Irpex mollis* Berk. & Curt. / No. 1729 Santee River / species prox. *Irp. paleacea*" (K).

Holotype consisting of 4 apparently pileate basidiomes glued to a piece of paper. Pileus about 35 mm radius, up to 70 mm wide in largest specimen, suborbicular to flabelliform, indistinctly concentrically zoned, tomentose, ochraceous or of a warm yellow-brown, dark brown near margin. Adhymenial surface subtomentose, yellow-brown. Spines up to 8 mm long and up to 1 mm broad, distant to more or less crowded, simple or confluent, near margin occasionally confluent to form radiately aligned lamellar structures, subulate, terete or more often flattened, glabrous, fairly dark yellow-brown, with entire or incised, concolorous tip. Context up to about 3 mm thick, pale dingy ochraceous.

Context monomitic, consisting of generative and tendril hyphae. Generative hyphae up to 5.4  $\mu$ m wide, not inflating, thin-walled, branched, septate, with clamp-connections. Context of spines similar. Basidia 24.5–36  $\times$  7–8  $\mu$ m, immature, clavate, with basal clamp. Spores 5.4–6.3  $\times$  4.5–5  $\mu$ m, possibly immature, subglobose to obovoid, very little flattened adaxially, smooth, colourless, with large oil drop and small oblique apiculus, not amyloid. Cystidia none.

This is *Spongipellis pachyodon* (Pers.) Kotl. & Pouz.

*natalensis*. — *Irpex flavus* f. *natalensis* Sacc., Syll. Fung. 6: 486. 1888 ("Kalchbr."). — Type: Natal, Inanda, Wood 202 (not seen).

Kalchbrenner (1881: 57) listed in his *Fungi macowaniani* a species, which he called "*Irpex flavus* (Jung. — non Klotsch) . . ." and of which he gave a brief description, beginning with the words "Forma membranacea. . ." These words may have caused Saccardo to think that it was Kalchbrenner who described a separate form, but technically he himself was the author. The description is a true copy of Kalchbrenner's. Since Kalchbrenner thought this particular collection not different from *I. flavus* Jungh. it follows that *f. natalensis* has no relation to genuine *Irpex*.

*niveus*. — *Sistotrema niveum* Schw. in Schr. naturf. Ges. Leipzig 1: 102. 1822. — *Irpex niveus* (Schw.) Schw., Syn. Fung. Am. bor. (= in Trans. Am. phil. Soc., N.S. 4): 164. 1832. — Type: not seen.

The original description is too brief for recognition of the species or its possible affinity.

*nodulosus*. — *Irpex nodulosus* Peck in Rep. N.Y. St. Mus. nat. Hist. 41: 79. 1888. — *Xylodon nodulosus* (Peck) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Type: not seen.

The redescription of the type given by Gilbertson (1963a: 666) mentions, among other things, brownish hyphae, "gloeocystidium-like hyphae . . . imbedded in inner tissue of the teeth," and very long-cylindric spores. These characters are not those of *Irpex*.

*noharae*. — *Irpiciporus noharae* Murrill in Mycologia 1: 166. 1909. — *Irpex noharae* (Murrill) Sacc. & Trott. in Syll. Fung. 21: 377. 1912. — Type: not seen.

This was recognized by Imazeki (1939: 307-308) to be a synonym of *Lopharia mirabilis* (Berk.) Pat. It was pointed out by Ito (1955: 258-259) that *I. noharae* in the sense of Lloyd (1916: 601, fig. 851) represented *Hirschioporus fusco-violaceus* (Ehrenb. ex Fr.) Donk.

*obliquus*. — *Hydnum obliquum* Schrad., Spicil. Fl. germ. 1: 179. 1794: ex Fr., Syst. mycol. 1: 424. 1821. — *Irpex obliquus* (Schrad. ex Fr.) Fr., Elench. Fung. 1: 147. 1828; not *Irpex obliquus* sensu Vel., České houby: 743. 1922 (= *Irpex gracillimus* Pilát). — *Xylodon obliquus* (Schrad. ex Fr.) P. Karst. in Acta Soc. Fauna Fl. fenn. 2(1): 31. 1881. — *Poria mucida* var. *radula* f. *Irpex obliquus* (Schrad. ex Fr.) Bourd. & Galz., Hym. Fr.: 681. 1928 (not validly published). — *Poria versipora* f. *obliqua* (Schrad. ex Fr.) Kreisell, Phytopath. Grosspilze Deutschl.: 154. 1961. — *Xylodon versiporus* f. *obliquus* (Schrad. ex Fr.) Dom. in Fl. polska, Grzyby (Fungi): 51. 1965. — Type locality: Germany.

This was shown by Donk to be the same as *Schizopora paradoxa* (Schrad. ex Fr.) Donk (1967: 103).

*ochraceus*. — *Irpex ochraceus* Schw., Syn. Fung. Am. bor. (= in Trans. Am. phil. Soc., N.S. 4): 164. 1832. — Type locality: U.S.A., Bethlehem.

This binomial is not a recombination based on *Hydnum ochraceum*, since the latter was separately listed as No. 538 on p. 162. Information was received from PH that the type of *Irpex ochraceus* could not be located. In view of the insufficiency of the description supplied, the name must remain a nomen dubium.

*ochrosimilis*. — *Irpex ochrosimilis* Lloyd, Mycol. Writ. 7: 1273, pl. 286 fig. 2803. 1924. — Holotype: "*Irpex ochrosimilis* / Christchurch, N.Z. / James Mitchell" (Lloyd Mycol. Coll. 24118, BPI).

Basidiome compound, consisting of several fused and partly imbricate pilei, apparently terrestrial. Pileus approximately 10–15 mm radius and wide (difficult to measure properly), flabelliform, narrowed behind, harshly radiately fibrillose or with sharp-edged reticulations, ochraceous yellow, faintly zoned with yellow-brown or somewhat darker brown concentric rings. Hymenophore radiately lamellate or irpicoid-poroid, dissepiments or spines up to c. 1.5 mm long, flat, glabrous or pruinose, pale orange-brown, variously lacerate at tip. Context c. 0.5 mm thick, very tough, brownish whitish.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 2.7–4.5  $\mu\text{m}$  wide, not inflating, thin- to moderately thick-walled, branched, septate, with clamp-connections. Skeletal hyphae 2.7–6.3  $\mu\text{m}$  wide, thick-walled to solid. Context of dissepiments similar. Basidia c.  $18 \times 3.6 \mu\text{m}$ , immature, clavate, with basal clamp. Spores c.  $4.5 \times 2 \mu\text{m}$ , slender-amygdaliform, smooth, colourless, with small oblique apiculus. Cystidia up to 8  $\mu\text{m}$  wide, probably of subhymenial origin, numerous, little protruding, fusiform to lageniform, often with long and slender neck, solid, glabrous.

Lloyd (l.c.) remarked "I opine this is only a species-form of *Hydnum ochraceum*." This is an error. His species is neither an *Irpex* nor a *Steccherinum*. Cunningham (1949: 3; 1965: 72) placed the species in the synonymy of *I. brevis*, which is another error.

*orbicularis*. — *Polyporus flavus* var. *orbicularis* Jungh. in Verh. batav. Genootsch. Kunst. Wetensch. 17: 48, pl. 10 fig. 26. 1838. — *Irpex flavus* var. *orbicularis* (Jungh.) Berk. in Hook. J. Bot. 6: 168. 1854. — Holotype: "*Polyporus flavus*, var. *orbicularis* / Febr. Djocjakarta. In *Bambusa arundin.*" (L. 910.219–545).

This is the incipient, effused stage of *Polyporus flavus*. For a redescription, see under *flavus* Jungh.

*owensii*. — *Irpex owensii* Lloyd, Mycol. Writ. 5: 616. 1916. — *Radulum owensii* (Lloyd) Lloyd, Mycol. Writ. 5 (*Radulum*): 10. 1917; 6: 1059, fig. 1984. 1921. — Type: not seen.

The redescription by Gilbertson (1963b: 144) mentions several characters which are clearly not those of *Irpex*. These are: "tissue . . . dark chocolate brown," the apparently monomitic hyphal structure, and the lack of cystidia. In a later publication Gilbertson (1964: 18) synonymized the name of Lloyd's species with *Radulum concentricum* Cooke & Ellis.



*pachyodon*. — *Hydnum pachyodon* Pers., Mycol. eur. 2: 174. 1825. — *Sistotrema pachyodon* (Pers.) Fr., Epicr. Syst. mycol.: 520. 1838. — *Irpex pachyodon* (Pers.) Quél., Fl. mycol.: 377. 1888. — *Lenzites pachyodon* (Pers.) Pat., Essai tax. Hym.: 89. 1900. — *Trametes pachyodon* (Pers.) Pilát in Atlas Champ. Eur. 3: 258. 1939; 3: 326. 1940. — *Irpiciporus pachyodon* (Pers.) Kctl. & Pouz. in Česká Mykol. 11: 156. 1957. — *Radulomyces pachyodon* (Pers.) M. P. Christ. in Dansk bot. Ark. 19(2): 232, fig. 234. 1960. — *Spongipellis pachyodon* (Pers.) Kotl. & Pouz. in Česká Mykol. 19: 77. 1965. — Type: "*Hydnum pachyodon* / Delastre / Gallia" (L 910.263-1321).

The name at present accepted to be the correct one is *Spongipellis pachyodon*. It is the name of a fungus characterized by monomitic construction of the context, lack of cystidia of any kind, remarkably large basidia, and subglobose spores.

"*pachylon*." — *Irpex "pachylon"*; Lloyd, Mycol. Writ. 4 (Lett. 59): 7. 1915 (incidental mention); 5 (Lett. 69): 11. 1919; 7: 1159. 1922; 7: pl. 225 fig. 2306. 1923; 7: 1287. 1924.

Lloyd consistently misspelled this species *Irpex "pachylon"*, the correct epithet being *pachyodon*. The correct name for the fungus is *Spongipellis pachyodon* (Pers.) Kotl. & Pouz.

*paleaceus*. — *Hydnum paleaceum* Thore, Essai Chlor. Dép. Landes: 492. 1803 (not seen); ex Pers., Mycol. eur. 2: 203. 1825. — *Irpex paleaceus* (Thore ex Pers.) Fr., Elench. Fung. 1: 144. 1828. — *Xylodon paleaceus* (Thore ex Pers.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Type locality: France, near Dax.

Identification of this fungus is difficult since a type does not seem to have been preserved. Perhaps, however, the species does not belong to *Irpex* on account of the rather unusual aspect of the spines. These were stated to be large, subfoliaceous, deeply incised, compressed, imitating the chaffy scales on the receptacle of *Compositae*.

*pallidus*. — *Irpex pallidus* Lloyd, Mycol. Writ. 6: 954. 1920. — Holotype: "*Irpex pallidus* / Bahamas / L. J. K. Brace" (Lloyd Mycol. Coll. 24180, BPI).

Holotype consisting of several isolated and fused basidiomes, the largest measuring c. 35 × 15 mm. Basidiome effused or effused-reflexed. Reflexed portion up to 1.5 mm radius and 5 mm wide, flange-like, convex, woolly-hirsute, shiny, pale ochraceous; margin involute, running out into spines. Margin of effused portion fibrillose; fibrils tending to disappear with age (or perhaps eaten by insects). Adhymenial surface ceraceous, pale orange-brown to pale salmon, areolate with age. Spines up to 2.5 mm long, 0.2–0.5 mm broad, broader when confluent, subdistant to crowded, subulate, terete to flattened or fused to plates, coarse, glabrous or pruinose, concolorous with adhymenial surface, with obtuse puberulous tip. Context thin, soft, pale dingy ochraceous.

Context monomitic, consisting of generative hyphae. Generative hyphae 2.7–6.3 μm wide, not inflating, thin- to moderately thick-walled, branched, septate, without clamp-connections. Context of spines similar, several hyphae in subhymenial

region with incrustated cell-walls. Basidia c.  $24 \times 5.5 \mu\text{m}$ , immature, clavate, without basal clamp. Spores  $4.5\text{--}5.4 \times 2.7\text{--}3.1 \mu\text{m}$ , ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia up to  $8 \mu\text{m}$  wide, constituting terminal ends of increasingly thicker-walled generative hyphae, evenly distributed, little protruding, thick-walled to nearly solid, incrustated, cylindrical, with obtuse apex.

Gilbertson (1963b: 147) in redescribing the type mentioned the presence of thin-walled hyphae "with simple septa and also clamp connections," but the material is definitely devoid of clamps. On account of the monomitic construction of the context, the species is not an *Irpex*.

*palmatus*. — *Radulum palmatum* Berk. in Ann. Mag. nat. Hist. 9: 445, pl. 10 fig. 1. 1842. — *Irpex palmatus* (Berk.) Rick in Iheringia (Bot.) No. 5: 187. 1959 ("Speg."). — Holotype: "*Radulum palmatum* Berk. / Rio Janeiro" (K).

Holotype consisting of two tiny basidiomes, c. 9 mm across, made up of radiating, antler-like, brown processes springing from pale brownish subiculum.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae  $3.6\text{--}4.5 \mu\text{m}$  wide, with slight tendency to become inflated, thin- to moderately thick-walled, branched, septate, with clamp-connections. Skeletal hyphae  $3.6\text{--}6.3 \mu\text{m}$  wide, thick-walled to nearly solid. Hymenium not developed.

While the correct place for this species may well prove a problem, since the fungus is sterile, it certainly does not belong to *Irpex* on account of its brown-walled hyphae.

Donk (1963: 153) pointed out that Berkeley had provisionally proposed a genus *Cladodontia* to accommodate *Radulum palmatum* and some other species with palmate teeth.

*paradoxus*. — *Hydnum paradoxum* Schrad., Spicil. Fl. germ. 1: 179, pl. 4 fig. 1. 1794; ex Fr., Syst. mycol. 1: 424. 1821. — *Irpex paradoxus* (Schrad. ex Fr.) Fr., Epicr. Syst. mycol.: 522. 1838. — *Poria mucida* var. *radula* f. *Irpex paradoxus* (Schrad. ex Fr.) Bourd. & Galz., Hym. Fr.: 681. 1928 (not validly published). — *Xylodon versiporus* f. *paradoxus* (Schrad. ex Fr.) Dom. in Fl. polska, Grzyby (Fungi): 51. 1965. — *Schizopora paradoxa* (Schrad. ex Fr.) Donk in Persoonia 5: 104. 1967. — Type locality: Germany.

This species was eventually referred to *Schizopora* Vel., a genus universally considered distinct from *Irpex*.

*parvulus*. — *Irpex parvulus* Yasuda in Bot. Mag., Tokyo 35: (254). 1921 (Japanese text); 36: 84, fig. 1. 1922. — Holotype: "No. 452, Oct. 1, 1916 [*Radulum*, *Kneiffiella*, *Odontia* crossed out] *Irpex parvulus* Yasuda / Hymenium mit farblosen, incrustierten Metuloiden [locality in Japanese] A. Yasuda" (TNS).

Basidiomes effused to effused-reflexed, beginning as solitary patches, but confluent with age. Reflexed portion up to 1–1.5 mm radius, concentrically grooved and/or zoned, fibrillose, somewhat shiny, dingy yellowish or pale brownish yellow, margin

strigose, concolorous. Adhymenial surface floccose-porous, dull brown with some yellowish hue. Hymenophore consisting of more or less radiately aligned flattened spines or plates, these up to about 0.5 mm long, up to 0.4 mm broad, much broader when confluent, subdistant, flattened to angular, simple or compound, pulverulent to finely pubescent, concolorous with adhymenial surface, apical part variously incised, hispid. Context very thin, pallid near margin, brownish towards centre, brown colour intensified in KOH.

Context dimittic, consisting of generative and skeletal hyphae. Generative hyphae 2.7-4  $\mu$ m wide, not inflating, thin- to moderately thick-walled, branched, septate, with clamp-connections. Skeletal hyphae 2.7-5.4  $\mu$ m wide, thick-walled to almost solid. Context of hymenophore similar. Basidia 12.5-17  $\times$  4.5-5.5  $\mu$ m, immature, clavate, with basal clamp. Spores 3.8-4.3  $\times$  2.2  $\mu$ m, probably only seen immature, ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia 4-7  $\mu$ m wide, numerous, evenly distributed, somewhat projecting, thick-walled to solid, incrustated, cylindrical to somewhat fusiform in distal part, with obtuse apex.

The material investigated bears no sign that it is the type but the shipping notice preceding the parcel contained the following information: "*Irpex parvulus* Yasuda, The Type, on *Lespedeza burgeri* Miq., Sendai City, Japan; Oct. 1. 1916, Coll. A. Yasuda, TNS-203047." The collection consists of three lengths of twigs, the two larger ones bearing numerous basidiomes of *I. parvulus*, the third supporting patches of *Steccherinum ochraceum*.

Microscopically there is a notable resemblance between *I. parvulus* and species of *Steccherinum* but it does not belong to this genus on account of the more or less pronounced radiate configuration of the hymenophore as well as the shape and colour of the teeth and plates. This configuration and the colour can also be used to separate the species from true *Irpex*. Dr M. A. Donk, to whom the collection was shown, suggested a possible relationship to the genus *Lopharia* Kalchbr. & McOw., but this supposition was not further investigated.

*pavichii*. — *Irpex pavichii* Kalchbr. in Verh. zool.-bot. Ges. Wien 18: 430. 1868 (nomen nudum); apud Fr., Hym. eur.: 621. 1874. — *Xylodon pavichii* (Kalchbr. apud Fr.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Type locality: Croatia.

According to my notes made in Uppsala there is no material of *Irpex pavichii* in Herb. Fries, while this author stated to have seen an illustration of the species. Fries held the opinion that *I. pavichii* was different from both *I. lacteus* and *I. sinuosus* because the pileus, instead of being effused-reflexed, was sessile with a narrow base. On the other hand, *I. pavichii* was considered to come near *I. canescens* on account of the reticulate aspect of the incipient hymenophore. Since in the present paper *I. lacteus*, *I. sinuosus*, and *I. canescens* are taken to represent the same species, it would follow that *I. pavichii* is yet another synonym. Perhaps the supposition is correct but I prefer to regard *I. pavichii* as a nomen dubium.

*pellicula*. — *Polyporus pellicula* Jungh. in Verh. batav. Genootsch. Kunst. Wetensch. 17: 44. 1838. — *Irpex pellicula* (Jungh.) Bres. in Anns mycol. 8: 586. 1910. — Holotype: "17. *Polyporus Pellicula* n. / [illegible] Jungh." (L).

Context pale brown, monomitic. Generative hyphae 4.5–6.3  $\mu\text{m}$  wide, not inflating, thick-walled (cell-walls up to 2.2  $\mu\text{m}$  thick), anastomosing, branched, septate, without clamp-connections.

The hyphal construction shows this fungus to be different from *Irpex*.

*pendulus*. — *Sistotrema pendulum* Alb. & Schw., Consp. Fung.: 261, pl. 6 fig. 7. 1805. — *Hydnium pendulum* Alb. & Schw. ex Fr., Syst. mycol. 1: 413. 1821. — *Irpex pendulus* (Alb. & Schw. ex Fr.) Fr., Elench. Fung. 1: 143. 1828. — *Xylodon pendulus* (Alb. & Schw. ex Fr.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — *Trametes pendula* (Alb. & Schw. ex Fr.) Pilát in Atlas Champ. Eur. 3: 258. 1939; 3: 324. 1940. — *Raaulum pendulinum* Nikol. in Fl. sporov. Rast. SSSR 6(2): 94. 1961 (name change). — *Irpicondium pendulus* (Alb. & Schw. ex Fr.) Pouz. in Folia geobot. phytotax. 1: 371. 1966. — Type: represented by Alb. & Schw., Consp. Fung.: pl. 6 fig. 7. 1805.

Pouzar (1966b: 371) showed the present species to have a monomitic hyphal structure, amyloid spores, and no cystidia. Very rightly he decided that the species was not to be maintained in the same genus with *Irpex lacteus*.

*pityreus*. — *Irpex pityreus* Berk. & Curt. apud Berk. in Grevillea 1: 102. 1873. — *Xylodon pityreus* (Berk. & Curt. apud Berk.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Holotype: "No. 6329. *Irpex pityreus* B. & C. / Rhode Island, Bennett" (K).

The holotype is a mere fragment, measuring about 8×5 mm and consisting of three pileus segments, two of which are imbricate. Pileus, as far as visible, fibrillose, dark dull brown, abraded in places and lighter. Spines up to 3 mm long, 0.2–1 mm broad, crowded, subulate, terete or somewhat channelled or much flattened, glabrous, yellow-brown to dark brown, with entire or incised tip.

Context monomitic. Generative hyphae 3.6–6.3  $\mu\text{m}$  wide, somewhat inflating, with fairly thick brown cell-walls, branched, septate, occasionally constricted at septa, without clamps.

With so little of the material left it seemed inadmissible to examine more than a few fibrils of the context. These were all that was needed to prove that the present species is not an *Irpex*.

*platensis*. — *Irpex? platensis* Speg. in An. Mus. nac. Hist. nat. B. Aires 6: 178. 1899 ("*Hirpex*"). — Type: not seen.

It is reasonable to assume that the growth habit of a fungus is just as much governed by genetic factors as any morphological character. The terrestrial growth of *I. platensis* is therefore regarded with some suspicion. The nature of the context, described as subceraceous or almost cheesy when fresh, drying "*rigidula fragilis*," removes all doubt. This species does not belong to *Irpex*, and Spegazzini must have been aware of this possibility, hence the question mark.

*plumosus*. — *Sistotrema plumosum* Pers., Mycol. eur. 2: 201. 1825. — *Irpex paradoxus* var. *plumosus* (Pers.) Brondeau, Rec. pl. cryptog. Agen.: pl. 14 figs. 6, 7.

1830 (not seen, quoted from Quélet in *Revue mycol.* **14**: 63. 1892). — *Irpex plumosus* (Pers.) Quél. in *C.r. Ass. franç. Av. Sci.* **24**: 620. 1896. — Type locality: France.

According to Bourdot & Galzin (1928: 741) this is a variety of *Irpex paradoxus*, the correct name of which now reads *Schizopora paradoxa* (Schrad. ex Fr.) Donk.

*pomicola*. — *Irpex spathulatus* var. *pomicola* Quél. *apud* Schulzer in *Hedwigia* **24**: 146. 1885. — Type locality: Slavonia.

With so short a description ("Ex effuso reflexus, luteo-albidus; ceterum forma typica. Aestivalis, gregatim ad ramos emortuos Pyri Mali in hortis.") this varietal name must remain a nomen dubium.

*poria*. — *Irpex poria* Rick in *Iheringia* (Bot.) No. 5: 190. 1959. — Type: not seen.

Rick's description yields only few features that characterize his fungus, but these at least seem sufficient to mark *I. poria* as not congeneric with true *Irpex*. The indication "...late poroideus ... dentibus elevatis; siccus reticulatus..." rather points to a merulioid affinity, while the blood red discolouring of the fresh basidiome on being touched is a character unknown in *Irpex*.

*poroso-lamellatus*. — *Irpex poroso-lamellatus* Rick in *Iheringia* (Bot.) No. 5: 187. 1959. — Type: not seen.

The description shows the species to be a dingy white fungus turning straw yellow, with a sparingly arachnoid margin and a porose-lamellate hymenophore. It is the combination of these characters which makes the affinity with true *Irpex* improbable.

*portoricensis*. — [*Daedalea portoricensis* Spreng. in litt. —] *Polyporus portoricensis* Spreng. *apud* Fr., *Elench. Fung.* **1**: 115. 1828. — *Irpex portoricensis* (Spreng. *apud* Fr.) Bres. in *Hedwigia* **35**: 287. 1896. — Type: not seen.

Fries described the colour of the basidiome as "fuligineo-umbrina" which is definitely not an *Irpex* character; otherwise his description is too short for recognition.

*purpureus*. — *Irpex purpureus* Yasuda in *Bot. Mag., Tokyo* **33**: 191, fig. 2. 1919. — *Hirschioporus purpureus* (Yasuda) Imaz. *apud* Ito, *Mycol. Fl. Jap.* **2**(4): 260. 1955. — Type: not seen.

Some of the characteristics described by Yasuda concern the pileus and its context. The former was said to be "oberseits purpurbraun, mit weichen, glatt unterdrückten Fasern" and the latter "weich, leicht purpurbraun." From these colours and the presence of incrustated, thick-walled cystidia it seems safe to conclude that the species is correctly placed in the genus *Hirschioporus*.

*purus*. — *Irpex sinuosus* var. *purus* P. Karst. in *Bidr. Känn. Finl. Nat. Folk* **48**: 312. 1889. — Holotype: "*Irpex sinuosus* Fr. var. *purus* / Mustiala, in *Caragana arborescente*, m. Nov. 1886" (H).

Karsten intended this as a variety of *Irpex sinuosus* which in this paper is regarded as a growth form of *Irpex lacteus*. The present variety, however, has no relation to the genus *Irpex*, for its context is monomitic throughout, consisting of generative hyphae. The latter are 3.6–5.4  $\mu\text{m}$  wide, thin- to moderately thick-walled, anastomosing, branched, septate, without clamps. The hymenium is not yet developed, but very long, thick-walled, incrusting cystidia are already visible.

*quisquiliaris*. — *Irpex quisquiliaris* Pat. apud Pat. & Lagerh. in Bull. Herb. Boissier 3: 55. 1895. — *Xylodon quisquiliaris* (Pat. apud Pat. & Lagerh.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Type: not seen.

The fulvous context, the dark brown hymenium, and the presence of very long, thick-walled, acute cystidia (which are actually the setae), clearly refer this species to the Hymenochaetaeae.

*radicatus*. — *Irpex* (?) *radicatus* Fuck. in Jb. Nassau. Ver. Naturk. 23–24: 23. 1870. — *Xylodon radicatus* (Fuck.) O.K., Rev. Gen. Pl. 3(2): 541. 1898 (“*radicalis*”). — Type locality: Germany, near Eberbach.

A terrestrial fungus with a tough mycelial chord rooting to a depth of one foot cannot be a member of *Irpex*. Other characters which render the inclusion in this genus impossible are the thickness of the context of the pileus (“ad unciam crasso”), and the fuscous colour of the hymenium. Fries (1874: 619) who saw a dried specimen (which according to my notes is still extant in UPS) pointed out that the structure of the hymenium in his material could not be made out. Later Velenovský (1922: 740, fig. 133 left) gave a description of what he thought to be *I. radicatus*; this no doubt represents *Abortiporus biennis* (Bull. ex Fr.) Sing. It is not improbable that Fuckel’s original fungus belongs to the same species.

*ravenelii*. — *Daedalea ravenelii* Berk. in Grevillea 1: 68. 1872. — *Cerrenella ravenelii* (Berk.) Murrill in N. Am. Fl. 9(2): 73. 1908. — *Irpex ravenelii* (Berk.) Overh. in Bull. Torrey bot. Club 65: 171. 1938 (incidental mention, not validly published); Polypor. U.S., Alaska, Canada: 129. 1953 (not validly published). — Holotype: “No. 1775 / *Daedalea ravenelii* B. / on dead oak / [illegible]” (K).

The type packet contains an identification slip which bears the annotation: “*Inonotus radiatus* (Sow. ex Fr.) Karst. var. *cucullatus* (Berk. & Curt.) Pegler / TBMS 47: 181 (1964).” In this connection it may be of interest to refer to the notes under *Irpex tabacinus*.

*regularissimus*. — *Irpex regularissimus* Rick in Iheringia (Bot.) No. 5: 190. 1959. — Type: not seen.

The spines of this species, springing from a white subiculum, were stated to be sparse, odontoid and very regularly shaped, greyish red. These characters provide sufficient evidence to exclude the species from true *Irpex*.

*rickii*. — *Irpex rickii* Lloyd, Mycol. Writ. 7: 1358. 1925. — Type: not seen.

This species was shown by Mrs Kaufmann Fidalgo to be identical with *Phaeodaedalea sprucei* (Berk.) K. Fidalgo (1962: 203).

*saepiarius*. — *Irpex saepiarius* Lloyd, Mycol. Writ. 5: 682, fig. 1019. 1917. — Type: not seen.

The contrasting colours (dark brown pileus, white hymenium), the dark brown context, and the numerous setae, are all characters that exclude the possibility of *I. saepiarius* being a true *Irpex*. Cunningham (1965: 279) suggested that it was some species of *Hydnochaete*.

*schweinitzii*. — *Irpex schweinitzii* Berk. & Curt. apud Berk. in Grevillea 1: 102. 1873. — *Xylodon schweinitzii* (Berk. & Curt. apud Berk.) O.K., Rev. Gen. Pl. 3(2): 541. 1898.

The redescription of the isotype (FH) given by Gilbertson (1965: 864) suggests that the context is monomitic and cystidia are actually absent. A fungus thus characterized cannot be maintained in *Irpex*.

*spathulatus*. — *Hydnum spathulatum* Schrad., Spicil. Fl. germ. 1: 178, pl. 4 fig. 3. 1794. — *Sistotrema spathulatum* (Schrad.) Pers., Syn. meth. Fung.: 553. 1801. — *Hydnum spathulatum* Schrad. ex Fr., Syst. mycol. 1: 423. 1821. — *Sistotrema spathulatum* (Schrad. ex Fr.) Pers., Mycol. eur. 2: 197. 1825. — *Irpex spathulatus* (Schrad. ex Fr.) Fr., Elench. Fung. 1: 146. 1828. — *Xylodon spathulatus* (Schrad. ex Fr.) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — *Radulum spathulatum* (Schrad. ex Fr.) Bres. in Anns mycol. 1: 89. 1903. — *Odontia spathulata* (Schrad. ex Fr.) Litsch. in Österr. bot. Z. 88: 125. 1939. — *Odontia arguta* f. *spathulata* (Schrad. ex Fr.) Nikol. in Fl. sporov. Rast. SSSR 6(2): 113. 1961 ("Wakefield"). — *Hyphodontia spathulata* (Schrad. ex Fr.) Parm., Consp. Syst. Cortic.: 123. 1968; Gilbertson in R. H. Petersen (Ed.), Evol. high. Basidiomyc.: 300. 1971 (preoccupied). — Type locality: Germany.

The descriptions given by Bourdot & Galzin (1928: 693) and Miller & Boyle (1943: 37), although containing but scanty microscopic detail, seem to indicate that the context is made up of a single kind of hyphae. On account of this character the species cannot be a member of *Irpex*. At present *Hyphodontia* J. Erikss. seems to be accepted as the correct genus for the species.

Pilát (1939: 276) placed the species in the synonymy of what he called *Trametes abietina* var. *Xylodon candidum* (Ehrh.) Bourd. & Galz.

*spiculifer*. — *Irpex spiculifer* G. H. Cunn. in Bull. N.Z. Dep. scient. industr. Res. 164: 74, 261. 1965. — Type: not seen.

This species is not an *Irpex* on account of its monomitic hyphal system.

*sprucei*. — *Irpex sprucei* Berk. in Hook. J. Bot. **8**: 238. 1856. — *Xylodon sprucei* (Berk.) O.K., Rev. Gen. Pl. **3**(2): 541. 1898. — Type: not seen.

A fungus characterized by an infundibuliform pileus, a cylindrical stipe, a white decurrent hymenium, and growing on the ground among roots, possesses a set of characters obviously too different from those of *Irpex* to be maintained in this genus.

This is not the herbarium name *I. sprucei* Lloyd (see Kauffmann Fidalgo, 1962: 204).

*subcervinus*. — *Irpex cervinus* var. *subcervinus* Rick in Iheringia (Bot.) No. 5: 189. 1959. — Type: not seen (not asked for).

Rick's description is rather short but it does state that the spines are even more hirsute than those of *Irpex cervinus*, and grey instead of fawn. An important piece of information is the addition "*Odontiae microspora* similis." The latter was described on p. 154 of the same paper, and characterized, among other things, by the presence of small cystidia. Since cystidia were not mentioned in the description of both *I. cervinus* and its var. *subcervinus*, it follows that the hairyness of the spines must have a different origin.

The little as can be extracted from Rick's description seems sufficient evidence to exclude variety *subcervinus* from *Irpex*.

*subcoriaceus*. — *Cerrenella subcoriacea* Murrill in N. Am. Fl. **9**: 74. 1908. — *Irpex subcoriacea* (Murrill) Sacc. & Trott. in Syll. Fung. **21**: 377. 1912. — Type: not seen.

This is not an *Irpex* on account of its "chestnut-colored" context and the 2-4 cm long tubes with glistening dark mouths.

*subflavus*. — *Irpex subflavus* Pat. in J. Bot., Paris **3**: 167. 1889. — *Xylodon subflavus* (Pat.) O.K., Rev. Gen. Pl. **3**(2): 541. 1898. — Type: not seen.

Patouillard was well aware of the similarity of his fungus to *Polyporus flavus* Jungh., and both have the citrine colour of the context in common. It is on account of this colour that *I. subflavus* is here not accepted in *Irpex*.

*subhypogaeus*. — *Irpex subhypogaeus* Rick in Egatea **17**: 212. 1932. — Type: not seen.

The somewhat coloured and echinate spores offer good differences to separate this species from *Irpex*.

*submersus*. — *Irpex submersus* Killerm. in Denkschr. regensb. bot. Ges. **21** (=N.S. **15**): 67, 68. 1940. — Type locality: Germany, Bavaria, Chiemsee.

The author stated that the fungus had been found submersed at a depth of one meter on stalks of reed. Both this habitat and the size of the globose spores indicate that the species, if a fungus at all, does not belong to *Irpex*.



*subresupinatus*. — *Irpex lacteus* f. *subresupinatus* Bres. *apud* Jaap in *Annls mycol.* **14**: 28. 1916.

This is a *nomen nudum*.

*subvinosus*. — *Hydnum subvinosum* Berk. & Br. in *J. Linn. Soc. (Bot.)* **14**: 60. 1873. — *Irpex subvinosus* (Berk. & Br.) Petch, *Dis. Tea Bush*: 173. 1923. — Holotype: “*Hydnum subvinosum* B. & Br. / No. 180 / Peradeniya” and “No. 180. *Hydnum subvinosum* B. & Br. / Ceylon. G. H. K. T[hwaites] Nov. 1867” (K).

Basidiome covering several cm<sup>2</sup> of bark, effused, plushy, olive brown, margin fibrillose to fimbriate, whitish. Hymenophore irpicoid. Spines up to 3 mm long, 0.2–1 mm broad, subulate, terete to flattened or fused, smooth or fluted, olive brown to dark brown, tip acute or incised, somewhat fibrillose, paler brownish. Context very thin, soft, yellowish brown.

Context monomitic, consisting of generative hyphae. Generative hyphae 2.7–8 μm wide, inflating and with tendency to form terminal or intercalary swellings, thin- to moderately thick-walled (cell-walls brownish), branched, septate, with clamp-connections. Context of spines similar. Basidia 15–20 × 5.5–7 μm, immature, clavate, some seen with 4 incipient sterigmata, with basal clamp. Spores 5.4–6.3 × 3.6–4.5 μm, broadly ellipsoid to phaseoliform, smooth, colourless, with oblique apiculus, not amyloid. Gloecystidia 5–13.5 μm wide, numerous, protruding, fusiform or lageniform in distal part, thin-walled, not incrustated.

The type sheet bears two packets, both numbered 180. Although the specimens from one packet look somewhat different externally from those of the second packet they are identical microscopically. There is no doubt that they represent a single collection, perhaps taken from different parts of a tea shrub. In this connection, of course, it is important to bear in mind the lines written by Petch & Bisby (1950: 2, 5–6) regarding Thwaites' specimens.

From the redescription given above it is clear that the species has no relation to *Irpex*.

*tabacinoïdes*. — *Irpex tabacinoïdes* Yasuda in *Bot. Mag., Tokyo* **33**: 189. 1919. — *Hydnochaete tabacinoïdes* (Yasuda) Imaz. in *Bull. Tokyo Sci. Mus.* **6**: 103. 1943. — Type: not seen.

Yasuda described thick-walled, brown setae 60–100 μm long in the hymenium, which clearly show his species to be a member of the *Hymenochaetaceae*.

*tabacinus*. — *Irpex tabacinus* Berk. & Curt. *apud* Fr. in *Nova Acta reg. Soc. Sci. upsal.* **III** **1**: 106. 1851; *apud* Berk. in *Grevillea* **1**: 102. 1873. — *Xylodon tabacinus* (Berk. & Curt. *apud* Fr.) O.K., *Rev. Gen. Pl.* **3**(2): 541. 1898. — *Trametes tabacina* (Berk. & Curt. *apud* Fr.) Pat., *Essai tax. Hym.*: 93. 1900. — *Cerrenella tabacina* (Berk. & Curt. *apud* Fr.) Murrill in *Bull. Torrey bot. Club* **32**: 361. 1905. — *Trametes abietina* var. *Irpex tabacinus* (Berk. & Curt. *apud* Fr.) Pilát in *Atlas Champ. Eur.* **3**: 275. 1939 (not validly published). — Lectotype (here chosen): “*Irpex tabacinus* B. & C. / No. 2358. *Car. Inf. / In Quercum albam*” (K).

Lectotype consisting of one large and two smaller pieces of bark covered by the fungus. Basidiome effused-reflexed, largest measuring c.  $50 \times 25$  mm. Reflexed portion about 3 mm radius, 2–6 mm wide or wider by lateral confluence, flabelliform, convex, more or less concentrically zoned or furrowed, rather harshly strigose, apparently becoming matted or glabrescent with age, brown; margin velutinous, cinnamon. Hymenophore hydroid-irpicoid, consisting of spines and plates. Spines up to 2 mm long, 0.1–0.2 mm broad, fused to become plates more than 1 mm broad, subulate, terete to flattened, smooth, pale brown, with entire, acute tip. Context less than 0.5 mm thick, somewhat duplex, underlying firmer layer dark brown.

Context of the pileus monomitic, consisting of generative hyphae. Generative hyphae 1.8–4.5  $\mu\text{m}$  wide, not inflating, thin- to moderately thick-walled, with brown cell-walls, branched, septate, without clamp-connections. Context of spines similar, generative hyphae practically all moderately thick-walled. Basidia  $13.5\text{--}18 \times 3.6\text{--}4.5$   $\mu\text{m}$ , immature, clavate, without basal clamp. Spores not seen. Cystidia up to 5–7  $\mu\text{m}$  wide, rare and occurring only near base of spine, fusiform, tapering to sharp point, with thick brown cell-walls.

This clearly is not an *Irpex*. Murrill (1908: 73) placed the species in the synonymy of *Cerrenella ravenelii* (Berk.) Murrill, which he described as devoid of cystidia. Patouillard, however, some years previously (1900: 99) had referred *Daedalea ravenelii* Berk. to *Hydnochaete* Bres., a genus characterized by the possession of brown, thick-walled cystidia (setae). Whether *Irpex tabacinus* and *Hydnochaete ravenelii* are actually the same species is not a matter of concern at this place. The point that requires some emphasis is that in the material investigated the setae are really very easily missed: some of the spines appeared to possess as few as two stunted setae near their base. To miss the setae is likely to result in misjudging the genus.

To the type sheet there are glued four smaller pieces of paper, all labelled *Irpex tabacinus*. Three of these bear a number mentioned by the authors of the species, No. 1088, 2932, and 2358. The last one has been chosen as the lectotype.

**t a n a k a e.** — *Irpiciporus tanakae* Murrill in *Mycologia* **1**: 167. 1909. — *Irpex tanakae* (Murrill) Sacc. & Trott. in *Syll. Fung.* **21**: 378. 1912. — Type: not seen.

The glabrous, azonate pileus and the lack of cystidia separate this species from *Irpex*. Imazeki (1939: 302) placed it in the synonymy of *Trametes albida* (Fr.) Bourd. & Galz. Aoshima (1967: 3) preferred to maintain *Irpiciporus tanakae* as a species in its own right but, considering it was better placed in *Daedalea*, proposed the new combination *D. tanakae*.

**t a s m a n i c u s.** — *Irpex tasmanicus* H. Syd. & P. Syd. in *Annls mycol.* **1**: 177. 1903. This is a name change for *Irpex depauperatus* Masee, which see.

**t i l i a c e u s.** — *Irpex tiliaceus* Pilát in *Annls mycol.* **23**: 306. 1925. — Type: not seen; type locality: near Prague.

Such characters as the indefinite margin, the rather fleshy nature of the context becoming "sehr zerbrechlich" on drying, the apparently monomitic hyphal construction, the lack of cystidia, clearly exclude the species from *Irpex*.

*tomentoso-cinctus*. — *Irpex tomentoso-cinctus* Rick in *Iheringia* (Bot.) No. 5: 190. 1959. — Type: not seen.

It remains to be seen whether the remark "*Poria tomentoso-cinctae* Berk. videtur lusus" does not invalidate the publication. In any case the fungus does not belong to *Irpex* on account of its angular-globose spores.

*trachyodon*. — *Hydnum trachyodon* Lév. in *Annls Sci. nat.* (Bot.) III 5: 302. 1846. — *Irpex trachyodon* (Lév.) Berk. & Curt. in *J. Linn. Soc.* (Bot.) 10: 326. 1868. — Type: not seen.

The fuscous margin of the basidiome and the equally fuscous context of the spines separate this species from *Irpex*. Bresadola (1896: 287) referred it to *I. portoricensis* (p. 495) which is not an *Irpex* either.

*umbrinus*. — *Irpex umbrinus* Weinm., *Hym.-Gasteromyc.*: 372. 1836. — *Xylodon umbrinus* (Weinm.) O.K., *Rev. Gen. Pl.* 3(2): 541. 1898. — *Gloeophyllum abietinum* f. *Irpex umbrinus* (Weinm.) Pilát in *Atlas Champ. Eur.* 3: 336. 1940 (not validly published). — Type locality: "in *Rossia minori*."

In the description by Weinmann the hymenophore is said to consist of serially aligned and closely spaced folds or lamellae, and the context of the basidiome to be dark brown. These features suggest that the fungus is not an *Irpex*. Hruby (1932: 1088) made an annotation which indicates that he, guided by an identification of Pilát, followed this author in regarding *I. umbrinus* as a form of *Lenzites abietina* (Bull. ex Fr.) Fr.

*unicolor*. — *Boletus unicolor* Bull., *Herb. Fr.*: pl. 408. 1788; pl. 501 fig. 3. 1790; *Hist. Champ. Fr.*: 365. 1791. — *Daedalea unicolor* Bull. ex Fr., *Syst. mycol.* 1: 336. 1821. — *Sistotrema unicolor* (Bull. ex Fr.) Secr., *Mycogr. suisse* 2: 498. 1833. — *Coriolus unicolor* (Bull. ex Fr.) Pat., *Essai tax. Hym.*: 94. 1900. — *Cerrena unicolor* (Bull. ex Fr.) Murrill in *J. Mycol.* 9: 91. 1903. — *Irpex unicolor* (Bull. ex Fr.) Lloyd, *Mycol. Writ.* 6: 921, pl. 145 figs. 1649, 1650. 1920. — *Trametes unicolor* (Bull. ex Fr.) Pilát in *Atlas Champ. Eur.* 3: 279. 1939. — Type: represented by Bull., *Herb. Fr.*: pl. 408. 1788.

Lloyd based his remark "This for me is the *Irpex* form of the common *Daedalea unicolor*..." on a Japanese collection. It must be doubted whether *Irpex unicolor* constitutes a valid recombination. His identification of the Japanese material (Lloyd *Mycol. Coll.* 24169, BPI), however, appears to be correct.

*vellerius*. — *Irpex vellerius* Berk. & Br. in *J. Linn. Soc.* (Bot.) 14: 61. 1873. — *Xylodon vellerius* (Berk. & Br.) O.K., *Rev. Gen. Pl.* 3(2): 541. 1898. — *Hirschioporus vellerius* (Berk. & Br.) Teng, *High. Fungi China*: 484, 761. 1964. — Type: not seen.

Reid (1956: 637) described the context of this fungus as "apparently monomitic..."

while the cystidia were said to arise "as terminal modifications of ordinary thick-walled hyphae." These two features are not consistent with *Irpex*.

*versatilis*. — *Irpex versatilis* Lloyd, Mycol. Writ. 5: 712, fig. 1068. 1917. — Holotype: "*Irpex versatilis* / Gladsville, Aust. / P. F. Clarke" (Lloyd Mycol. Coll. 24132, BPI).

While admitting that between his specimen and *Polystictus versatilis* there was some relation he could not explain, Lloyd undoubtedly meant to propose *Irpex versatilis* as an independent species. His macroscopic description is good enough. The context is monomitic, consisting of generative hyphae 4.5–9  $\mu\text{m}$  wide, not inflating, thin- to thick-walled or nearly solid, branched, more or less constricted at the septa, without clamp-connections. These supplementary data are needed to make quite sure that *I. versatilis* is not some strangely disguised *I. lacteus*.

Some time later Lloyd (1918: 791) changed his mind, writing that "evidently" *I. versatilis* was "only an indurated, irpicoid form" of *Polystictus anomalus*.

*violaceus*. — *Sistotrema violaceum* Pers., Syn. meth. Fung.: 551. 1801; ex Schleich., Cat. Pl. Helv., Ed. 4: 59. 1821. — *Irpex violaceus* (Pers. ex Schleich.) Quél., Fl. mycol.: 376. 1888. — Type locality: Germany.

This is generally accepted as a synonym of *Hirschioporus fusco-violaceus* (Ehrenb. ex Fr.) Donk.

*viticola*. — *Irpex viticola* Cooke & Peck in Rep. N.Y. St. Mus. nat. Hist. 34: 43. 1881. — *Xylodon viticola* (Cooke & Peck) O.K., Rev. Gen. Pl. 3(2): 541. 1898. — Holotype: "No. 335 / *Irpex viticola* C. & P. / on grape vine / North Greenbush N.Y. / July" (K).

As far as the holotype remains, it consists of three patches of different size, the largest measuring 50 × 13 mm. Basidiome effused-reflexed. Reflexed portion less than 2 mm radius, not concentrically grooved or zoned, finely fibrillose, faintly shiny, yellowish brown, margin incised or running out into spines, somewhat darker and more reddish brown. Adhymenial surface areolate, waxy, dingy ochraceous. Spines 1–1.5 mm long, 0.1–0.6 mm broad, subulate, terete or flattened, flexuous, interconnected at base or confluent to form lacerate dissepiments, glabrous to somewhat pruinose, concolorous with adhymenial surface, tip entire or incised, horny, reddish brown. Context pale brownish.

Context of reflexed portion monomitic. Generative hyphae 3–5  $\mu\text{m}$  wide, not inflating, thin-walled, branched, septate, without clamp-connections. Context of spines dimittic, made up of generative and skeletal hyphae. Skeletals up to 5.5  $\mu\text{m}$  wide, thick-walled (cell-wall up to 1.8  $\mu\text{m}$  thick), particularly near base of spine curved outwards to form cystidia. Basidia 13.5–23.5 × 3.5–5.4  $\mu\text{m}$ , immature, clavate, without basal clamp. Spores not seen. Cystidia mainly near base of spine, projecting but little beyond the hymenium, incrustated.

On account of its characters the species is here excluded from *Irpex*.

*woronowii*. — *Irpex woronowii* Bres. in *Annls mycol.* **18**: 42. 1920. — Type: not seen.

The description given by Bresadola mentions context hyphae with yellow cell-walls. This character in itself is significant but, connected with the apparent lack of cystidia, there can be no doubt that the species is totally unrelated to *Irpex*. According to Baxter (1938: 295) *I. woronowii* is synonymous with *Fomes alboluteus* Ell. & Ev.

*zonatus*. — *Irpex zonatus* Berk. in Hook. J. Bot. **6**: 168. 1854. — *Xylodon zonatus* (Berk.) O.K., Rev. Gen. Pl. **3**(2): 541. 1898. — Syntypes: “*Irpex zonatus* Berk. / E. Nepal Nov. 8” and “*Irpex zonatus* Berk. / Sikkim” (K).

For the description the syntype from Sikkim has been used. Pileus 50 mm radius, 65 mm wide, deeply incised, the two segments partly imbricate, flabelliform, plane, faintly radiately rugulose, closely concentrically furrowed, innately fibrillose, ochraceous yellow-brown, locally more warmly coloured; margin lobed or incised or running out into teeth, involute, finely fibrillose. Hymenophore compound-poroid. Dissepiments variously incised and lacerate to form terete, flattened, or strap-shaped ‘spines’ which are up to 4 mm long, glabrous, yellow-brown near base, darker towards tip. Context pale wood-brown, faintly zoned.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 2.7–4.5  $\mu\text{m}$  wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletal hyphae 4–6.3  $\mu\text{m}$  wide, thick-walled to solid, a certain proportion showing anomalous behaviour in that they are clamped or branched. Context of ‘spines’ similar, hyphae somewhat narrower, skeletal not curved outwards to form cystidia. Basidia about 13.5–18  $\times$  3.5–4.5  $\mu\text{m}$ , immature, clavate, with basal clamp. Spores not seen. Cystidia not seen.

On account of its different features the present species cannot be maintained in the genus *Irpex*.

Lloyd (1916: 602) suspected that *Irpex zonatus* (of which he had seen the type) and what he considered to be *I. noharae* (specimens of which he had received from K. Miyabe, Japan) were “virtually the same species.” However, as pointed out by Ito (1955: 188, 258), *Irpex noharae* (Murr.) Sacc. & Syd. is a synonym of *Lopharia mirabilis* (Berk. & Br.) Pat., whereas *Irpex noharae* sensu Lloyd proves to be *Hirschioporus fusco-violaceus* (Ehrenb. ex Fr.) Donk.

Later on Lloyd (1918: 795) gave an impenetrably muddled account of *I. cingulatus*, *I. consors*, and *I. zonatus* which can hardly be taken seriously.

Cunningham (1965: 74, 75) held the view that *Daedalea gollanii* Masee and *I. zonatus* represented the same species. I have re-examined the type of *D. gollanii* and agree entirely.

Thind, Bindra & Chatrath (1957: 479), in their redescription of *Daedalea gollanii*, stated that the species possessed “pseudocystidia” which were formed by projecting skeletal hyphae.

## 2a. STECCHERINUM S. F. Gray

*Steccherinum* S. F. Gray, Nat. Arrang. Br. Pl. **1**: 651. 1821 (“*Steccherina*”). — Type species: *Hydnium ochraceum* Pers. apud Gmel. ex Fr. (cf. Donk in *Taxon* **5**: 112. 1956).

*Odontia* Fr., Fl. scan.: 340. 1835; Gen. Hym.: 13. 1836; Epicr. Syst. mycol.: 528. 1838; not

*Odontia* Pers. ex S. F. Gray, Nat. Arrang. Br. Pl. 1: 651. 1821. — *Etheiroidon* Banker in Bull. Torrey bot. Club 29: 441. 1902 (name change). — Type species: *Hydnum fimbriatum* Pers. ex Fr. (cf. Donk in Taxon 5: 76, 106. 1956).

*Leptodon* Quéf., Ench. Fung.: 191. 1886; not *Leptodon* Weber apud Mohr, Obs. bot.: 27. 1803 (Neckeraceae, Musci frond.). — *Mycoleptodon* Pat., Cat. rais. Pl. cell. Tunis.: 54. 1897; Essai tax. Hym.: 116. 1900 (name change). — Type species: *Hydnum pudorinum* Fr. (cf. Donk in Taxon 5: 101, 105. 1956).

*Odontina* Pat., Hym. Eur.: 147. 1887. — Type species: *Hydnum denticulatum* Pers. sensu Pat. (cf. Donk in Taxon 5: 107. 1956).

*Hydnum* [sect.] *Hypodon* J. Schroet. in Cohn, KryptFl. Schles. 3(1): 454. 1888; P. Henn. in Nat. PflFam. 1 (1\*\*): 145. 1898. — Type species (selected): *Hydnum ochraceum* Pers. apud Gmel. ex Fr.

Basidiome effused, effused-reflexed or pileate. Pileus sessile or attached to substratum by its vertex, rarely stipitate, tomentose, velutinous, woolly or hirsute, glabrescent or not, white or ochraceous to brown. Hymenophore hydroid; hymenium variously coloured (cream, flesh, brick or reddish brown). Context zoned or not, pliable to tough or rigid, white to pallid or brownish, dimitic, consisting of generative and skeletal hyphae. Generative hyphae not inflating, always with clamp-connections. Context of spines always dimitic. Basidia cylindrical to clavate, 4-spored, always with basal clamp. Spores ellipsoid to subglobose, smooth, colourless, neither amyloid nor cyanophilous. Cystidia of tramal and/or subhymenial origin, more or less protruding, usually incrusted, thick-walled to solid, in some cases together with gloecystidia, more rarely absent and replaced by gloecystidia.

Arboricolous or lignicolous.

Thus far seventeen species are accepted in the genus *Steccherinum*, while one unnamed species is admitted with some doubt.

## 2b. KEY TO THE SPECIES

(Based on characters of the dried material)

1. Basidiome effused. Adhymenial surface partly or entirely flushed with reddish or purplish or violaceous tints which persist on drying. Spines not exceeding 0.5 mm in length  
*S. fimbriatum*, p. 509
1. Basidiome differently characterized.
  2. Spores up to c. 3  $\mu$ m broad.
    3. Adhymenial surface at first minutely porous, then ceraceous, cream to pale ochraceous. Margin fimbriate, developing rhizomorphic strands. Context white. Basidiome thus far known only effused . . . . . *S. ciliolatum*, p. 506
    3. Basidiome differently characterized.
    4. Margin of effused part easily separable from substratum with aid of scalpel, or basidiome lacking effused parts.
      5. Spores less than 2.5  $\mu$ m broad; if, exceptionally, up to 2.7  $\mu$ m broad, spines of fungus characterized by numerous, acute cystidia.
      6. Pileus towards base with concentrically arranged, dome-shaped pustules  
*S. subrawakense*, p. 527
    6. Pileus different.
      7. Pileus slender-flabelliform, tapering behind into stipe-like base, marked by numerous concentric dark brown lines . . . . . *S. peckii*, p. 521
      7. Pileus different.

8. Cystidia of two kinds, the most conspicuous of which of subhymenial origin, thin-walled, and filled with some oleaginous matter. Adhymenial surface subceraceous. Spines glabrous or pruinose  
*S. ethiopicum*, p. 508
8. Differently characterized.
9. Spines reddish brown to dark brown, or pileus nearly plane, never hirsute, often substipitate.
10. All cystidia with obtuse tips.
11. Margin of pileus thin, acute.
12. Pileus marked by concentric hispid zones; gloecocystidia absent . . . . . *S. murashkinskyi*, p. 516
12. Pileus, depending on its age, finely tomentose or matted or glabrescent; gloecocystidia present  
*S. rawakense*, p. 523
11. Margin of pileus thick, obtuse; pileus minutely velutinous at margin, woolly-scrupose farther back *S. gilvum*, p. 512
10. Many cystidia in basal half of spine with acute tips  
*S. reniforme*, p. 524
9. Spines flesh colour, pinkish or more ochraceous.
13. Cystidia of tramal origin, usually incrustated over considerable length . . . . . *S. ochraceum*, p. 517
13. Cystidia of subhymenial origin, incrustated only at apex  
*S. willisii*, p. 527
5. Spores 2.5-c. 3  $\mu$ m broad. Cystidia predominantly or exclusively obtuse at apex.
14. Margin (of effused part) fimbriate.
15. Spines salmon to brick colour . . . . . *S. laeticolor*, p. 513
15. Spines cream to pale flesh colour . . . . . *S. spec. 1*, p. 528
14. Margin (of effused part) delicately scalloped, evenly velutinous  
*S. ochraceum*, p. 517
4. Basidiome effused. Margin inseparable from substratum.
16. Margin very inconspicuous or evanescent. Spines subdistant or united to form subdistant small groups. . . . . *S. narymicum*, p. 517
16. Margin delicately scalloped, velutinous. Spines crowded *S. ochraceum*, p. 517
2. Spores c. 3-4.3  $\mu$ m broad.
17. Spores c. 3-3.6  $\mu$ m broad. Basidiome pileate.
18. Spines less than 1 mm long. Context less than 0.5 mm thick  
*S. basi-badium*, p. 505
18. Spines up to 10 mm long. Context up to 2.5 mm thick . . . *S. galeritum*, p. 510
17. Spores 3.6-4.3  $\mu$ m broad. Basidiome effused or effused-reflexed.
19. Spines up to 2-3 mm long. Incrustated cystidia numerous. . . *S. hydneum*, p. 512
19. Spines up to 1.5 mm long. Incrustated cystidia absent . . . *S. lanestre*, p. 514

## STECCHERINUM BASI-BADIUM Banker — Fig. 1

*Steccherinum basi-badium* Banker in *Mycologia* 4: 314. 1912. — Holotype: "No. 285 B.G. / *Stech. n. sp.* / Murr. 253 Mexico" (NY).

Holotype consisting of several basidiomes: one still attached to decorticated piece of wood, others originated from margin of old weathered pilei. Pileus up to 10 mm radius and up to about 15 mm wide, flabelliform, depressed near point of attachment, convex to undulate farther outwards, shallowly radiately rugulose, with more or less raised concentric zones, minutely velutinous or woolly at extreme margin,

fibrillose-matted and shiny behind margin, glabrescent and dull towards oldest part, ochraceous yellow to yellow-brown near margin, bay to fuliginous towards base and here sometimes streaked with darker brown or black. Adhymenial surface granular. Spines up to 0.5 mm long, 0.1–0.2 mm broad, crowded, subulate, terete to somewhat flattened, pulverulent to minutely pubescent, yellowish flesh colour, with fimbriate or furcate tips. Context 0.2–0.3 mm thick, pliable, not truly layered but brown in upper half, whitish in lower half.

Context dimittic, consisting of generative and skeletal hyphae. Generative hyphae 3.6–4.5  $\mu\text{m}$  wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletal hyphae 3.6–8  $\mu\text{m}$  wide, thick-walled to solid. Context of spines similar, generative hyphae somewhat narrower. Basidia 15–20  $\times$  4.5–5.5  $\mu\text{m}$ , clavate, with basal clamp, 4-spored, with sterigmata about 3.6  $\mu\text{m}$  long. Spores 3.6–4.5  $\times$  3.1–3.4  $\mu\text{m}$ , broadly ellipsoid to obovoid, adaxially somewhat flattened, smooth, colourless, with extremely small apiculus. Cystidia 4.5–7.2  $\mu\text{m}$  wide, of tramal origin, evenly distributed over spine, protruding, incrustated, cylindrical or somewhat fusiform in distal part, with obtuse or acute apex.

DISTRIBUTION.—The species has long been known only from the type locality (Mexico) so that the record of two further localities situated in a widely separated part of the world (Nepal) is little short of spectacular. The two recent collections both come from east Nepal (1: between Tambakosi and Jassá, Sept. 1962, J. Poelt, herb. M; 2: Jassá, 9 Oct. 1962, J. Poelt P 204, in mountain forest, herb. M).

At first the two Nepalese collections were regarded with disbelief and suspicion, since their detection coincided with the description of a new species, *Steccerinum lanestri*, also globose-spored and also from Nepal. Since globose-spored species are thus far known only from very few places in the world, it seemed quite logical to assume that the two collections from Jassá and surroundings and *S. lanestri* would represent the same species. Repeated investigations, however, never changed the fact that they are not conspecific, while the characters of the two Jassá collections rather pointed in the direction of *S. basi-badium*. Although the characters of the Nepalese collections do not match exactly those of the Mexican holotype, the differences registered seem of minor importance and in any case not constant in themselves. A brief redescription of the main points should help complete the picture of *Steccerinum basi-badium*.

Basidiome effused-reflexed' in 1 (but reflexed portion very narrow), seemingly pileate in 2. Reflexed portion of 1 almost identical with pileus of holotype; pileus of 2 with somewhat different aspect. Spines up to 1.5 mm long, 0.2–0.3 mm broad, flesh coloured in 1, up to 0.8 mm long and more whitish cream in 2. Context less than 0.5 mm in both 1 and 2, brown above, white below. Spores 4.0–4.3  $\times$  3.1–3.4  $\mu\text{m}$  in 1, 3.6–4.0  $\times$  3.1–3.6  $\mu\text{m}$  in 2. Cystidia in both 1 and 2 numerous, evenly distributed, protruding, incrustated.

#### STECCHERINUM CILIOLATUM (Berk. & Curt.)

Gilbertson & Budington — Figs. 2–4

*Hydnum ciliolatum* Berk. & Curt. in Hook. J. Bot. 1: 235. 1849; *apud* Berk. in Grevillea 1: 99. 1873. — *Odontia ciliolata* (Berk. & Curt.) Rick in Egatea 18: 46. 1933; L. W. Miller in Mycologia 26: 18, pl. 2 fig. 5. 1934 (recombination preoccupied). — *Steccerinum ciliolatum* (Berk. & Curt.) Gilbertson & Budington in J. Arizona Acad. Sci. 6: 97. 1970; Gilbertson in R. H. Petersen



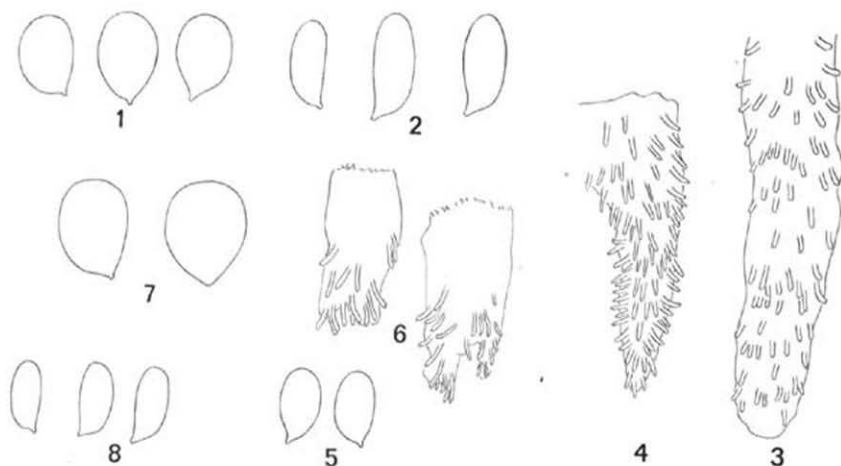


Fig. 1. *Steccherinum basi-badium* (holotype). — Spores ( $\times 2800$ ).

Figs. 2, 3. *Mycoleptodon litschaueri* (part of the holotype, UPS). — 2. Spores. — 3. Spine with cystidia. (Fig. 2,  $\times 2800$ ; Fig. 3,  $\times 70$ .)

Fig. 4. *Steccherinum ciliolatum* (U.S.A., Michigan, Tahquamenon Falls State Park, 9 Sept. 1969, M. A. Donk 14213, L). — Spine with cystidia ( $\times 70$ ).

Figs. 5, 6. *Hydnum fimbriatum* (neotype). — 5. Spores. — 6. Spines with cystidia only at the apex (Fig. 5,  $\times 2800$ ; Fig. 6,  $\times 70$ .)

Fig. 7. *Irpex hydneus* (holotype). — Spores ( $\times 2800$ ).

Fig. 8. *Hydnum rhois* (part of type). — Spores ( $\times 2800$ ).

(Ed.), *Evol. high. Basidiomyc.*: 294. 1971 (recombination preoccupied). — Holotype: "*Hydnum ciliolatum*, B. & C. / No. 1464 Car. Inf." (K).

*Mycoleptodon litschaueri* Bourd. & Galz., *Hym. Fr.*: 441. 1928. — *Steccherinum litschaueri* (Bourd. & Galz.) John Erikss. in *Symb. bot. upsal.* 16(1): 134. 1958. — Holotype: "N., 34863 / *Mycoleptodon Litschaueri* / Hym. de Fr. [Bourdot's hand] / *Odontia* sp. / Mutters bei Innsbruck, Tirol. 16.IX.1921. Hab. in ramis *Abietis excelsae*. leg. V. Litschauer" [Litschauer's hand] (PC). — Part of holotype: No. 183 (UPS).

Basidiome eventually covering an area of several cm<sup>2</sup>, effused, inseparable from substratum without damage. Adhymenial surface at first minutely porous, becoming subceraceous to ceraceous, finally areolately cracked, milk white to pale cream. Margin finely fibrillose to fimbriate, sometimes forming runners or rhizomorphic strands, whitish. Spines up to about 1.5 mm long, 0.1–0.2 mm broad, moderately crowded to subdistant, subulate, terete to more or less flattened, straight, simple or connate, rarely furcate, pulverulent or pubescent to almost hispid, cream in younger parts of basidiome, pale ochraceous in centre, tip fimbriate to lacerate, white. Context very thin, soft, whitish.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 1.8–5.4  $\mu$ m wide, not inflating, thin- to moderately thick-walled, branched, septate, with clamp-connections. Skeletal hyphae 2.7–5.4  $\mu$ m wide, thick-walled to solid.

Context of spines similar, skeletal usually somewhat narrower. Basidia  $18-22 \times 4.5-6 \mu\text{m}$ , clavate, 4-spored, with sterigmata  $2.7-3.6 \mu\text{m}$  long, with basal clamp. Spores  $4.5-5.4 \times 1.8-2.7 \mu\text{m}$ , ellipsoid to somewhat elongate, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia  $3.5-8 \mu\text{m}$  wide, of tramal origin, evenly distributed over length of spine, numerous to abundant, more or less protruding, incrusting, cylindrical to somewhat fusiform in distal part, with obtuse or more acute apex.

HABITAT.—The type of *Mycoleptodon litschaueri* was collected on *Picea abies*, but Gilbertson (1965: 851) listed also several collectings from deciduous trees.

DISTRIBUTION.—The species is known from Europe and the U.S.A. (but as far as could be ascertained exsiccates were not distributed).

REPRESENTATIVE HABIT ILLUSTRATION.—Eriksson in Symb. bot. upsal. 16(1): pl. 21B. 1958 (*S. litschaueri*).

In the herbarium at Geneva there are two exsiccates (Ellis & Everhart, N. Am. fungi, Second Series 3411 and Ravenel, Fungi carol. 10) under the name *Hydnum ciliolatum* but neither represents this species.

Miller (1934: 18) commented on the close relation of the species to what he called *Odontia fimbriata*. Cunningham (1959: 86) went even further in that he reduced *Hydnum ciliolatum* to the synonymy of *O. fimbriata*. Apart from the macroscopic differences pointed out by Miller, *Steccherinum ciliolatum* and *S. fimbriatum* may be distinguished by the differences in the nature of the adhymental surface and the distributional pattern of the cystidia.

### *Steccherinum ethiopicum* Maas G., spec. nov.

*Hydnum pudorinum* f. *erythraeum* Baccarini in Annali Bot. 14: 122. 1917. — Lectotype: "No. 5515 [in pencil: *Hydnum pudorinum*] *Hydnum pudorinum* f. *erythraeum*/Eritrea-Amasen: Lungo il torrente Ghillà sotto i monti Deksanà / m. 1600 c. s.m. / 24-25. V. 1902 / Leg. A. Pappi" (Herbarium R. Horti Romani, Erbario coloniale, FI).

Basidiomata effuso-reflexa, imbricata, lateraliter confluentia. Pars pileata usque ad 15 mm antice producta, 20-30 mm lata, conchiformis vel flabelliformis, subconvexa, concentricè tenuiter sulcata, ad marginem minutè velutina, postice collisa vel subrugosa, sordide ochracea vel crustulina, interdum zonis concentricis glabris badiisque variegata, margine obtuso dein acuto. Aculei usque ad 4.5 mm longi, 0.1-0.3 mm lati, conferti, subulati, tereti vel compressi, recti vel flexuosi, simplices vel connati, flavobrunnei vel incarnati demum badii, glabri vel albo-vel caesiopruinosi, apice vulgo acuto, concolore. Caro usque ad 1 mm crassa, coriacea, pileo concolor, e hyphis generatoriis skeletalibusque formata. Hyphae generatoriae  $1.8-4 \mu\text{m}$  latae, haud inflatae, tenuiter tunicatae, ramosae, septatae, fibulis praeditae. Hyphae skeletales  $2.7-6.3 \mu\text{m}$  latae, crasse tunicatae vel solidae, plerumque valde ramosae. Basidia  $13.5-14.5 \times 3.5-4.5 \mu\text{m}$ , maxima ex parte immatura, clavata, fibulata. Sporae  $2.7-3.6 \times 1.3-1.8 \mu\text{m}$ , immaturae (?), ellipsoideae, adaxialiter applanatae, laeves, hyalinae, apiculo obliquo munitae. Cystidia duo modo formata, (1) e aculeorum trama atque (2) e subhymenio orientia; (1) aculeorum apicem versus inventa, plerumque exigua; (2)  $27-50 \times 4.5-6.5 \mu\text{m}$ , numerosa vel permulta, hymenium parum superantia, glabra, cylindracea vel fusiformia vel obclavata vel lageniformia, plerumque tenuiter tunicata, materia oleosa repleta, apice obtusa.

HOLOTYPE: est *Hydnum pudorini* f. *erythraei* lectotypus.

Basidiomes effused-reflexed, imbricate, laterally confluent. Reflexed portion up to 15 mm radius, 20-30 mm wide, conchiform or flabelliform, somewhat convex,

with shallow concentric grooves, minutely velutinous at margin, matted or somewhat wrinkled farther back, sometimes also with concentric glabrescent zones, dingy ochraceous or locally warm yellow-brown, glabrous areas reddish brown. Margin at first rather thick, blunt, becoming acute. Adhymenial surface subceraceous, soon difficult to distinguish, ochraceous. Spines up to 4.5 mm long, 0.1–0.3 mm broad, crowded, subulate, terete to flattened, straight to flexuous, simple or connate, yellow-brown to flesh colour, darkening to darkish red-brown, glabrous or with whitish or bluish pruina, tip usually acute, concolorous. Context up to 1 mm thick, leathery tough, concolorous with pileus.

Context dimittic, consisting of generative and skeletal hyphae, with high proportion of the latter kinked and rather extensively branched in older basidiomes. Generative hyphae 1.8–4  $\mu$ m wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletal hyphae 2.7–6.3  $\mu$ m wide, thick-walled to almost solid. Context of spines similar. Basidia 13.5–14.5  $\times$  3.5–4.5  $\mu$ m, immature or, rarely, with 4 incipient sterigmata, clavate, with basal clamp. Spores 2.7–3.6  $\times$  1.3–1.8  $\mu$ m, possibly immature, ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia of two kinds: (1) of tramal origin, usually nothing else but terminal ends of skeletal hyphae slightly bent outwards and sparingly incrustated with crystalline matter, to be found exclusively at tip of spine; (2) of subhymenial origin, 27–50  $\times$  4.5–6.5  $\mu$ m, numerous to abundant, little protruding, not incrustated, cylindrical, fusiform, obclavate or lageniform, thin-walled and filled with oleaginous matter or, more rarely, moderately thick-walled and empty, with obtuse apex.

HOLOTYPE: same as lectotype of *Hydnum pudorinum* f. *erythraeum*.

HABITAT.—On rotten decorticated wood.

DISTRIBUTION.—Known only from the type locality.

FURTHER COLLECTIONS.—Pappi 5525, 5581 (excellent collection), 5592 (all three syntypes of *H. pudorinum* f. *erythraeum*, FI).

Macroscopically the present species resembles well developed *S. ochraceum* of the kind that some authors may prefer to call *S. rhois* but the spines are rather darker (reddish brownish) than in that species. On looking more closely, the spines appear different in being glabrous or pruinose. The most important difference lies in the cystidia, however, while it is also possible that the spores of *S. ethiopicum* will prove to be consistently smaller.

#### STECCHERINUM FIMBRIATUM (Pers. ex Fr.) John Erikss.

Figs. 5, 6

*Odontia fimbriata* Pers., Obs. mycol. 1: 88. 1796. — *Sistotrema? fimbriatum* (Pers.) Pers., Syn. meth. Fung.: 553. 1801. — *Hydnum fimbriatum* (Pers.) Poiret, Encycl. méth. (Bot.) 8: 201. 1808. — *Hydnum fimbriatum* Pers. ex Fr., Syst. mycol. 1: 421. 1821; not *Hydnum fimbriatum* (Banker) Sacc. & Trott. in Syll. Fung. 21: 373. 1912. — *Sistotrema fimbriatum* (Pers. ex Fr.) Schw. in Schr. naturf. Ges. Leipzig 1: 102. 1822. — *Xylodon fimbriatus* (Pers. ex Fr.) Chev., Fl. gén. Envir. Paris 1: 273. 1826. — *Odontia fimbriata* (Pers. ex Fr.) Fr., Gen. Hym.: 13. 1836 (not seen); Epicr. Syst. mycol.: 529. 1838. — *Etheiroduon fimbriatus* (Pers. ex Fr.) Banker in Bull. Torrey bot. Club 29: 441. 1902. — *Mycoleptodon fimbriatus* (Pers. ex Fr.) Bourd. & Galz. in Bull. trimest. Soc. mycol. Fr. 30: 276. 1914; Hym. Fr.: 441. 1928. — *Gloiodon fimbriatus* (Pers. ex Fr.) Donk in Nederl. kruidk. Archf [40]: 79. 1930; in Meded. Nederl. mycol. Ver. 18–20: 190. 1931. — *Steccherinum fimbriatum* (Pers. ex Fr.) John Erikss. in Symb. bot. upsala. 16(1): 134.

1958. — Neotype: "*Hydnum?* (*Schizodon*) *fimbriatum* / Satis frequens prope Parisios" (L 910.256—1391).

*Sistotrema fimbriatum* var. *stalactiticum* Fr., Obs. mycol. 2: 268. 1818. — Type locality: Sweden.  
? *Hydnum obtusum abietis* Secr., Mycogr. suisse 2: 534. 1833. — Type locality: Switzerland, "près de la Clochettaz."

Basidiome by confluence often attaining considerable size, effused, partly separable. Adhymenial surface porous, somewhat floccose, or areolate, sometimes shiny as if suffused with some glutinous matter, smooth or veined or marked by raised rhizomorphic strands, dingy yellowish grey flushed with pink, pinkish grey, sometimes partly flushed with purple or violaceous tints, or dingy purplish brown. Margin fimbriate and forming rhizomorphic strands, whitish, becoming concolorous. Spines up to 0.5 mm long, 0.1–0.2 mm broad, subdistant to crowded or aggregated into dense clumps, rarely simple, usually variously connate, wart-like to more elongate and then usually flattened or with fluted sides, pulverulent to granular, concolorous with adhymenial surface, tip conspicuously shaggy or spiny with tufts of white bristles. Context less than 0.5 mm thick, leathery tough.

Context dimittic, consisting of generative and skeletal hyphae. Generative hyphae 2.5–4.5  $\mu$ m wide, not inflating, thin- to moderately thick-walled, branched, septate, with clamp-connections. Skeletal hyphae 3.6–5.4  $\mu$ m wide, thick-walled to almost solid, those adjoining substratum frequently brownish. Context of spines similar, most skeletal solid. Basidia 15–20  $\times$  3.5–5.5  $\mu$ m, clavate, with basal clamp, with 4 sterigmata about 3.6  $\mu$ m long. Spores 3.3–4  $\times$  2.5–3  $\mu$ m, broadly ellipsoid to obovoid, adaxially little flattened, smooth, colourless, with small oblique apiculus. Cystidia 3–9  $\mu$ m wide, of tramal origin, numerous to abundant at tip of spine, rare to absent farther back, conspicuously protruding, usually heavily incrustated, cylindrical in distal part, with obtuse apex.

HABITAT.—On fallen branches and decaying wood of frondose and coniferous trees.

DISTRIBUTION.—Widely distributed in the northern hemisphere. Cunningham (1959: 86) enumerated many localities for this species in New Zealand, arranged according to the host. Examination of the two collections listed under *Brachyglottis repanda* Forst. and of a third collection not represented in this list proved that the specimens have nothing to do with *S. fimbriatum* since their hyphal construction is monomitic.

EXSICCATES.—Brinkmann, Westfäl. Pilze, Lief. 2, 91 (*Odontia*, L.). Jaap, Fungi sel. exs. 341 (*Odontia*, L.). Lundell & Nannfeldt, Fungi exs. succ., praes. upsal. 163 (*Mycoleptodon*, UPS). Roumeguère, Fungi gall. exs. 1207 (*Odontia*, L.). Sydow, Mycoth. germ. 2260 (*Odontia*, L.).

REPRESENTATIVE HABIT ILLUSTRATION.—Jahn in Westfäl. Pilzbr. 7: 143, pl. 9. 1969.

Cejp (1930: 310) cited *Porothelium fimbriatum* among the synonyms of the present species. This is an error. *Porothelium* (correctly: *Porothelium*) *fimbriatum* (Pers. ex Fr.) Fr. is a member of the Cyphellaceae (Donk, 1959: 81).

### *Steccherinum galeritum* Maas G., spec. nov.<sup>2</sup>

Basidioma pileatum. Pileus usque ad 35 mm antice productus, dimidiatus, sessilis, conchatus, subconvexus, inconspicue concentric sulcatus, ad marginem lanato-strigosus, postice crasse fibrillosus fibrillis flexuosis agglutinatisque, ochraceus vel crustulinus, zonis obscuriusculis

<sup>2</sup> Etymology: *galeritus*, covered with a hairy hood.

obsolete variegatus, margine acutus, integer. Aculei 8–10 mm longi, 0.1–0.3 mm lati, conferti, subulati, teretes, recti vel flexuosi, simplices vel connati, sordide flavo-brunnei, albopruinosi. Caro usque ad 2.5 mm crassa, coriacea vel spongioso-fibrillosa, albidia, e hyphis generatoriis skeletalibusque formata. Hyphae generativae 1.8–4  $\mu$ m latae, haud inflatae, tenuiter tunicatae, ramosae, septatae, fibulis praeditae. Hyphae skeletales 4–6  $\mu$ m latae, crasse tunicatae vel sub-solidae. Basidia 17–19  $\times$  4.5–5.5  $\mu$ m, clavata, 4 sterigmatibus c. 2.7  $\mu$ m longis munita, fibulata. Sporae 3.7–4.5  $\times$  3.1–3.6  $\mu$ m, late ellipsoideae vel subgloboae, laeves, hyalinae, apiculo minuto obliquo munitae. Cystidia 4.5–6.5  $\mu$ m lata, aculeorum partem subdistalem versus numerosa, apice deflexa, immersa vel parum prominentia, haud incrusteda, cylindracea, apice obtusa.

HOLOTYPE: "Borneo, Sabah, Mt. Kinabalu, Mesilau River, 10 April 1964, E. J. H. Corner, RSNB 8224, 1600 m alt." (L).

Basidiome pileate. Pileus up to 35 mm radius, dimidiate, sessile, conchate, somewhat convex, inconspicuously concentrically grooved, woolly-strigose near margin, very coarsely fibrillose farther back (fibrils flexuous and agglutinated to form untidy strands), ochraceous yellow to warm yellow-brown, obscurely zoned by somewhat darker grooves; margin acute, even. Adhymenial surface pruinose. Spines 8–10 mm long, 0.1–0.3 mm broad, crowded, subulate, terete, straight to flexuous, simple or connate, dingy yellow-brown, white-pruinose. Context up to 2.5 mm thick at base, partly compact and leathery, partly spongy-stringy, whitish.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 1.8–4  $\mu$ m wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletal hyphae 4–6  $\mu$ m wide, thick-walled to almost solid. Context of spines similar, skeletal 7–8  $\mu$ m wide. Basidia 17–19  $\times$  4.5–5.5  $\mu$ m, clavate, 4-spored, with sterigmata c. 2.7  $\mu$ m long, with basal clamp. Spores 3.7–4.5  $\times$  3.1–3.6  $\mu$ m, broadly ellipsoid to subglobose, smooth, colourless, with minute oblique apiculus. Cystidia 4.5–6.5  $\mu$ m wide, of tramal origin, lacking at base of spine, numerous in distal third portion, scarce towards tip, at apex sharply curved outwards, remaining immersed or little protruding, not incrusted, cylindrical, with obtuse apex.

HOLOTYPE: "Borneo, Sabah, Mt. Kinabalu, Mesilau River, 10 April 1964, E. J. H. Corner, RSNB 8224, 1600 m alt." (also in liquid, L).

HABITAT.—On rotten wood in the forest.

DISTRIBUTION.—Known only from Mt. Kinabalu.

ADDITIONAL COLLECTIONS.—Sabah, Mt. Kinabalu, 12 June 1961, E. J. H. Corner, RSNB 555, 1000 m alt. (L); 13 July 1961, E. J. H. Corner, RSNB 808, 3000 m alt. (also in liquid, L).

The description given above is drawn up from the dried material, which unfortunately seems only a fragment of the entire basidiome. The following are some of the notes made by the collector:—

Upper side fibrilloso-spiculose, fuscous drab, margin entire, pale cream. Spines up to 11 mm long, 0.3–0.8 mm wide at the base... pale ochraceous with white points. Flesh 5–8 mm thick, fibrous coriaceous, more or less fibrilloso-lacunar, pallid ochraceous-buff. Smell rather fruity, sour.

The position of the present species in *Steccherinum* seems open to criticism. The aspect of the pileus with its coarse untidy fibrils, and the spongy-stringy context are rather more reminiscent of *Climacodon* P. Karst. Besides it is certainly unusual in *Steccherinum* for cystidia of tramal origin to be devoid of a crystalline covering. Yet in its essential characters the species conforms to those of the genus so that it seems unavoidable to accept *S. galeritum* and, with it, an extension of the generic description.

**Steccherinum gilvum** Maas G., *spec. nov.*<sup>3</sup>

Basidiomata e effuso anguste reflexa, lateraliter confluentia. Pars pileata usque ad 13 mm antice producta, 55 mm lata, conchiformis, subconvexa, concentric angustequae sulcata, subzonata, ad marginem dense velutina, postice scruposo-lanata, zonis laevioribus variegata, ochraceo-alutacea, isabellina vel crustulina, margine crasso obtuso ochraceo. Aculei usque ad 1.5 mm longi, 0.1–0.2 mm lati, conferti, subulati, tereti vel compressi, recti, simplices vel connati, minute puberuli, badii, albopruinosi. Caro c. 1 mm crassa, coriacea vel suberosa, pileo subpallidior, e hyphis generatoriis skeletalibusque formata. Hyphae generatoriae 1.8–3.6  $\mu$ m latae, haud inflatae, tenuiter tunicatae, ramosae, septatae, fibulis praeditae. Hyphae skeletales 2.7–8  $\mu$ m latae, crasse tunicatae vel solidae. Basidia 9–11  $\times$  3–4  $\mu$ m, immatura, clavata, fibulata. Sporae 3.6–4.2  $\times$  1.6–2  $\mu$ m, immaturae (?), ellipsoideae, adaxialiter applanatae, laeves, hyalinae, apiculo obliquo munitae. Cystidia usque ad 9  $\mu$ m lata, numerosa, hymenium superantia, incrustata, cylindracea vel clavata, apice obtusa.

HOLOTYPE: "No. 296 / Mt. Tachibana, near Fukuoka, Fukuoka Prefecture, Kyushu / S. Imai, H. Yoshii, R. P. Korf et al. / 28.X.[19]57" (CUP; pars holotypi in L).

Basidiomes effused-reflexed, laterally confluent. Reflexed portion up to 13 mm radius, 55 mm wide, narrower than effused part, conchate, somewhat convex, with narrow concentric grooves, inconspicuously zoned, densely and minutely velutinous at margin, woolly-scrupose farther back with alternating narrow zones where surface is matted and almost smooth; alutaceous with a yellowish tinge, isabelline, or yellow-brown (approaching, but not nearly identical with Munsell 10 YR 6/8), with thick, obtuse, more deeply ochraceous margin. Adhymenial surface somewhat porous, pale dingy ochraceous, difficult to see. Spines up to 1.5 mm long, 0.1–0.2 mm broad, crowded, subulate, terete to flattened, straight, simple or connate, minutely puberulous, reddish brown with whitish bloom. Context c. 1 mm thick, leathery or corky, somewhat paler than pileus.

Context dimittic, consisting of generative and skeletal hyphae. Generative hyphae 1.8–3.6  $\mu$ m wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletal hyphae 2.7–8  $\mu$ m wide, thick-walled to solid. Context of spines similar. Basidia 9–11  $\times$  3–4  $\mu$ m, immature, clavate, with basal clamp. Spores 3.6–4.2  $\times$  1.6–2  $\mu$ m, immature (?), ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia up to 9  $\mu$ m wide, of tramal origin, evenly distributed over spine, numerous, protruding, heavily incrustated, cylindrical or clavate, with obtuse apex.

HOLOTYPE: "No. 296 / Mt. Tachibana, near Fukuoka, Fukuoka Prefecture, Kyushu / S. Imai, H. Yoshii, R. P. Korf et al. / 28.X.1957" (CUP; part in L).

**Steccherinum hydneum** (Rick) Maas G., *comb. nov.*

Fig. 7

*Irpex hydneus* Rick in *Iheringia* (Bot.) No. 5: 190. 1959 (basonym). — Holotype: "No. 22824. *Irpex hydneus* Rick / Typus / S. Salvador, 4.4.1945 / Legit et det. Rick" (PACA).

Holotype consisting of two specimens attached to bark. Basidiome c. 75  $\times$  45 mm (larger one), effused, in part easily separable. Adhymenial surface subtomentose, dingy ochraceous. Margin byssoid-fimbriate. Spines up to 2–3 mm long, 0.1–0.3 mm broad, crowded, fairly evenly arranged, subulate, terete to flattened, straight to somewhat flexuous, simple or furcate, lightly pulverulent, yellowish flesh colour, tip

<sup>3</sup> Etymology: *gilvus*, yellowish tan.

entire, more rarely incised, pulverulent or apparently glabrous, concolorous. Context thin, soft leathery.

Context dimittic, consisting of generative and skeletal hyphae. Generative hyphae 2.7–3.6  $\mu\text{m}$  wide, not inflating, thin- to moderately thick-walled, branched, septate, with clamp-connections. Skeletals 4.5–6.3  $\mu\text{m}$  wide, thick-walled to nearly solid. Context of spines similar, generative hyphae somewhat narrower. Basidia 15–18  $\times$  5.4–6.3  $\mu\text{m}$ , clavate, with basal clamp, 4-spored, with sterigmata up to 3.6  $\mu\text{m}$  long. Spores 4.5–5.2  $\times$  3.8–4.3  $\mu\text{m}$ , subglobose, adaxially flattened, smooth, colourless, apiculus difficult to observe. Cystidia 3.5–8  $\mu\text{m}$  wide, of tramal origin, evenly distributed over entire length of spine, protruding, incrusting, cylindrical to fusiform in distal part, with obtuse apex.

DISTRIBUTION.—Known only from the type locality.

Both specimens of the type were at first sight mistaken for large basidiomes of *S. ochraceum* until the different shape of the spores was observed.

STECCHERINUM LAETICOLOR (Berk. & Curt. apud Berk.) Banker

Pl. 40, fig. 1

*Hydnum laeticolor* Berk. & Curt. apud Berk. in Grevillea 1: 99. 1873. — *Irpex laeticolor* (Berk. & Curt. apud Berk.) Morg. in J. Cincinn. Soc. nat. Hist. 10: 15. 1887 ("laeticolor"). — *Mycoleptodon laeticolor* (Berk. & Curt. apud Berk.) Pat., Essai tax. Hym.: 117. 1900. — *Steccherinum laeticolor* (Berk. & Curt. apud Berk.) Banker in Mycologia 4: 316. 1912. — Lectotype (Banker, l.c.): "No. 2930 / *Hydnum laeticolor*, B. & C. / Car. Inf. / Rav." (K).

*Hydnum parasitans* Berk. & Curt. apud Berk. in Grevillea 1: 100. 1873. — Holotype: "No. 6113 / *Hydnum parasitans*, B. & C. / Alabama Peters / in *Ulmum americanum*" (K).

*Hydnum floridanum* Berk. & Cooke apud Cooke in Grevillea 6: 131. 1878. — Holotype: "*Hydnum floridanum* B. & Cke / near *H. fragilissimum* / Gainesville Fla / No. 4 H.W.R." (K).

*Mycoleptodon robustior* John Erikss. & Lundell apud Lundell & Nannf., Fungi exs. succ., Fasc. 43–44: 26. 1953. — *Steccherinum robustius* (John Erikss. & Lundell apud Lundell & Nannf.) John Erikss. in Symb. bot. upsala. 16(1): 134. 1958. — *Mycoleptodon laeticolor* f. *robustior* (John Erikss. & Lundell apud Lundell & Nannf.) Nikol. in Fl. sporov. Rast. SSSR 6(2): 148. 1961. — Type distribution: Lundell & Nannf., Fungi exs. succ. 2147.

*Mycoleptodon laeticolor* f. *pileatus* Nikol. in Fl. sporov. Rast. SSSR 6(2): 148, pl. 31 fig. 2. 1961. — Holotype: "*Mycoleptodon laeticolor* (Berk. & Curt.) Pat. f. *pileatus* Nikol. / [translated:] On living trunk of deciduous tree / SSSR, Primorye Territory, Shkotovskij rajon, Urema, along river Majche / 28.IX.1945. L. N. Vasil'sva" (LE).

HERBARIUM NAMES: *Hydnum martianoffanum* Bres. — "Ex Herbario De Thümen / *Hydnum subcarnaceum* Fr. / Sibiria: Minussinsk / leg. Martianoff" [Second label:] "*Hydnum martianoffanum* Bres. n. sp. / Bresadola" (UPS); "*Mycoleptodon ochraceum* var. *aurantiacum*" Pilát (W).

Basidiome growing out to cover several  $\text{cm}^2$ , effused, more rarely effused-reflexed. Reflexed portion up to c. 4 mm radius and wide, conchate or laterally fused and flange-like, horizontal or pendent, concentrically grooved, woolly-hirsute, pale dingy salmon, somewhat pallescent towards vertex, margin hirsute or obscurely running out into spines. Margin of effused portion fimbriate, at times forming short runners, more or less easily separable from substratum, white to yellowish. Abhymenial surface pale salmon or almost concolorous with spines. Adhymenial surface tomentose to membranous, smooth to areolate or slightly alveolate, dingy salmon to reddish brick, vividly contrasting with whitish margin (liable to assume drab or very dark brown colours when badly dried or too old). Hymenophore hydroid, only once seen poroid-irpicoid. Spines up to 3.5 mm long, 0.1–0.3(–0.5) mm broad,

broader when confluent, scattered to crowded, somewhat unevenly arranged, giving untidy impression, subulate, terete to flattened, straight to flexuous, simple or confluent, pubescent to scabrous, dingy salmon to reddish brick, tip smooth and colorless or fimbriate and whitish. Context up to 0.5 mm thick, uniform, soft, spongy, yellowish to pale salmon.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 2.7–4.5(–5.4)  $\mu\text{m}$  wide, not inflating, thin- to moderately thick-walled, branched, septate, with clamp-connections. Skeletal hyphae 3.6–7.2  $\mu\text{m}$  wide, thick-walled to solid. Context of spines similar. Basidia 15–19  $\times$  4.5–6.5  $\mu\text{m}$ , clavate, 4-spored, with sterigmata 3.6–4.5  $\mu\text{m}$  long, with basal clamp. Spores 4–6.5  $\times$  2–3  $\mu\text{m}$ , ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia 4–14(–18)  $\mu\text{m}$  wide, of tramal origin, evenly distributed over length of spine, little protruding, incrustate, cylindrical to fusiform in distal part, with obtuse apex.

HABITAT.—Thus far known exclusively from frondose trees (*Fagus*, *Fraxinus*, *Prunus*, *Quercus*, *Ulmus*).

DISTRIBUTION.—Collections have been examined from U.S.A. and Europe (Sweden, Latvian S.S.R., U.S.S.R., and South Germany).

EXSICCATES (AND MATERIAL OF SIMILAR IMPORTANCE).—Ellis & Everhart, N. Am. Fungi, Second series, No. 2015 (*H. laeticolor*, G, L). Lundell & Nannfeldt, Fungi exs. succ., praes. upsal. 1411a, 1411b (*M. ochraceum*, UPS, W); 2147 (*M. robustior*. Type material, UPS); 2148 (*M. robustior*, UPS). Petrak, Mycoth. gen. 1539 (*H. laeticolor*, G, UPS, W). Pilát, Fungi carpat. lignic. exs. 216 (*M. dichrous*, UPS). Ravenel, Fungi carol. 18 (*H. laeticolor*, G). Ravenel, ad ram. delapsos M.A.C.[urtis] (*H. laeticolor*, with a note added by Bresadola "non videtur diversum ab *Hydno pudorino* Fr.," Herb. E. Fries, UPS). Smarods, Fungi latv. exs. 568 (*H. laeticolor*, W).

*Steccherinum laeticolor* would appear to be well separated from *S. ochraceum* by several characters, but not all of them are unrelated and one or two may be found to be either underdeveloped or altered by age. One of the characters probably least subject to change is the aspect of the margin. Plate 40 Figs. 1 and 2 give a very good idea of the difference between the two species.

One particular collection of *S. laeticolor* should be mentioned here as it demonstrates the capacity of the species for expressing its variation. This collection — Plants of Texas, Houston, 22 Dec. 1941, G. L. Fisher 41247 (UPS) — comprises two twig fragments covered with a brick red fungus, of which the hymenophore is poroid-irpicoid, instead of the usual, somewhat disorderly hydroid arrangement.

In the Herbarium at Vienna there is a packet labelled *Hymenomyces cecho-sloveniae* and issued by Dr. A. Pilát which contains the present species. The type-written name, *Mycoleptodon ochraceum* var. *aurantiacum*, is a provisional name that, as confirmed by Dr. Pilát, has never been published. Since the name may puzzle possible future workers, the situation is better explained once for all.

### ***Steccherinum lanestre* Maas G., sp. nov.<sup>4</sup>**

Basidiomata effuso-reflexa, imbricata, lateraliter confluentia. Pars pileata usque ad 15 mm antice producta, 20 mm lata, conchiformis, inconspicue concentricè zonata, ad marginem

<sup>4</sup> Etymology: *lanestris*, woollen.



lanestris, postice depressa-rugulosa, subnitida, pallide sordideque ochracea, margine acuto integro. Aculei usque ad 0.8 mm longi, 0.1–0.2 mm lati, decurrentes, conferti, subulati, tereti vel compressi, recti, simplices vel connati, minute puberuli, carnei, apicibus albidis. Caro c. 0.5 mm crassa, coriacea, duplex, inferne carnea vel pallide sordideque ochracea, superne et postice fuscescens, e hyphis generatoriis skeletalibusque formata. Hyphae generatoriae 2.7–4.5  $\mu\text{m}$  latae, haud inflatae, tenuiter tunicatae vel parietibus subincrassatis instructae, ramosae, septatae, fibulatae. Hyphae skeletales 2.7–6.3  $\mu\text{m}$  latae, crasse tunicatae vel solidae. Basidia 15–18  $\times$  5.5–6.5  $\mu\text{m}$ , clavata, fibulata, 4-spora, sterigmatibus usque ad 4.5  $\mu\text{m}$  longis praedita. Sporae 4.3–4.9  $\times$  3.6–4.3  $\mu\text{m}$ , subgloboseae, adaxialiter vix applanatae, laeves, hyalinae, apiculo obliquo munitae. Cystidia incrustedata absentia, (gloeo?) cystidia tamen aculeorum apicem versus numerosa, prolata, tenuiter tunicata, apice inflata.

HOLOTYPE: "P 208 / Nepal / Khumbu: nördlich Thyangboche, *Abies-Rhododendron*-Wald, 37–3900 m, 9.10.1962, J. Poelt" (M; fragmentum holotypi in L).

Basidiomes effused-reflexed, imbricate, laterally confluent. Reflexed portion up to 15 mm radius, 20 mm wide, conchate, inconspicuously concentrically zoned, woolly at margin, matted-rugulose farther back, shiny, pale dingy ochraceous, passing into yellow-brown or reddish brown on abhymenial side of effused portion. Margin thin, even. Adhymenial surface minutely porous to tomentose, dingy ochraceous, difficult to see. Spines up to 0.8 mm long, 0.1–0.2 mm broad, decurrent, crowded, subulate, terete to flattened, straight, simple or connate, minutely puberulous, flesh colour with whitish tips. Context c. 0.5 mm thick, leathery, duplex; firmer lower half flesh colour to pale dingy ochraceous, tomentose upper half becoming darker and greyish brown farther away from margin.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 2.7–4.5  $\mu\text{m}$  wide, not inflating, thin- to moderately thick-walled, branched, septate, with clamp-connections. Skeletal hyphae 2.7–6.3  $\mu\text{m}$  wide, thick-walled to almost solid. Context of spines similar, hyphae somewhat narrower. Basidia 15–18  $\times$  5.5–6.5  $\mu\text{m}$ , clavate, with basal clamp, with 4 sterigmata up to 4.5  $\mu\text{m}$  long. Spores 4.3–4.9  $\times$  3.6–4.3  $\mu\text{m}$ , subglobose, hardly flattened adaxially, smooth, colourless, with small oblique apiculus. Incrusted cystidia (extremities of skeletal hyphae) lacking. (Gloeo?) cystidia up to 6.5  $\mu\text{m}$  wide, far protruding and numerous at tip of spine, little or not protruding (consequently not easily detected) farther back, thin-walled, with swollen apex, filled with some matter that does not seem to be of an oily nature.

HOLOTYPE: "P 208 / Nepal / Khumbu: nördlich Thyangboche, *Abies-Rhododendron*-Wald, 37–3900 m, 9.10.1962, J. Poelt" (M; fragment of holotype in L).

DISTRIBUTION.—Apart from the holotype there is a second collection of this species from Sumatra (Brastagi, 6 Sept. 1931, E. J. H. Corner, on fallen trunk in the forest, c. 1900 m alt., L).

This second collection deviates in some respects from the type. The following description, incorporating the main points of the collector's notes, is given to demonstrate the variability of the species: —

Basidiomes effused-reflexed, imbricate. Reflexed portion up to 22 mm radius, subtomentose-villous, shallowly sulcate (in some of the dry specimens somewhat rough, rugulose or even pitted), greyish brown, pale fawn drab when dry, margin subacute, entire, white. Flesh 1 mm thick at base, floccose and greyish brown above, firm and whitish below. Spines up to 1.3 mm long fresh, 1 mm long dry, cream.

Spores 3.5–4.2  $\times$  3–4  $\mu\text{m}$ . Cystidia 5–9  $\mu\text{m}$  wide, very scattered, protruding slightly, clavate or subcylindric, thick-walled, smooth.

The present species stands apart by a remarkable set of characters: the pileus is covered with an almost featureless woolly tomentum, the spores are subglobose, and the cystidia are devoid of incrustation.

Together with three others — *S. basi-badium*, *S. galeritum*, and *S. hydneum* — *Steccherinum lanestre* keys out in a small group of species characterized by subglobose spores. Yet these four species do not seem to have more in common than their occurrence outside the broad, temperate zone of Europe and North America.

#### STECCHERINUM MURASHKINSKYI (Burt) Maas G.

*Hydnum murashkinskyi* Burt in Ann. Mo. bot. Gdn 18: 477. 1931. — *Mycoleptodon murashkinskyi* (Burt) Pilát in Bull. trimest. Soc. mycol. Fr. 49: 300, fig., pl. 21 figs. 1-7. 1934. — *Steccherinum murashkinskyi* (Burt) Maas G. in Persoonia 2: 405. 1962. — Authentic material: "*Mycoleptodon murashkinskyi* Burt in Miss. Bot. Gard. Ann. 18 (1931) p. 477/*Betula verrucosa*/Siberia. Distr. Tara/Murashkinsky/Doubl. spec. orig.!" (PR 156151).

Basidiomes effused-reflexed, simple or laterally fused. Reflexed portion up to 20 mm radius and 55 mm wide, flabelliform, marked by concentric shallow grooves and hispid zones, in between these zones at first tomentose, glabrescent at margin, matting down and somewhat shiny farther back, ochraceous yellow-brown or flushed with warmer shade of brown; slender agglutinated hairs of hispid areas and glabrous patches tinted dark yellow-brown to reddish brown. Margin straight or wavy, thin, glabrescent. Adhymenial surface only visible near margin, porous-subtomentose, pale ochraceous. Spines 4-5 mm long, 0.1-0.3 mm broad, decurrent, crowded, subulate, terete or, more often, flattened, straight, simple or furcate or connate, brownish flesh colour with whitish bloom, with age dingy red-brown but this colour almost entirely concealed under bluish grey bloom, which makes spines look very dark, tip acute or incised, usually glabrous. Context less than 1 mm thick, tough, pale yellowish brown.

Context dimitic, consisting of generative and skeletal hyphae and a rather high proportion of branched skeletal. Generative hyphae 1.8-3.6  $\mu$ m wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletal hyphae 2.7-6.3  $\mu$ m wide, thick-walled to almost solid. Context of spines similar, but lacking branched skeletal. Basidia 12.5-15  $\times$  3.6  $\mu$ m, immature, clavate, with basal clamp. Spores 3.1-3.6  $\times$  1.8  $\mu$ m, ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia up to 5  $\mu$ m wide, the majority of tramal origin, evenly distributed over spine, rather sparse, little protruding, few incrustated, the majority smooth, cylindrical or tapering towards obtuse apex. Particularly near base of spine several of cystidia tend to be of subhymenial origin.

HABITAT.—Reported from *Betula verrucosa*, *Populus tremula*, *Salix* and, with some doubt, *Abies sibirica* (Pilát, 1936: 399).

DISTRIBUTION:—U.S.S.R.

ADDITIONAL COLLECTIONS:—Siberia: Distr. Tara, Aug. 1929, Murashkinsky, ad trunc. putrid. *Betulae verrucosae* (Herb. Donk).

Kazachskaja SSR: Kusta naiskaja obl., Borovoje, 3 Sept. 1946, B. Kralcev (UPS).

Information was received that type material of the species could not be located in FH. Instead of this, the excellent collection from PR was used, which may well prove to be part of the material of which another portion had been forwarded to Burt.

Pilát (1934: 302) stated that he had found cystidia only in the tips of the spines. This is not borne out in the material examined.

STECCHERINUM NARYMICUM (Pilát) Parm.

*Mycoleptodon narymicus* Pilát in Bull. trimest. Soc. mycol. Fr. 51: 404, fig. 13, pl. 9 fig. 3, 1936.  
— *Steccherinum narymicum* (Pilát) Parm., Consp. Syst. Cortic.: 173, 1968. — Holotype: "W 157/Flora Sibirica / *Mycoleptodon narymicus* Pilát sp. n. / Sibirica: districtus Narym, ad ramos *Pruni Padi* / X 1933. Krawtzev" (PR 187750).

Basidiome (in portion of type sent) covering some cm<sup>2</sup>, effused, inseparable from substratum without damage, consisting of little more than thin subicular layer of fibrils, sparse and more or less radiating at margin, somewhat denser and matted in centre, pale dingy yellowish; adhymenial surface areolately cracked, minutely porous-floccose, pale ochraceous; margin very inconspicuous or even evanescent. Spines up to 2 mm long, 0.2–0.4 mm broad, subdistant or united into subdistant small groups, subulate, terete or somewhat flattened, simple or confluent, minutely porous to smooth, pale ochraceous throughout or uncovered tip brownish flesh colour.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 2.7–3.6  $\mu$ m wide, not inflating, thin-walled to moderately thick-walled, branched, septate, with clamp-connections. Skeletal hyphae 2.7–4.5  $\mu$ m wide, thick-walled to solid. Context of spines similar, skeletal up to 5.4  $\mu$ m wide. Basidia 14.5–17  $\times$  4–5  $\mu$ m, immature, clavate, with basal clamp. Spores 3.8–4  $\times$  2.7  $\mu$ m, few seen and these possibly immature, ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia 2.5–4.5  $\mu$ m wide, of tramal origin, more or less evenly distributed over spine, although less frequent or even absent at tip, little or not protruding, incrustated, cylindrical or tapering towards obtuse apex.

HABITAT.—Reported from *Prunus padus*.

DISTRIBUTION.—Known only from the type locality.

STECCHERINUM OCHRACEUM (Pers. apud Gmel. ex Fr.) S. F. Gray

Figs. 8–11, Pl. 40 fig. 2

? *Hydnum rubicundum* Willd. in Mag. Bot. (ed. Römer & Usteri) 2(4): 13, pl. 3 fig. 6, 1788; ex Steud., Nomencl. bot.: 205, 1824. — Type locality: Germany, surroundings of Berlin. — Type: represented by pl. 3 fig. 6.

*Hydnum ochraceum* Pers. apud Gmel., Syst. Nat. 2: 1440, 1792; Pers., Obs. mycol. 1: 73, 1796; Syn. meth. Fung.: 559, pl. 5 fig. 5, 1801; ex Fr., Syst. mycol. 1: 414, 1821. — *Steccherinum ochraceum* (Pers. apud Gmel. ex Fr.) S. F. Gray, Nat. Arrang. Br. Pl. 1: 651, 1821. — *Climacodon ochraceus* (Pers. apud Gmel. ex Fr.) P. Karst. in Bidr. Känn. Finl. Nat. Folk 37: 98, 1882. — *Leptodon ochraceus* (Pers. apud Gmel. ex Fr.) Quél., Ench. Fung.: 192, 1886. — *Mycoleptodon ochraceus* (Pers. apud Gmel. ex Fr.) Pat., Essai tax. Hym.: 117, 1900. — *Pleurodon ochraceus* (Pers. apud Gmel. ex Fr.) Ricken, Vadem. Pilzfr.: 242, 1918. — Neotype: "Prope Parisios / *Hydnum ochraceum* (junius? resupinatum)" (L 910.263–1314).

*Hydnum daviesii* Sow., Col. Fig. Engl. Fungi 1: [12], pl. 15, 1797. — Type: represented by pl. 15.

*Hydnum microdon* Pers., Syn. meth. Fung.: 561, 1801; ex Fr., Syst. mycol. 1: 417, 1821. — Type locality: [Germany?] "In fodina lithanthracina in monte Meisner lectum."

*Hydnum ochraceum* var. *dimidiatum* Alb. & Schw., Consp. Fung.: 268, 1805. — Type locality: Germany, Ober-Lausitz.

*Hydnum rhois* Schw. in Schr. naturf. Ges. Leipzig 1: 103, 1822; Fr., Elench. Fung. 1: 134, 1828. — *Phyllocladonia rhois* (Schw.) P. Karst. in Hedwigia 22: 163, 1883. — *Mycocleptodon rhois* (Schw.) Pat., Essai tax. Hym.: 117, 1900; Nikol. in Fl. sporov. Rast. SSSR 6(2): 143, 1961 (recombination preoccupied). — *Steccherinum rhois* (Schw.) Banker in Mem. Torrey bot. Club 12: 12, 1906. — Part of (holo?) type: "*Hydnum rhois* L.v.S. / Herb. Schwein!" (K).

*Hydnum ochraceum* var. *resupinatum* Pers., Mycol. eur. 2: 176, 1825. — Holotype: "*Hydnum spadiceum* Desvaux Journ. d. Botan. / prope Nantes, Gallia. Est varietas effusa *Hydni ochracei*. Syn. fung." (L 910.263-1315).

*Hydnum denticulatum* Pers., Mycol. eur. 2: 181, 1825. — *Sarcodontia denticulata* (Pers.) Nikol. in Fl. sporov. Rast. SSSR 6(2): 185, 1961 ("Fr."). — *Mycocacia denticulata* (Pers.) Parm. in Eesti NSV tead. Akad. Toim. (Biol.) 16: 386, 1967. — Holotype: "*Odontia / Hydnum denticulatum* / Spec. sub.... [undecipherable] / Gallia" (L 910.256-1549).

*Hydnum dichroum* Pers., Mycol. eur. 2: 213, 1825. — *Mycocleptodon dichroum* (Pers.) Maire in Bull. Soc. bot. Fr. 53: cxx, 1906; Bourd. & Galz. in Bull. trimest. Soc. mycol. Fr. 30: 276, 1914 (recombination preoccupied). — *Steccherinum dichroum* (Pers.) Banker in Mycologia 4: 310, 1912. — *Hydnum ochraceum* var. *dichroum* (Pers.) Killerm. in Denkschr. K. bayer. bot. Ges. Regensb. 15: 46, 1922. — *Glotodon dichroum* (Pers.) Maire in Publ. Inst. bot. Barcelona 3(4): 34, 1937. — Holotype: [Delastre's handwriting:] "*hydnum rubiginosum* Dre. / herbar de la Vienne / Sur les troncs cariés de chênes, dans les futaies." [Persoon's handwriting:] "*Hydnum dichroum*" (L 910.262-504).

*Hydnum pudorinum* Fr., Elench. Fung. 1: 133, 1828. — *Hydnum hirtum* subsp. *H. pudorinum* (Fr.) Sacc. in Michelia 1: 4, 1879. — *Mycocleptodon pudorinum* (Fr.) Pat., Essai tax. Hym.: 117, 1900. — Type locality: Czechoslovakia ("In truncis *Alni incanae* in Ruthenia").

*Hydnum flabelliforme* Berk. in J. Bot., London 4: 306, 1845. — *Mycocleptodon flabelliformis* (Berk.) Pilát in Bull. trimest. Soc. mycol. Fr. 51: 403, 1936. — Holotype: "No. 42 / *Hydnum flabelliforme*, Berk. / Imbricating & confluent / spines fleshy-red / Jany — on a dead red-oak" (K).

*Hydnum decurrens* Berk. & Curt. in J. Linn. Soc. (Bot.) 10: 325, 1868. — *Mycocleptodon decurrens* (Berk. & Curt.) Pat., Essai tax. Hym.: 117, 1900. — Lectotype: "No. 297. *Hydnum decurrens* B. & C. / Cuba. Wright (Curtis)" (K).

*Hydnum plumarium* Berk. & Curt. apud Berk. in Grevillea 1: 97, 1873; not *Hydnum plumarium* Berk. & Curt. in J. Linn. Soc. (Bot.) 10: 324, 1868. — *Hydnum conchiforme* Sacc., Syll. Fung. 6: 458, 1888 (name change). — Holotype: "No. 4936. *Hydnum plumarium* B. & C. / Car. Sup. in *Viburnum* ut videtur" (K).

*Hydnum ochraceum* \* *tenerum* Sacc. in Atti R. Ist. veneto Sci., VI 2: 435, 1884; *Hydnum ochraceum* subsp. *tenerum* Sacc., Syll. Fung. 6: 457, 1888. — *Hydnum ochraceum* var. *tenerum* (Sacc.) Malbr. & Letendre in Bull. Soc. Amis Sci. nat. Rouen III 20: 392, 1885. — Holotype: "No 1725 / *Hydnum ochraceum* \* *tenerum* / *Hydnum ochraceum* \* *tener* / *Rubus* à St. Jouin sur mer" (Herb. Saccardo, PAD).

*Hydnum alnicola* Vel., České houby: 745, 1922. — Type: not seen (PRC).

*Hydnum reflexum* Burt in Ann. Mo. bot. Gdn. 18: 478, 1931. — *Mycocleptodon reflexum* (Burt) Pilát in Bull. trimest. Soc. mycol. Fr. 49: 302, figs. 1934. — Part of holotype: "B 0129 / Specimen originalis!!! / *Hydnum reflexum* Burt n. sp. / *Mycocleptodon reflexum* (Burt) Pilát / *Betula verrucosa* / Sibiria. Distr. Bijsk / 3.X.[19]28 Leg. Dravert Det. Burt (B 0129)" (PR 704210).

*Mycocleptodon gracilis* Pilát in Stud. bot. čech. 1: 4, figs. 1-3, 1938. — *Steccherinum gracile* (Pilát) Parm., Consp. Syst. Cortic.: 173, 1968. — Holotype: "Flora czechoslovenica / *Mycocleptodon gracilis* Pilát / Carpatorossia: In silvis mixtis virginicis (*Abies alba*, *Fagus sylvatica*) ad jugum montis Menčul inter rivus Kuzy et Bredeccl prope vicum Trebušany, alt. 800-1200 m. *Abies alba*. VIII. 1934. A. Pilát" (PR 26114; part of holotype in UPS).

*Steccherinum resupinatum* G. H. Cunn. in Trans. R. Soc. N.Z. 85: 596, fig. 4, pl. 41 fig. 1, 1958. — Holotype: "*Steccherinum resupinatum* G. H. Cunn. on *Coprosma australis* / Auckland, Mamaku Forest, 1800 ft. / September 1954 / G. H. Cunningham" (PPD 17708).

MISAPPLICATION: *Hydnum denticulatum* Pers. sensu Pat., Tab. anal. Fung. 1: 64, pl. 50 fig. 148, 1883 (cf. Donk, 1956a: 107).

Basidiomes extremely variable, effused, effused-reflexed, or pileate, single, gregarious, or confluent and forming extensive patches or becoming imbricate; in pileate forms sessile, attached at vertex, substipitate to frankly stipitate.<sup>5</sup>

Reflexed portion or pileus up to about 20 mm radius and wide, or much wider by lateral confluence, flange-like, dimidiate, conchate to flabelliform with constricted base, horizontal or pendent, occasionally erect, more or less convex (but infundibuliform in erect specimens), repeatedly concentrically grooved, velutinous, tomentose, or woolly-hirsute, matting down in concentric areas or even glabrescent, not infrequently more or less radiately rugulose, variously coloured, whitish cream, pale ochraceous, pale grey, often somewhat darker towards margin, occasionally also in the grooves. Margin of reflexed portion and of pileus strongly incurved when dried; margin of effused portion delicately scalloped, evenly velutinous, whitish. Stipe in some cases remarkably developed, up to 8 mm long and 2 mm broad, clothed and coloured like pileus. Abhyemial surface of effused portion pale ochraceous or pale flesh colour to whitish. Adhyemial surface subtomentose to minutely porous, flesh colour with or without yellowish shade, rarely whitish. Spines 0.5–3 mm long, 0.1–0.3 mm broad or broader when confluent, decurrent in reflexed and pileate forms, crowded, subulate, terete or flattened, sometimes irpicoid, straight to flexuous, simple, furcate, or confluent, pulverulent, flesh colour, with yellowish shade when young, more brownish when old, tip smooth or finely pubescent to hirsute, concolorous or whitish. Context 0.5–1.5 mm thick, uniform or duplex, lower part leathery to tough, whitish to pallid, upper part tomentose, soft, concolorous to yellowish, both parts sometimes separated by dark brown line.

Context dimittic, consisting of generative and skeletal hyphae. Generative hyphae 1.8–4.5  $\mu$ m wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletal hyphae 1.8–9  $\mu$ m wide, thick-walled to solid. Context of spines similar. Basidia 11–15  $\times$  3.6–5.5  $\mu$ m, clavate, with basal clamp, 4-spored, with sterigmata 2.7–3.5  $\mu$ m long. Spores (3.1–)3.4–4.5(–4.7)  $\times$  (1.6–)1.8–2.5(–2.7)  $\mu$ m, ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia 4–10  $\mu$ m wide, of tramal origin, abundant to scarce, evenly distributed over spine, somewhat protruding, incrustated, cylindrical to somewhat fusiform in distal part, with obtuse apex.

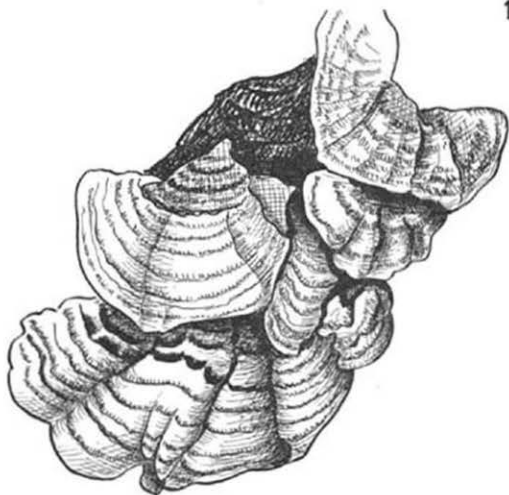
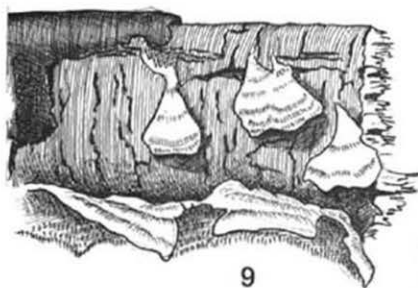
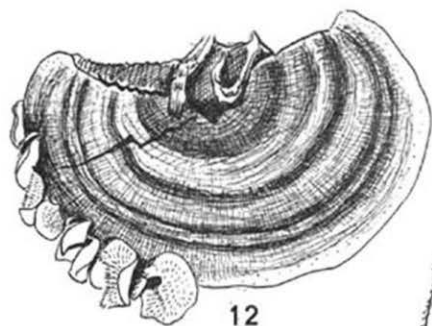
HABITAT.—On fallen branches and decaying wood of frondose and coniferous trees.

DISTRIBUTION.—No records are known as yet from Africa, but otherwise the species has a very wide distribution on either side of the equator. With a single exception all Brazilian collections named *Hydnum decurrens* in Herb. Rick (PACA) represent the effused stage of *S. ochraceum*.

EXSICCATES.—California fungi 572 (*S. ochraceum*, W). Ellis, N. Am. Fungi 605 (*H. ochraceum*, G). Ellis & Everhart, Fungi columb. 2 (*H. ochraceum*, G). Fungi cubenses Wright. 344 (*H. flabelliforme*, W); 346 (*H. decurrens*, W). Klotzsch, Herb. viv. mycol. [1st Ed.] 1918 (*H. microdon*, W). Litschauer & Lohweg, Fungi sel. exs. eur. 61 (*M. ochraceus*, W). Pilát, Fungi carpat. lignic. exs. 60 (*M. ochraceus*, W). Rabenhorst, Fungi eur. exs. [3rd Ed.] 2303 (*H. pudorinum*, W). Ravenel, Fungi carol. 25 (*H. rhois*, G). Ravenel, Fungi am. exs. 455 (*H. ochraceum*, W). Reliquiae farlowianae (Fungi) 327 (*H. ochraceum*, G, W). Roumeguère, Fungi gall. exs. 3008 (*H. ochraceum* \**tener*, G). Saccardo, Mycoth. ven. 829 (*H. hirtum*, W); 1109 (*H. hirtum* subsp. *pudorinum*, W). Shear, New York fungi 114 (*H. ochraceum*, G, W). Weese, Eumyc. sel. exs. 7 (*H. ochraceum*, W).

REPRESENTATIVE HABIT ILLUSTRATIONS.—Jahn in Westfäl. Pilzbr. 7: 143, pl. 8. 1969. Nikolajeva in Fl. sporov. Rast. SSSR 6(2): 140 figs. 1, 2. 1961.

<sup>5</sup> An extreme example of the stipitate condition is Coker 3493 (Coker & Beers, 1951: 8), shown in Fig. 11.



Very occasionally the spines in *Steccherinum ochraceum* are of a vivid colour approaching that in *S. laeticolor*. The more regular disposition of the spines, the smoother aspect of their surface and, above all, the more even contours of the margin of the effused parts should help distinguish *S. ochraceum* (see Pl. 40 figs. 1, 2).

Another disturbing form is occasionally found, resembling *Irpex lacteus* in the ipericoid hymenophore, its pale ochraceous colour, and the aspect of the margin of the effused part, which is less typical of *S. ochraceum*. The form is a true *Steccherinum*, however, on account of the clamped generative hyphae. Mycologists who would be in favour of interpreting this and similar forms as an *Irpex* will inevitably one day find themselves forced to merge *Irpex* with *Steccherinum*, and they will have to face the consequences (see p. 449).

On rare occasions specimens may be collected, of which all cystidia are devoid of their crystalline cover. Such specimens may not even be recognized as a *Steccherinum* by the uninitiated.

The copy of the exsiccate Roumeguère, Fungi gall. exs. 2914 in G, issued as *Hydnum ochraceum*, appears to be *Hirschioporus pargamensis* (Fr.) Bond. & Sing.

#### STECCHERINUM PECKII Banker — Figs. 13–20

*Steccherinum peckii* Banker in *Mycologia* 4: 314. 1912. — Holotype: "No. 177 / 3 / *Steccherinum peckii* / Griffin Corners Del. Co. / N.Y. / On maple / Peck" and, fastened with a staple, a smaller label which reads: "Herbarium of Howard J. Banker / *Steccherinum peckii* Banker" (NY).

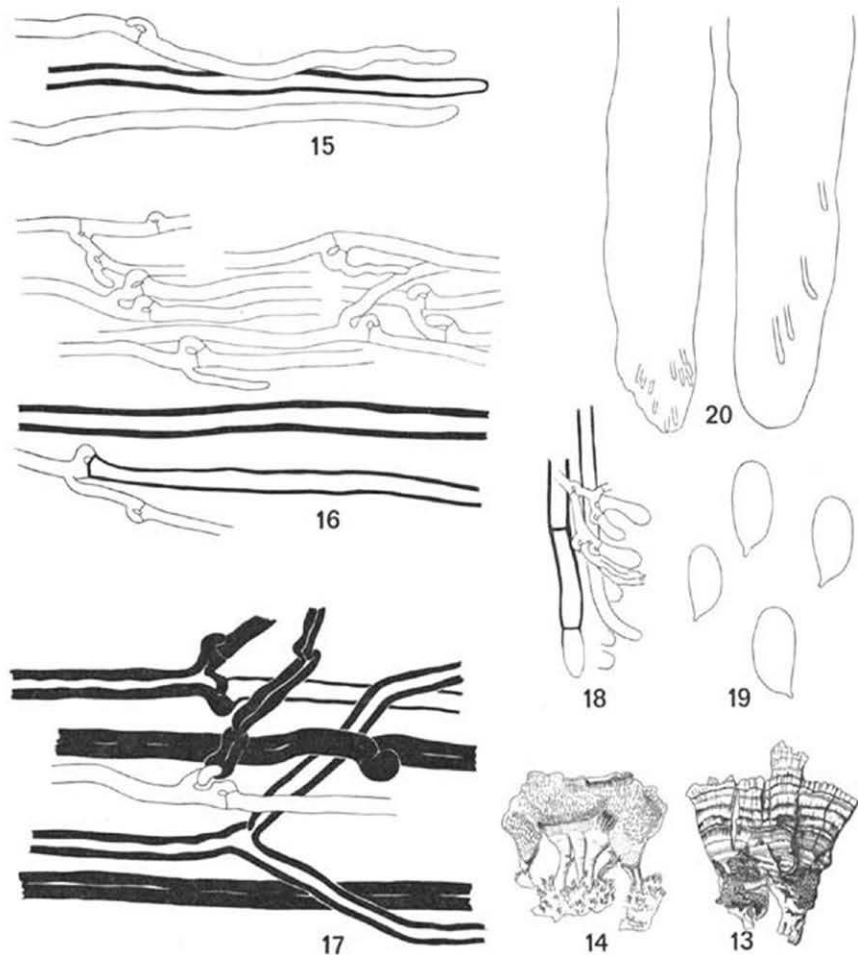
Holotype consisting of three groups of basidiomes, each group made up of several, laterally confluent pilei. Pileus up to 20 mm radius and 10 mm wide, wider by confluence, slender-flabelliform, tapering behind into long stipe-like base, somewhat plano-convex but depressed behind, more or less clearly radiately rugulose, with a few concentric shallow depressions, finely fibrillose-velutinous at margin, fibrillose farther back, ochraceous yellow-brown, conspicuously zoned by numerous concentric, darker brown lines. Stipe-like base thickly velutinous to woolly, concolorous. Spines up to 2 mm long, 0.1–0.2 mm broad, more or less decurrent but sharply demarcated towards base by rim, crowded, subulate, terete to flattened, almost glabrous, ochraceous-brownish, puberulous and whitish at the tip. Context less than 1 mm thick, hard, rigid, obscurely zoned, whitish.

Context dimitic, consisting of generative and skeletal hyphae, but also of hyphae

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Figs. 9–11. *Steccherinum ochraceum*. — Variation in the shape of the basidiome. — 9. Basidiomes of the same mycelium: effused-reflexed below, *rhois*-like above (France, Doubs, Lougres, 14 Oct. 1955, H. S. C. Huijsman, L.) — 10. Tight aggregate of *rhois*-like basidiomes (U.S.A., North Carolina, Hendersonville, 13 Aug. 1934, A. S. Rhoads, Herb. W. C. Coker, NCU). — 11. Two normally developed pilei and one centrally stipitate pileus; to the right two stunted stipes with abortive spines (U.S.A., North Carolina, Chapel Hill, Battle Park, 20 Oct. 1919, H. R. Totten, No. 3494, Herb. W. C. Coker, NCU). (Fig. 9,  $\times 1.5$ ; Fig. 10,  $\times 2$ ; Fig. 11,  $\times 8$ .)

Fig. 12. *Steccherinum reniforme*. — Development of a second generation of basidiomes (Brazil, Rio Grande do Sul, Município de Taquari, Coqueiros, Granja das Três Figueiras, 1 Oct. 1965, J. P. da Costa Neto, No. 97888, SP;  $\times 1.5$ ).



Figs. 13-20. *Stecherinum peckii* (holotype). — 13, 14. Habit sketch of two basidiome groups, showing upper- and underside. — 15. Two generative hyphae and one skeletal from the margin of the pileus. — 16. Detail of the context 50-100  $\mu\text{m}$  back from the margin, showing various types of the formation of side-branches and two skeletals. — 17. Detail of the context about 1 cm back from the margin with thick-walled to almost solid generative hyphae. — 18. Immature basidia, a fairly thin-walled cystidium, and the tip of a skeletal. — 19. Spores. — 20. Two spines showing the apical position of the incrustated cystidia. (Figs. 13, 14,  $\times 1$ ; Figs. 15-18,  $\times 700$ ; Fig. 19,  $\times 2800$ ; Fig. 20,  $\times 70$ ).



of intergrading types. Generative hyphae 2.7–5.4  $\mu\text{m}$  wide, not inflating, thin-walled to almost solid, branched, septate, with clamp-connections. Skeletal hyphae 3.6–7.2  $\mu\text{m}$  wide, thick-walled to almost solid. Context of spines similar. Basidia about  $16 \times 5.5 \mu\text{m}$ , mostly immature, clavate, with basal clamp, 4-spored, with sterigmata about 2.7  $\mu\text{m}$  long. Spores 3.6–4.2  $\times$  1.8–2.4  $\mu\text{m}$ , ellipsoid, adaxially flattened, smooth, colourless, with oblique apiculus. Cystidia 2.7–5.4  $\mu\text{m}$  wide, of tramal origin; at least incrustated ones occurring only at tip of spine, little or not projecting beyond hymenium; those that are not incrustated thin-walled towards their apex and hard to find, cylindrical, with obtuse apex.

DISTRIBUTION.—Known only from the type locality.

This is a most remarkable species, deviating in several respects from all other members of the genus *Steccherinum*. Apparently *S. peckii* is extremely rare, for it has not been reported since its original description (Coker & Beers, 1951: 6). The presence of a stipe or stipe-like base is not unusual in the genus, neither is the lateral confluence of the pilei. The habit of *S. peckii*, however, combining the two characters, is very striking. Another conspicuous feature is the repeated concentric zonation. Delimitation of the fertile area towards the base of the pileus by a raised line is also known to occur in such pileate forms of *S. ochraceum* that used to be called *S. rhois* but in *S. peckii* the character is unusually developed. Whereas in other species the generative hyphae of the pileus are thin- to moderately thick-walled, many of the hyphae in *S. peckii*, particularly those at some distance from the margin, become thick-walled to almost solid. At the same time they are uncommonly brittle so that, more often than not in the few slides made, it proved impossible to determine the exact nature of a practically solid hypha which had both its ends broken off. Added to this mention must be made of an appreciable proportion of skeletal hyphae with side branches. In most species of *Steccherinum* the incrustated cystidia are easily found and appear to be evenly distributed over the entire length of the spine. In *S. peckii* the cystidia are thinly incrustated and, consequently, harder to find; they are restricted to the tip of the spine, and lose their crystalline cover as soon as they are treated with KOH.

#### STECCHERINUM RAWAKENSE (Pers. apud Gaud.) Banker

*Hydnum rawakense* Pers. apud Gaud. in Freycin., Bot. Voy. Monde: 175. 1827. — *Mycoleptodon rawakensis* (Pers. apud Gaud.) Pat., Essai tax. Hym.: 117. 1900. — *Steccherinum rawakense* (Pers. apud Gaud.) Banker in Mycologia 4: 312. 1912. — Holotype: "*Hydnum rawakense* / Ded. Gaudichaud" (L 910.262–648; part in PC, isotype in G).

*Hydnum mülleri* Berk. in J. Linn. Soc. (Bot.) 13: 167. 1872. — Holotype: "*Hydnum mülleri* B. / [Australia] Tweed [River], Guilfoyle" (K).

Basidiomes pileate, solitary or laterally fused or imbricate, originally effused-reflexed, later occasionally with abortive portion running down substratum but no longer fastened to it. Pileus up to 30 mm radius and some 20 mm wide, attached at vertex or narrowed behind into short stipe-like base or springing from basal disc, flabelliform to reniform, horizontal, shallowly concentrically grooved, rarely smooth, at first finely tomentose, then matted, glabrescent in alternating concentric areas, finally completely glabrous, radiately innate-fibrillose in glabrous parts, dingy ochraceous or pallid tan to warm yellowish red-brown or dull fawn brown, zoned

with numerous broad bands and narrow lines of a darker to ferruginous brown, frequently also darker at base; margin straight, thin, even or somewhat lobed. Stipe-like base remaining tomentose even after pileus has become glabrous, concolorous. Adhymenial surface smooth to indistinctly areolately cracked, pallid. Spines up to 1.5 mm long, 0.1–0.2 mm broad, broader when fused, extending to base of pileus, very crowded, subulate, terete or flattened or somewhat angular, finely pubescent or pulverulent, pale wood colour to brownish flesh colour, darkening with age, tip acute, obtuse, or furcate, more or less pulverulent, concolorous. Context up to 3 mm thick at very base of pileus, remainder about 0.5 mm thick, leathery tough to corky, little or not duplex at base, indistinctly to clearly zoned, whitish to pale dingy yellowish-brownish.

Context dimitic, consisting of generative, tendril, and skeletal hyphae. Generative hyphae 2.5–4.5  $\mu\text{m}$  wide, not inflating, thin- to thick-walled or almost solid, branched, septate, with clamp-connections. Skeletal hyphae 2.5–9  $\mu\text{m}$  wide, thick-walled to solid. Tendril hyphae tortuous, profusely branched, usually solid, with occasional clamp-connections. Context of spines similar, but lacking tendril hyphae. Basidia 14–16  $\times$  3–4  $\mu\text{m}$ , with clamp-connection at base, with 4 sterigmata up to 3  $\mu\text{m}$  long. Spores 2.8–3.5  $\times$  1.3–1.7  $\mu\text{m}$ , ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia only occurring in apical part of spines, of two main kinds which however do not seem to be strictly separated: (type 1) up to 5–6  $\mu\text{m}$  wide, cylindrical or fusiform, thin-walled gloecystidia, filled with oily matter, with obtuse tips, and (type 2) about equally wide, clavate to ventricose, thick-walled, apparently empty tramal cystidia, mostly with obtuse, incrustated tips.

DISTRIBUTION.—Known from the area enclosing Ceylon, the Malay Peninsula, Borneo, Java, New Guinea, Australia, and New Zealand (Maas Geesteranus, 1971: 83).

#### STECCHERINUM RENIFORME (Berk. & Curt.) Banker

Fig. 12

*Hydnum reniforme* Berk. & Curt. in J. Linn. Soc. (Bot.) 10: 325. 1868. — *Mycoleptodon reniformis* (Berk. & Curt.) Pat., Essai tax. Hym.: 117. 1900. — *Steccherinum reniforme* (Berk. & Curt.) Banker in Mem. Torrey bot. Club 12: 127. 1906. — Holotype: "301 / *Hydnum reniforme* B. & C. / Cuba / Wright (Curtis)" (K).

*Hydnum glabrescens* Berk. & Rav. apud Berk. in Grevillea 1: 97. Jan. 1873; apud Berk. & Br. in J. Linn. Soc. (Bot.) 14: 59. Apr. 1873. — Holotype: "1634 / *Hydnum glabrescens* B. & R. / Sept. in putrid logs of *Carya* (all I have to spare) North America S[outh] C[arolina]. H. W. R[avenel]" (K).

*Hydnum guaraniticum* Speg. in An. Soc. cient. argent. 17: 74. 1884. — *Mycoleptodon guaraniticus* (Speg.) Pat., Essai tax. Hym.: 117. 1900. — Holotype: "No. 3908. *Hydnum guaraniticum* Speg. / Paraguari, dans les bois. / Juin 1883" [label inside], "No 21468 / *Hydnum guaraniticum* Speg. TIPO / Paraguay, Paraguari, VIII-1883 / Leg. Balansa, nro. 3908" [label outside] (LPS, part in G).

*Hydnum innovans* G. Beck, Itin. Princ. S. Coburgi 2: 145, pl. 16 fig. 1. 1888. — Holotype: "*Hydnum (Apus) innovans* G. Beck / No. 282 / Cantagallo; an Urwaldbäumen / Dr. H. Wawra" (W).

? *Hydnum puiggarii* Speg. in Boln Acad. nac. Cienc. Córdoba 11: 457. 1889. — ? Type: "*Irpex* / 1.709 / *Puiggarii* [in pencil] / *Hydnum Puiggarii* Sp. [in ink]" (LPS).

*Hydnum basi-asperatum* P. Henn. in Hedwigia 36: 199. 1897. — Lectotype: "743 / *Hydnum basi asperatum* P. Henn. / [Brazil] Pr. St. Catharina / Auf Baumstamm am Bugarbach / Blumenau / April / [18]88" (Herb. Ule, HBG). — Isotype: "*Hydnum basiasperatum* P. Henn. n. sp. / *H. rawacensis* aff. / E. Ule 743" (Herb. Schroeter, BRSL).

*Steccherinum morganii* Banker in Mem. Torrey bot. Club 12: 127. 1906. — *Hydnum morganii* (Banker) Sacc. & Trott. in Syll. Fung. 21: 370. 1912. — Holotype: "Hydnum glabrescens B. & Rav. Ohio. Morgan. no. 104 / Imbricated" (NY).

Basidiomes pileate, solitary or laterally fused or imbricate, occasionally with more or less extensive effused portion running down substratum. Pileus up to 55 mm radius and 57 mm wide, subsessile or attached at vertex or narrowed into short stipe, conchate to reniform, sometimes complicated in that resumed growth at various points of margin of old pileus gives rise to new pilci, more or less conical when young, flattening with age, concentrically grooved, radiately rugulose, at first puberulous or velutinous or tomentose, then becoming matted or even glabrous in alternating concentric areas, variously coloured, ranging from dingy ochraceous yellow, or yellow-brown with slight cinnamon shade to date brown or somewhat reddish brown, zoned with a few broad bands and numerous narrow lines of a darker reddish brown or fuscous; margin straight to more or less incurved, thin, even or lobed. Stipe as far as developed concolorous with pileus and with same tomentose covering or more roughened and finely pitted. Adhymenial surface finely porous to areolately cracked, pallid. Spines 0.5–3.5 mm long, 0.2–0.3 mm broad, broader when confluent, decurrent or not, very much crowded, subulate, terete or flattened, finely pubescent or pulverulent, brownish flesh colour, whitened by ripening spores, darkening with age, tip acute, entire, smooth, not whitish. Context up to 2 mm thick near base of pileus, leathery tough to corky, frequently duplex at base, not visibly zoned, dingy ochraceous when young, from base outwards turning cinnamon to reddish brown.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 1.8–3.6  $\mu$ m wide, not inflating, thin- to thick-walled, branched, septate, with clamp-connections. Skeletal hyphae 3.6–9  $\mu$ m wide, thick-walled. Context of spines similar, hyphae somewhat narrower. Basidia 11.6–13.4  $\times$  3.6–4.5  $\mu$ m (immature), clavate, with basal clamp. Spores 2.7–3.6(–4.5)  $\times$  1.6–1.8(–2.3)  $\mu$ m, ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia of two or three kinds: (type 1) of tramal origin, thick-walled to solid, and actually representing distal part of skeletal hyphae more or less abruptly curved outwards, (type 2) of subhymenial origin and thick-walled to solid; (type 3) of subhymenial origin and thin-walled. Type 1 common but not abundant, little or not projecting beyond hymenial layer, often more or less fusiform in distal part, and thinly incrustated; type 2 lacking from tip of spine, but becoming numerous towards middle, and abundant near base, 2.5–6.5  $\mu$ m wide, obclavate or ventricose to lageniform, with only acute tip incrustated; type 3 rare in middle of spine, more often seen near tip, but never numerous, and sometimes missing, up to 5  $\mu$ m wide, cylindrical to clavate, smooth or, more rarely, obtuse apex capped with crystals.

HABITAT.—The very scarce information available indicates that the species grows on dead forest trees and rotting wood.

DISTRIBUTION.—The bulk of the collections thus far seen comes from the South American area south of the 20th parallel northern latitude (Brazil, Jamaica, and Honduras). Unexpectedly, there seems to be one isolated station far north in the U.S.A. (Indiana, Montgomery Co., Pine Hills, 25 Aug. 1961, W. B. & V. G. Cooke 32839, on rotting wood, labelled "*Steccherinum adustum*").

The spore measurements given above exclusively concern the Brazilian material. It should be noted that the collection from the state of Indiana, macroscopically identical with South American specimens and with the same kind of cystidia, has rather larger spores, measuring 3.6–4.9  $\times$  2.2–2.7  $\mu$ m. Hence my doubt.

From the notes accompanying specimens collected by Prof. Corner near Rio de Janeiro the following details are copied as they have apparently been taken from the fresh material and confirm or supplement the above description drawn up from herbarium specimens: —

[Pilei] fusing in flanges, often imbricate; upper side pale fawn brownish... drying pallid, subfuscous at the base. Flesh... floccoso-coriaceous...; smell slight, sour. Spores  $3-4.5 \times 1.8-2.3 \mu\text{m}$ , white... with one small guttule (living)... Hymenium thickening at the base of the spines.

A change of position of the substratum apparently can induce the present species to form new pilei adjusted to the altered conditions. Banker (1912: 313) described such a case of regeneration, while another is seen in the material illustrated in Fig. 12. Here one half of the margin of a full-grown specimen is adorned with young pilei set at an angle to the horizontal.

With regard to the cystidia described above, it should be pointed out that forms intermediate between types 1 and 2 are very common, those between 2 and 3 much less so. All cystidia have in common that their crystalline cover usually dissolves easily in KOH so that in order to find this incrustation the cystidia should be observed in lactophenol or polyvinyl-lactophenol, preferably lightly coloured by methyl blue.

I once was convinced (Maas Geesteranus, 1964: 171) that *Hydnum reniforme* was conspecific with *Steccherinum rawakense* but had to torture myself in order to explain away the differences. It was not until I had the good fortune to compare the excellent collections brought together by Prof. Corner from the Malaysian area (L) and (as *Hydnum rawakense*) by Father Rick from Brazil (PACA) that I saw my error. There are, in fact, so many differences that it is hard to understand why they remained unobserved for so long. They are tabulated as follows: —

## S. RAWAKENSE

- 
- Upper surface of pileus glabrescent.
- 
- Context showing fairly smooth surface when broken radiately.
- 
- Context remaining whitish or pale dingy yellowish-brownish.
- 
- Skeletal hyphae in pileus predominantly solid or nearly so.
- 
- Cystidia neither particularly numerous, nor very conspicuous, rarely of subhymenial origin, with obtuse tip.
- 

## S. RENIFORME

- 
- Upper surface of pileus with one or more concentric zones remaining tomentose.
- 
- Context showing frayed surface when broken radiately.
- 
- Context from base outwards turning cinnamon to reddish brown.
- 
- Skeletal hyphae in context rarely solid.
- 
- Cystidia, more particularly those of subhymenial origin, very numerous and conspicuous, with acute tip.
-

## STECCHERINUM SUBRAWAKENSE Murrill

*Steccherinum subrawakense* Murrill in Bull. Torrey bot. Club 67: 275. 1940. — *Hydnum subrawakense* (Murrill) Murrill in Bull. Torrey bot. Club 67: 281. 1940. — Holotype: "Hydnum subrawakense M. / Hardwood log, S. Planera Hammock, near Gainesville, Fla. 10-26-[19]38 West + Murrill" (FLAS F18420).

Basidiomes effused-reflexed, laterally connate or fused, imbricate. Reflexed portion up to 35 mm radius and 45 mm wide, wider by confluence, flabelliform, plane to convex, concentrically zoned or shallowly grooved, at first smooth along margin, farther back characterized by development in concentric areas of dome-shaped pustules; surface originally finely velutinous to tomentose, glabrescent near margin, matting down or becoming puckered-rough or radiately wrinkled or ridged towards centre; ochraceous in younger specimens, with a somewhat warmer colour in broad zone behind margin, and some of hindmost pustules pale orange-brown; ochraceous colour deeper in oldest specimen, and most pustules and some zones flushed with yellow-brown to orange-brown. Margin fairly thick, even, finely velutinous, glabrescent with age. Adhymenial surface subtomentose or matted, pale ochraceous. Spines up to 7 mm long, 0.1-0.3 mm broad, broader when confluent, decurrent, crowded, subulate, terete or flattened, straight, simple, densely puberulous or minutely hirsute, with age becoming shaggy, brownish flesh colour, pale ochraceous in oldest specimen, tip acute or incised. Context up to 2-3 mm thick, very tough, obscurely zoned, pale dingy ochraceous.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 2.7-3.6  $\mu$ m wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletal hyphae 2.7-6.3  $\mu$ m wide, thick-walled, rarely solid. Context of spines similar. Basidia 11.5-15.5  $\times$  4.5-5.4  $\mu$ m, clavate, with basal clamp, with 4 sterigmata 2.7-3.6  $\mu$ m long. Spores 3.1-3.4  $\times$  1.8-2  $\mu$ m, ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia of two kinds: (type 1) of tramal origin, 2.5-5  $\mu$ m wide, evenly distributed over spine, numerous, more or less projecting beyond hymenium, incrusting, thick-walled, cylindrical or tapering towards obtuse apex; (type 2) of subhymenial origin, 18-40  $\times$  2.5-7  $\mu$ m, evenly distributed, abundant, often far protruding, glabrous, thin-walled, more rarely moderately thick-walled, without or with long stipe-like portion, cylindrical or with ampullaceous base or fusiform, straight or flexuous or curved or crooked, not filled with oily matter.

DISTRIBUTION.—Known only from the type locality.

This is a most distinctive species on account of its pustular upper surface (some of the pustules reaching a height of 5 mm and a width of 5-7 mm), its warm colour, and the two kinds of cystidia. Fresh, the colour of the entire fungus is said to be white.

***Steccherinum willisii* Maas G., spec. nov.<sup>6</sup>**

Basidiomata imbricata, pileata. Pileus usque ad 25 mm antice productus, 35 mm latus, sessilis vel scidula angusta decurrenteque instructus, conchiformis vel flabelliformis, subconvexus, concentric sulcatus, subzonatus, primo minute tomentosus, deinde pro majore parte glabrescens, ochraceus, zonis angustis colore saturiore variegatus, margine tenui. Aculei usque ad 1.7 mm longi, 0.1-0.2 mm lati, conferti, subulati, tereti vel nonnihil compressi,

<sup>6</sup> Named after Mr. J. H. Willis (South Yarra, Australia), indefatigable contributor of interesting fungi.

recti vel curvati, simplices vel raro connati, omnino albedo-puberuli vel subhispidi, ochraceo-incarnati, ad basin fulvelli. Caro c. 1 mm crassa, coriacea vel suberosa, pileo subconcolor, e hyphis generatoriis skeletalibusque formata. Hyphae generatoriae 2.2–3.6  $\mu\text{m}$  latae, haud inflatae, tenuiter tunicatae vel parietibus subincrassatis munitae, ramosae, septatae, fibulis praeditae. Hyphae skeletales 2.7–7.2  $\mu\text{m}$  latae, crasse tunicatae vel subsolidae. Basidia 4.5–5.5  $\mu\text{m}$  lata, immatura solum visa, clavata, 4-spora. Sporae 3.1–3.4  $\times$  1.6–1.8  $\mu\text{m}$ , verisimiliter immaturae, ellipsoideae, adaxialiter appanatae, laeves, hyalinae, apiculo obliquo munitae. Cystidia usque ad 35  $\mu\text{m}$  longa, 2.5–5.5  $\mu\text{m}$  lata, numerosissima nonnumquam congregata, hymenium superantia, apice tantum incrustata, cylindracea vel obclavata vel lageniformia, saepe flexuosa, apicibus acutis vel obtusis.

HOLOTYPE: Australia, S. E. Queensland, Lamington National Park, 16 May 1969, J. H. Willis & G. Beaton (L).

Basidiomes imbricate, pilcate. Pileus up to 25 mm radius, 35 mm wide, sessile or with narrow, decurrent effused portion, conchate or flabelliform, somewhat convex, concentrically grooved, somewhat zoned, at first minutely tomentose, becoming glabrous for the greater part, ochraceous (between Munsell 2.5 Y 8/4 and 10 YR 8/4) with narrow zones of a deeper and somewhat more brownish colour, with thin margin. Adhymenial surface floccose-porous, pale dingy ochraceous. Spines up to 1.7 mm long, 0.1–0.2 mm broad, crowded, subulate, terete or somewhat flattened, straight to curved, simple or more rarely connate, entirely puberulous to almost hispid, yellowish flesh colour, somewhat more reddish brown near base. Context c. 1 mm thick, leathery or corky, almost of same colour as pileus.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 2.2–3.6  $\mu\text{m}$  wide, not inflating, thin- to moderately thick-walled, branched, septate, with clamp-connections. Skeletal hyphae 2.7–7.2  $\mu\text{m}$  wide, thick-walled to almost solid. Context of spines similar, hyphae somewhat narrower. Basidia 4.5–5.5  $\mu\text{m}$  wide, immature, difficult to observe, clavate, 4-spored. Spores 3.1–3.4  $\times$  1.6–1.8  $\mu\text{m}$ , most probably immature, ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia up to 35  $\mu\text{m}$  long and 2.5–5.5  $\mu\text{m}$  wide, of subhymenial origin (although a few of tramal origin may have been mixed), evenly distributed over spine, abundant, frequently clustered, protruding, with small crystalline cap or incrustated part extending down as a sleeve not longer than 13–18  $\mu\text{m}$ , cylindrical or obclavate to lageniform, straight or more often flexuous, with acute or obtuse apex.

HOLOTYPE: Australia, S.E. Queensland, Lamington National Park, along track to Mount Bethongabel,  $\pm$  2 miles S.E. of O'Reilly's guest house, 16 May 1969, J. H. Willis & G. Beaton, gregarious on rotting log in rain-forest (L).

*Steccherinum willisii* keys out near *S. ochraceum* but has no close relationship to this species. It stands well apart generally by a set of conspicuous characters: the pileus apparently becomes glabrous very soon; the spines are almost hispid; the cystidia occur in great abundance and often clustered, they are of subhymenial origin, and often incrustated only at the apex. On account of some of the properties of the cystidia *S. willisii* would seem to be near *S. reniforme* but the latter differs by the reddish brown discolouration in the herbarium of both the context and the spines, by the different aspect of the spines, and by the presence of two further cystidial types.

#### STECCHERINUM SPECIES I

Basidiomes effused to effused-reflexed, laterally connate or fused. Reflexed portion up to 6 mm radius and 10 mm wide, flange-like or conchate to flabelliform, horizontal

or pendent, more or less convex, concentrically grooved, velutinous or tomentose at first, hyphae collapsing with age to form glabrous, somewhat shiny surface, radiately rugulose or with radiating innate fibrils, from white turning pale cream to dingy ochraceous, not darkened in grooves. Margin of reflexed portion somewhat woolly; margin of effused portion fimbriate, white. Adhymenial surface glabrous to furfuraceous, cream to pale flesh colour, in some specimens with slight flush of deeper orange. Spines up to 1.2 mm long, 0.1–0.2 mm broad, up to 0.5 mm when confluent, decurrent on effused portion, subdistant and somewhat irregularly arranged, subulate, terete or flattened or plate-like, particularly towards margin interconnected and resembling dissepiments of wide, gaping pores, straight to flexuous, simple to manifold connate, puberulous, concolorous with adhymenial surface, tip hirsute, concolorous or whitish. Context less than 0.5 mm thick, uniform, leathery, whitish.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 2.2–3.6  $\mu\text{m}$  wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletal hyphae 3.4–6.3  $\mu\text{m}$  wide, thick-walled. Context of spines similar. Basidia 15–17.5  $\times$  4.5–5.4  $\mu\text{m}$ , clavate, with basal clamp, 4-spored with sterigmata c. 3.6  $\mu\text{m}$  long. Spores 4.5–5.4  $\times$  2.7–2.9  $\mu\text{m}$ , ellipsoid, adaxially flattened, smooth, colourless, with oblique apiculus. Cystidia 4.5–8(–10)  $\mu\text{m}$  wide, of tramal origin, abundant, evenly distributed over spine, often far protruding, incrusting, cylindrical to fusiform in distal part, with obtuse to acute apex.

HABITAT.—On *Sarothamnus scoparius*.

DISTRIBUTION.—Known only from a single collection (France, Ain, Les Echets, 24 Feb. 1963, J. Boidin; LY 4582 and L).

This is a confusing collection. On account of its broad, flattened spines the specimens reminded the collector of *Irpex lacteus*. The presence of clamps, however, determines the material as a species of *Steccherinum*. The general colouration is of a richer hue, resembling that of *S. ochraceum* but in the latter the margin of the effused portion is not fimbriate, and the hymenophore near the margin is not (almost) poroid. In a way the specimens seem to represent an intermediate form between *S. ochraceum* and *S. laeticolor*. With the latter species this form has the fimbriate margin and irregularly arranged, hirsute spines in common. It differs, however, in the colour and the subporoid hymenophore. The capacity to form a reflexed pileus seemed a further difference but *S. laeticolor* does not seem to be always strictly effused, as is evidenced by the description of a *Mycoleptodon laeticolor* f. *pileatus* Nikol. Here is a clear case where interfertility tests must answer the question: is this a good species?

## 2c. TYPES OF THE SYNONYMS: DESCRIPTIONS AND COMMENTS

This chapter deals with the taxa enumerated in the synonymy of various species of *Steccherinum*, and contains discussions or redescriptions of their types. The taxa are arranged alphabetically according to their specific epithet.

### HYDNUM ALNICOLA Vel. (p. 518)

Information was received that the type material of *Hydnum alnicola* is preserved in liquid, and hence presumably unfit to be sent by post. However, the species was

stated to be identical with *H. ochraceum* by Bourdot & Galzin (1928: 440) and Cejp (1928: 312).

HYDNUM CILIOLATUM Berk. & Curt. (p. 506)

Holotype consisting of several basidiomes attached to bits of bark glued to a piece of paper. Basidiome c.  $27 \times 13$  mm (largest specimen), effused. Adhymenial surface subceraceous, areolately cracked, ochraceous yellow, paler towards margin, flushed with warm yellow-brown in centre. Margin firmly adnate, finely fimbriate to byssoid, in places (accidentally?) curled up. Spines up to c. 0.6 mm long, 0.1–0.2 mm broad, moderately crowded to subdistant, evenly arranged, subulate, terete to flattened, straight, simple or connate, pubescent to almost hispid, yellow-brown, tip fimbriate to lacerate, whitish. Context soft, very thin.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae  $2.7\text{--}3.6$   $\mu\text{m}$  wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletals  $2.7\text{--}5.4$   $\mu\text{m}$  wide, thick-walled to solid. Context of spines similar. Basidia (immature)  $12.5\text{--}14.5 \times 3.6\text{--}4.5$   $\mu\text{m}$ , clavate, with basal clamp. Spores not seen, stated by P. Lentz (who left annotations with material) to be " $3.5\text{--}4.6 \times 2.2\text{--}2.4$   $\mu\text{m}$ , rather narrowly obovoid, colorless." Cystidia up to  $6.3\text{--}8$   $\mu\text{m}$  wide, evenly distributed over spine, abundant, thick-walled to solid, incrusting, protruding, cylindrical or slightly fusiform in distal part, with obtuse or more acute apex.

HYDNUM DAVIESII Sow. (p. 517)

Fries in his *Systema* synonymized *H. daviesii* with *H. ochraceum* without wasting a single word of explanation. There seems, indeed, little else that can be suggested in the absence of material so that Fries' view is here followed.

HYDNUM DECURRENS Berk. & Curt. (p. 518)

Lectotype consisting of several basidiomes glued to a piece of paper, more or less laterally confluent, largest patch measuring some  $70 \times 40$  mm. Basidiome effused to effused-reflexed. Reflexed portion up to 10 mm radius, 20 mm or more wide by confluence, more or less convex, shallowly concentrically grooved, woolly-hirsute, matting down or in places somewhat glabrescent farther back from margin, radiately rugulose-uneven, dingy yellow-brown; margin velutinous, concolorous or paler. Spines up to 1.8 mm long, 0.1–0.3 mm broad, decurrent, crowded, subulate, terete or flattened, straight, simple or confluent, pulverulent, brownish flesh colour, tip acute, smooth, concolorous. Context up to 1 mm thick, uniform, tough, dingy pale yellowish.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae  $2.7\text{--}4.5$   $\mu\text{m}$  wide, not inflating, thin- to moderately thick-walled, branched, septate, with clamp-connections. Skeletal hyphae  $2.7\text{--}7.5$   $\mu\text{m}$  wide, thick-walled to solid. Context of spines similar. Basidia about  $18 \times 4.5\text{--}5.5$   $\mu\text{m}$ , immature, clavate, with basal clamp. Spores not seen. Cystidia  $3.6\text{--}6.3$   $\mu\text{m}$  wide, evenly distributed, incrusting, cylindrical, fusiform or tapering in distal part, with obtuse apex.

Banker (1906: 134), led astray by the colour of the spines ("a lilac tint rather than ochraceous"), thought that it was a good species close to *S. ochraceum*. Apparently he did not know that this is the colour the spines acquire when soaked in a solution of mercuric chloride. There is no doubt, however, *H. decurrens* and *S. ochraceum* are the same species.



## HYDNUM DENTICULATUM Pers. (p. 518)

Basidiome effused. Spines pulverulent. Context dimitic. Generative hyphae about  $2.5\ \mu\text{m}$  wide, not inflating, with clamps. Skeletal hyphae  $2\text{--}4.5\ \mu\text{m}$  wide, thick-walled to solid. Basidia collapsed. Spores not seen. Cystidia  $4\text{--}8\ \mu\text{m}$  wide, not numerous, but evenly distributed over spine, protruding, incrusting, cylindrical, with obtuse apex.

*Hydnum denticulatum*, perhaps more than any other *Hydnum* in Herb. Persoon, received a great deal of attention. G. Bresadola was sent a fragment of the material in 1895 but since that proved much too small his comment was: "Specimen tres incomplet; on ne peut rien relever de cet specimen." Subsequently L. Romell examined the type, which he recognized as identical with *Hydnum pudorinum*. Then, in 1929, the type was studied by M. A. Donk who confirmed Romell's identification but subordinated Fries' epithet to *H. ochraceum*.

Although the type is very poor indeed, as well as immature, its condition is sufficient to prove the previous identifications to be correct.

## HYDNUM DICHROM Pers. (p. 518)

Holotype consisting of a few basidiomes glued to a sheet of paper, partly imbricate, partly laterally confluent. Pileus up to 12 mm radius and 9 mm wide, flabelliform, narrowed behind; abhymenial surface showing alternating hirsute-sericeous and woolly-tomentose zones, concentrically grooved, dingy ochraceous to yellow-brown, margin straight, matted or horny. Spines up to 0.7 mm long, 0.1 mm broad, decurrent, subulate, terete or flattened, straight, simple, finely pulverulent, yellowish brownish or with faint flesh-colour, tip entire or somewhat lacerate, concolorous. Context pallid.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae  $2.7\text{--}3.6\ \mu\text{m}$  wide, not inflating, thin-walled, occasionally anastomosing, branched, septate, with clamp-connections. Skeletal hyphae  $1.8\text{--}5.4\ \mu\text{m}$  wide, thick-walled to solid. Context of spines similar. Basidia immature. Spores (immature?)  $3.6\text{--}3.8 \times 2\text{--}2.4\ \mu\text{m}$ , broadly ellipsoid, adaxially flattened, smooth, colourless, with oblique apiculus. Cystidia  $4.5\text{--}6.3\ \mu\text{m}$  wide, incrusting, evenly distributed over spine.

*Hydnum dichrom* has been variously rated, partly because of the lack of suitable material for comparison. Fries (1874: 612) considered the species to be identical with his *H. pudorinum*. As pointed out under the latter (p. 538), the outward appearance of the material at Fries' disposal and sent him as *H. dichrom* by Delastre is rather different from the holotype in Herb. Persoon. Bresadola, who saw at least this type, disagreed with Fries (1903: 84) and stated of *H. dichrom*: "Species haec ab *H. pudorino* . . . clare distincta pileo crassiori, generatim dimidiato-sessili, aculeis spathulatis et sporis fere globosis, 1-gutt." Unfortunately in this case Bresadola's observations are partly incorrect: the spines of *H. dichrom* are not more and not less spathulate than in *S. ochraceum*, while the subglobose spores he saw must have been immature or those of a mould.

Banker (1912: 310) like Fries regarded *H. dichrom* and *H. pudorinum* as a single species which, however, in his opinion should bear the name *Steccherinum dichrom*.

In his opinion this species embraced "a fairly well defined group of forms intermediate between *S. ochraceum* and *S. Rhöis* . . ." He did not, however, explain how these forms should be recognized, while his remark (p. 311): "it may even be reasonably questioned whether these species are anything more than extreme variations of a single fundamental type" may well be seen as an intimation of his own misgivings.

Bourdot & Galzin (1928: 440) maintained *Mycoleptodon dichrous* as a separate species differing among other things from *M. ochraceus* in the larger spores, being  $4-6.5 \times 3.5-4 \mu\text{m}$  in the former as against  $3-4 \times 2-2.5 \mu\text{m}$  in the latter. Although the measurements of the French authors have generally proved to be reliable, there is some reason to believe that in this case the spores measured were not those of a *Steccherinum*. Unfortunately there is no material of *M. dichrous* in Bourdot's herbarium to check this supposition. On requesting the loan of the collection from Allier, cited by Bourdot & Galzin, a letter was received stating that "aucun échantillon de cette espèce existe dans l'herbier de Bourdot." It is worth remembering, however, that the spores in the type of *H. dichroum* measure  $3.6-3.8 \times 2-2.4 \mu\text{m}$ , exactly the size given by Bourdot & Galzin for *S. ochraceum*. In conjunction with this, a Czechoslovakian collection of *S. ochraceum* in the Rijksherbarium (Bohemia, Boubín Forest, Maas Geesteranus 13265) should be mentioned in which large spores were seen, measuring  $4.5-6.3 \times 2.9-3.8 \mu\text{m}$  (later measurement,  $4.7-7.4 \times 2-3.6 \mu\text{m}$ ). On investigation of the origin of these spores it was found that they had been produced by an alien fungus parasitizing the spines of *S. ochraceum*. Their remarkable resemblance to basidiospores had at first led me to believe that they were true *Steccherinum*-spores, and a similar slip could well have been made by Bourdot & Galzin. With the loss of the spore size as an important differential character, there would be only the general appearance of the basidiome ("Moins étendu et plus réfléchi") to separate *Mycoleptodon dichrous* of the French authors from *Steccherinum ochraceum*. As I have explained elsewhere, I cannot accept this difference as a warrant for specific distinction.

In addition to the above it is necessary also to draw attention to the spore size Pilát (1934: 304) gave for what he considered to be *Mycoleptodon dichrous* ( $4-6 \times 3.5-4.3 \mu\text{m}$ ). I did not see the material on which these measurements had been based, but was kindly given the opportunity to study Pilát's Fungi carpat. No. 216 (as *Mycoleptodon dichrous*). This proved to be *Steccherinum laeticolor*.

#### ODONTIA FIMBRIATA Pers. (p. 509)

Basidiome of neotype by confluence covering several  $\text{cm}^2$ , effused, membranous-coriaceous, separable, adhymental surface granular to finely porous, more or less clearly veined or marked by loose rhizomorphic strands, dull yellow-brown with locally slight vinaceous hue; abhymental surface felted; margin byssoid to radiately fimbriate, whitish, fibrils sometimes combining to form loose strands up to 0.5 mm thick. Spines up to 0.4 mm long, crowded to subdistant (and then often clearly following course of veins), wart-like to cylindrical, often confluent and then variously shaped, with fimbriate tip.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae

3.6–4.5  $\mu\text{m}$  wide, not inflating, thin-walled or moderately thick-walled, branched, septate, with clamp-connections. Skeletal hyphae 3.6–5.4  $\mu\text{m}$  wide, thick-walled (cell-wall about 0.9  $\mu\text{m}$  thick), becoming nearly to completely solid towards centre of basidiome, straight or flexuous to kinked. Context of spines also dimitic, made up of generative and skeletal hyphae. Basidia badly preserved, approximately  $18\text{--}19 \times 4\text{--}4.5 \mu\text{m}$ , with basal clamp. Spores  $3.3\text{--}3.6 \times 2.5 \mu\text{m}$ , ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia 3–5.5  $\mu\text{m}$  wide, numerous at tip of spine, growing scarce farther back, straight to curved or flexuous at tip of spine, sharply bent towards hymenium farther back on sides, cylindrical, thick-walled to solid except at their apex, usually heavily incrustated, sometimes several also naked.

HYDNUM FLABELLIFORME Berk. (p. 518)

Type consisting of several basidiomes glued to a piece of paper, more or less confluent laterally. Pileus up to about 16 mm radius, 6–14 mm wide, flabelliform, narrowed behind and springing from mycelial base; abhymenial surface showing alternating hirsute and woolly zones, concentrically grooved, dingy ochraceous to yellow-brown, margin involute, hirsute. Spines up to 1.2 mm long, 0.1–0.2 mm broad, decurrent, crowded, subulate, terete to flattened, straight, simple, pulverulent to minutely pubescent, yellowish brownish or with touch of flesh-colour, tip entire or somewhat lacerate, concolorous. Context duplex, pallid, firmer part separated from overlying tomentum by narrow, dark brown line.

Context imperfectly dimitic, consisting of generative and skeletal hyphae, and an intermediate kind. Generative hyphae 2.2–3.6  $\mu\text{m}$  wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletal hyphae 3–9  $\mu\text{m}$  wide, thick-walled to solid, farther back from margin increasingly mixed with hyphae of intermediate kind as wide and thick-walled as skeletal but occasionally branched and clamped. Context of spines similar, but lacking intermediate kind of hyphae, and skeletal only up to 7  $\mu\text{m}$  wide. Basidia  $11\text{--}13.5 \times 3.6 \mu\text{m}$ , immature, clavate, with basal clamp. Spores (except for numerous spores of mould) not seen with certainty. Cystidia 6.3–7  $\mu\text{m}$  wide, incrustated, evenly distributed over spine, cylindrical, with obtuse or acute apex.

HYDNUM FLORIDANUM Berk. & Cooke apud Cooke (p. 513)

Basidiome covering several  $\text{cm}^2$  distributed over three pieces of a twig, effused. Abhymenial surface areolate, ceraceous, dingy salmon, overlying soft, tomentose, pale yellowish subiculum. Margin fibrillose-fimbriate, partially separable from substratum, yellowish. Spines up to 2.5 mm long, 0.2–0.3(–0.5) mm broad, scattered to moderately crowded, subulate, flexuous to curved, slender to rather plump, simple or confluent, minutely and sparingly pubescent or almost appearing glabrous, dingy salmon.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 2.7–4.5  $\mu\text{m}$  wide, not inflating, thin- to thick-walled, at times hard to distinguish from skeletal, branched, septate, with clamp-connections. Skeletal hyphae 3.6–6.3 (–7)  $\mu\text{m}$  wide, thick-walled to solid. Context of spines similar. Basidia c.  $13.5\text{--}15 \times 4.5 \mu\text{m}$ , immature, clavate, some with 4 incipient sterigmata, with basal clamp. Spores  $4\text{--}4.7 \times 2.2\text{--}2.5 \mu\text{m}$ , elongate-ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia 4.5–8(–10.7)  $\mu\text{m}$  wide, thick-walled (cell-walls up to 4.5  $\mu\text{m}$  thick), evenly distributed over entire length of spine, incrustated, little or not protruding beyond hymenium, cylindrical to fusiform in distal part, with obtuse or acute apex.

## MYCOLEPTODON GRACILIS Pilát (p. 518)

Basidiome 15 mm radius, up to 30 mm wide, effused-reflexed or attached at vertex, confluent with neighbouring basidiomes, more or less separable from substratum, orbicular to irregularly flabelliform, very rough and knobby from radial veins or fibrils or rugulosity and scale-like processes, with widely spaced, thin, concentric darker lines marking end of growth-period; upper surface very finely to innately fibrillose, somewhat shiny, whitish in younger and yellow-brown in older parts, margin crenate. Spines up to 2.5 mm long, 0.1–0.3 mm broad, crowded, subulate, terete to distinctly flattened, occasionally furcate, usually simple, entirely pulverulent to minutely pubescent, brownish flesh colour. Context up to 0.5 mm thick, tough, white.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 1.8–3.6  $\mu\text{m}$  wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletal hyphae 1.8–4.5  $\mu\text{m}$  wide, thick-walled to solid, straight to flexuous; also present numerous modified skeletals, which are kinked, tortuous, branched, very much intertwined between other hyphae. Context of spines similar. Basidia (not seen well-developed) 11–13.5  $\times$  4.5–5.5  $\mu\text{m}$ , with basal clamp, 4-spored, with sterigmata 2.7–3.5  $\mu\text{m}$  long. Spores 3.1–3.6  $\times$  2.2–2.5  $\mu\text{m}$ , ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia 5.4–7  $\mu\text{m}$  wide, incrustated with very coarse crystals, evenly distributed over spine, except at tip, where they are fewer, usually naked, and consequently not easily seen (description of part of type, UPS).

Pilát in his description stated that the cystidia are very numerous and particularly crowded at the tip of the spines. This is actually the case in young spines near the margin of the pileus, but in old spines, stretched to their full length, the cystidia are rather sparingly dotted over the surface, while they even seem absent from the tip of the spines.

## HYDNUM GUARANITICUM Spg. (p. 524)

Holotype consists of two laterally fused pilei and disconnected part of a third. Pileus about 25 mm radius and wide, laterally narrowed into stipe-like base, flabelliform, plane except for a few low and broad concentric corrugations, woolly-strigose alternating with glabrescent zones, bay to fawn (now largely discoloured because of mercuric chloride used). Spines up to 1 mm long, 0.2–0.3 mm broad, subulate, flattened or fluted, smooth, brown, with entire or incised tips. Context about 1 mm thick, tough, not visibly zoned, cinnamon brown.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 2.7–3.6  $\mu\text{m}$  wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletal hyphae 3.6–8  $\mu\text{m}$  wide, thick-walled (cell-walls 1.3–2  $\mu\text{m}$  thick). Context of spines similar, skeletals up to 10.5  $\mu\text{m}$  wide and thicker-walled (cell-walls up to 2.7  $\mu\text{m}$  thick). Basidia very young, collapsed. Spores not seen. Hymenial cystidia 13.5–43...  $\times$  3.6–7.5  $\mu\text{m}$ , numerous some distance away from tip of spine, projecting beyond hymenium, fusiform, thick-walled to almost solid, with acute apex, showing all kinds of transitional forms to skeletals.

## HYDNUM LAETICOLOR Berk. &amp; Curt. apud Berk. (p. 513)

Basidiome about 53  $\times$  18 mm, effused-reflexed. Reflexed part narrow, about 2 mm radius. Abhymenial surface radiately fibrillose, rather uneven, with 1–2 concentric grooves, pale dingy ochraceous, margin fimbriate. Adhymenial surface tomentose,

pale dingy ochraceous. Spines up to 2 mm long, 0.1–0.3 mm broad, moderately crowded, somewhat unevenly arranged, subulate, terete or flattened, flexuous to curved, simple or confluent, pulverulent to scabrous, brownish flesh colour, tip entire or finely fimbriate. Context fibrose-spongy, pale ochraceous.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae up to 3.6  $\mu\text{m}$  wide, not inflating, thin- to fairly thick-walled, branched, septate, with clamp-connections. Skeletals 4.5–7.2  $\mu\text{m}$  wide, thick-walled to solid. Context of spines similar. Basidia not seen with certainty. Spores not seen. Cystidia 4.5–8  $\mu\text{m}$  wide, exceptionally up to 18  $\mu\text{m}$  wide, evenly distributed over entire length of spine, thick-walled to solid, incrusting, little protruding beyond surface, cylindrical to fusiform in distal part, with obtuse apex.

The type packet contains two specimens which not only look slightly different but must also have been collected from different parts of the same tree, if not from two separate trees, judging from the different aspect of the two pieces of bark to which the basidiomes are attached. For the description the basidiome nearer Berkeley's pencil notes has been chosen but microscopically the two basidiomes prove identical. Both specimens were so young at the time they were collected that it is not now possible to tell whether the clavate elements seen represent immature basidia. Fortunately, however, the species is well characterized by the fimbriate margin, as well as the vivid colour, the somewhat disorderly arrangement, and the size of the spines.

MYCOLEPTODON LITSCHAUERI Bourd. & Galz. (p. 507)

Basidiome some  $\text{cm}^2$  in extent, effused, not separable from substratum without damage. Adhymenial surface at first minutely porous, then ceraceous, in places areolately cracked, milk white to pale cream in age; margin finely fibrillose to fimbriate, in places forming runners or rhizomorphic strands, whitish. Spines up to about 1.5 mm long, 0.1–0.2 mm broad, subdistant, cylindrical or slightly flattened, rarely furcate, usually simple but occasionally also 2 or 3 confluent, pulverulent, cream in younger parts, pale ochraceous in centre of basidiome, with white-fimbriate tip. Context thin, whitish.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 1.8–5.4  $\mu\text{m}$  wide, not inflating, thin-walled to moderately thick-walled, branched, occasionally anastomosing, septate, with clamp-connections. Skeletal hyphae 2.7–3.6  $\mu\text{m}$  wide, thick-walled to solid, straight to flexuous. Context of spines similarly dimitic, skeletals usually being somewhat narrower. Basidia 18–22  $\times$  4.5–6  $\mu\text{m}$ , clavate, 4-spored, with sterigmata 2.7–3.6  $\mu\text{m}$  long, with basal clamp. Spores 4.5–5.4  $\times$  1.8–2.7  $\mu\text{m}$ , elongate-ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia 3.5–4.5  $\mu\text{m}$  wide, evenly distributed over entire length of spine, projecting only little beyond hymenium, incrusting, cylindrical to somewhat fusiform in distal part, with obtuse apex, towards tip of spine mixed with occasional naked cystidia.

HYDNUM MARTIANOFFANUM Bres. (p. 513)

Basidiome approximately 25  $\times$  15 mm, effused-reflexed. Reflexed portions about 2 mm radius, velutinous to woolly, soft, indistinctly concentrically grooved, dingy yellow-brown, margin cream. Spines up to 3 mm long, 0.1–0.3 mm broad, crowded, subulate, terete or flattened, more or less flexuous, simple, rarely furcate, furfuraceous to scabrous, brownish flesh-colour, paler at the tip.

Context dimitic, consisting of generative and skeletal hyphae. Basidia immature. Spores  $4.3-4.5 \times 2.8-3.1 \mu\text{m}$ . Cystidia up to  $9 \mu\text{m}$  wide, evenly distributed over spine, thick-walled to solid, incrustated.

The material (now in UPS) was originally identified as *Hydnum subcarnaceum* Fr. by von Thümen. Bresadola disagreed and renamed it *H. martianoffanum* after the collector who had found it in Siberia. The basidiome is effused-reflexed, with very little of the margin of the effused part left, badly overgrown by a mould and discoloured. However, close scrutiny revealed a few remnants of the margin showing the typical fimbriate structure, while the name given by von Thümen offered a clue for the original colour of the unaffected fungus. Fries (1818: 271), it may be pointed out, described his *H. subcarnaceum* as "albido-carneum l. rufescens." These features combined with several others mentioned in the redescription prove the identity of the specimen: *Steccherinum laeticolor*.

#### HYDNUM MICRODON Pers. (p. 517)

There is no material in Herb. Persoon of *H. microdon* which, as indicated by its author, had been collected in a coal mine. Fries in later years (1874: 612) thought that it was hardly different from the completely effused form of *H. ochraceum*, while Bresadola (1903: 85) regarded it as a juvenile state of this species. I am inclined to adhere to the views of both authors since no other suggestion offers itself.

#### STECCHERINUM MORGANII Banker (p. 525)

To supplement Banker's description, the following microscopic data are supplied:

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae  $1.8-3.6 \mu\text{m}$  wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletals  $3.6-8 \mu\text{m}$  wide, thick-walled (cell-walls up to  $2 \mu\text{m}$  thick). Context of spines similar, generative hyphae somewhat narrower. Basidia badly discernible resulting from mercuric chloride treatment. Spores not seen. Cystidia of hymenial and tramal origin, the former  $13-45 \times 4-9 \mu\text{m}$ , cylindrical to clavate or fusiform, thick-walled, with obtuse to acute apex.

#### HYDNUM OCHRACEUM Pers. (p. 517)

Basidiomes of neotype effused, many grown together to form large patch approximately  $13.5 \times 4.5 \text{ cm}$ , separable from substratum. Spines about  $0.5 \text{ mm}$  long,  $0.1 \text{ mm}$  broad, crowded, subulate to somewhat flattened, occasionally furcate, pulverulent, brownish flesh-colour, with whitish tip. Context less than  $0.5 \text{ mm}$  thick, pale brownish.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae up to  $3.6-4.5 \mu\text{m}$  wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletal hyphae  $2.7-6.3 \mu\text{m}$  wide, thick-walled to solid, flexuous to straight. Context of spines similar. Basidia hardly discernible. Spores not seen. Cystidia  $4.5-6.5 \mu\text{m}$  wide, incrustated, evenly distributed over spine, cylindrical to somewhat fusiform, with obtuse apex.

There are two sheets in Herb. Persoon, numbered 910.262-532 and 910.263-1314, which bear material of *Hydnum ochraceum*. Persoon for some reason was not sure about

the identity of the former which he called "*Hypnum*[!] *ochraceum*?" but he had no doubts about the latter. Since this material was stated to have been collected near Paris, and cannot therefore have served for the original description drawn up by Persoon when he was still in Germany, the collection is here designated neotype. It may be pointed out, however, that the type is in no way better than the material of the other sheet, both collections having been taken in immature condition and, consequently, lacking spores.

HYDNUM OCHRACEUM var. DIMIDIATUM Alb. & Schw. (p. 517)

*Hydnum ochraceum* var. *dimidiatum*, to judge from the description, comprizes a wide scale of growth forms of *Steccherinum ochraceum*. It is by no means rare to find these growing together, albeit on different sides of the same fallen branch.

As regards the other two varieties described by von Albertini & von Schweinitz, var. *integrum* and var. *muscorum*, see under excluded taxa.

HYDNUM OCHRACEUM var. RESUPINATUM Pers. (p. 518)

The material of *H. ochraceum* var. *resupinatum* in Herb. Persoon seems to be without spores but the cystidia are similar to those found in typical *S. ochraceum*, while the macroscopic agreement is also satisfactory. Persoon's varietal epithet is therefore placed in the synonymy of *Steccherinum ochraceum*.

HYDNUM OCHRACEUM subsp. TENERUM Sacc. (p. 518)

Type consisting of several basidiomes attached to two fragments of stem of *Rubus*. Basidiome effused, partially separable from substratum, adhymental surface porous, dingy cream; margin uneven to somewhat lobed, velutinous, paler to whitish. Spines up to 0.6 mm long, 0.1–0.2 mm broad, crowded, cylindrical to subulate, or flattened, not infrequently 2 or 3 confluent, straight, pulverulent, flesh colour, with entire, concolorous tip.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 1.8–2.7  $\mu\text{m}$  wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletal hyphae 2.7–3.6  $\mu\text{m}$  wide, thick-walled to solid. Context of spines similar. Basidia c. 11.6  $\times$  4.5  $\mu\text{m}$ , immature, clavate. Spores c. 3.1  $\times$  1.8  $\mu\text{m}$ , immature, ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia up to 10  $\mu\text{m}$  wide, evenly distributed over spine, incrusting, little or not protruding, cylindrical or fusiform in distal part, with obtuse apex.

HYDNUM PARASITANS Berk. & Curt. apud Berk. (p. 513)

Basidiome roughly 35  $\times$  30 mm, probably effused (it is not possible to know this for certain since the top half has been cut off), adhymental surface tomentose or felted, dingy flesh colour or brownish yellowish. Margin fimbriate, pale ochraceous. Spines up to 3.5 mm long, 0.1–0.3 mm broad, crowded, subulate, flexuous, simple or confluent, finely pubescent, brownish flesh colour, tip smooth and concolorous, or pulverulent and whitish. Context soft, spongy, pale ochraceous.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 2.7–3.6  $\mu\text{m}$  wide, not inflating, thin-to moderately thick-walled, branched, septate,

with clamp-connections. Skeletal hyphae 5.4–6.3  $\mu\text{m}$  wide, thick-walled to solid, straight or somewhat flexuous. Context of spines similar, skeletal up to 9  $\mu\text{m}$  wide. Basidia seen only immature,  $19 \times 5\text{--}6.5$   $\mu\text{m}$ , clavate, with basal clamp. Spores not seen (4.5–6  $\times$  2–3  $\mu\text{m}$  in isotype, according to Gilbertson, 1965: 861). Cystidia up to 10  $\mu\text{m}$  wide, evenly distributed over spine but lacking from extreme tip, incrustated.

Gilbertson (1965: 861) gave an explanation of the relation between the two kinds of spines he found in the isotype, which had induced Berkeley to think that one kind was parasitizing the other. Agreeing with Gilbertson's view that the two kinds of spines form part of the same basidiome, I have used the data extracted from both kinds for drawing up the above description.

#### HYDNUM PLUMARIUM Berk. & Curt., 1873 (p. 518)

Basidiome up to 3 mm across, effused-reflexed. Reflexed part up to 0.6 mm radius, flange-like, more or less convex, velutinous to woolly-hirsute, dingy whitish. Margin of effused part easily separable from substratum, velutinous. Adhymenial surface dingy flesh colour. Spines up to 1 mm long, 0.1–0.2 mm broad, subdistant, subulate, terete to somewhat flattened, straight, simple, pulverulent, hirsute towards tip, flesh colour. Context thin, leathery.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 2.2–3.6  $\mu\text{m}$  wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletal hyphae 2.7–6.3  $\mu\text{m}$  wide, thick-walled to almost solid. Context of spines similar. Basidia c.  $13.5 \times 4.5$   $\mu\text{m}$ , immature, clavate, with basal clamp. Spores 3.6–4.5  $\times$  2–2.2  $\mu\text{m}$ , ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia 3.5–7.5  $\mu\text{m}$  wide, evenly distributed over spine, protruding incrustated, cylindrical in distal part, with obtuse apex.

The type packet contains three twig fragments, each with differently developed basidiomes. Those on the twig in the middle were chosen for the redescription. The original description, indicating the pileus as conchiform, obviously referred to the specimens to the right.

#### HYDNUM PUDORINUM Fr. (p. 518)

The three fragments in Uppsala sent by Delastre and labelled "*Hydnum rubiginosum* Dre. 1823 / — *dichroum*. Pers. Myc. Eur. s<sup>o</sup>2.add<sup>e</sup> Pag. 213", and thought by Banker (1912: 311) to approach more nearly *S. ochraceum*, actually represent this species. It should be added that the fragments are of the effused-reflexed kind, a very common growth-type in *S. ochraceum*, and—it must be pointed out—looking strikingly different from the pileate material Delastre had sent to Persoon. The latter has been dealt with under *H. dichroum*. To return to the material in Herb. Fries, the redetermination "*pudorinum* Fr.!" written in pencil is definitely not in Fries' hand but there is hardly room for doubt that it is this very collection which must have made Fries (1874: 612) decide to identify what he considered to be Persoon's *H. dichroum* with his own *H. pudorinum*. There is a slight difficulty in that Fries indicated *Quercus* as substratum, which was not mentioned with Delastre's specimens but he probably borrowed this information from Persoon's remark "Hab. ad truncos cariosos quer-



cuum. Delastre." (1825: 213). As it is, the collection in Fries' herbarium seems to be the only clue in existence to give information on the identity of *Hydnum pudorinum*. From the foregoing the conclusion seems justified that *H. pudorinum* is a synonym of *Steccherinum ochraceum*. Bresadola (1897: 93) long ago had come to the same conclusion: "Inter *Hydnum ochraceum* et *H. pudorinum* nullam prorsus differentiam invenire licuit," but he never disclosed his line of reasoning.

#### HYDNUM PUIGGARII Speg. (p. 524)

This species was previously thought to be the same as *Steccherinum rawakense* (Maas Geesteranus, 1967c: 8). Since it has been shown that *S. rawakense* and *S. reniforme* are two distinct species, which are also geographically separated, it follows that *H. puiggarii* is better placed in the synonymy of the South American *S. reniforme*.

#### HYDNUM REFLEXUM Burt (p. 518)

The part of the type investigated is not more than a fragment taken from the margin of the pileus, measuring 13 × 6 mm. Pileus thickly woolly-tomentose, dingy ochraceous, with somewhat warmer, slightly orange shade at margin. Hymenial surface, as far as visible, subtomentose, whitish flesh colour. Spines up to 2 mm long, 0.2–0.3 mm broad, crowded, subulate, terete to somewhat flattened, straight, simple to connate, pulverulent, pubescent near tip, yellowish flesh colour. Tip acute, pubescent to hirsute. Context up to 1.5 mm thick, duplex, firm and pallid below, tomentose and more dingy yellowish above, both layers separated by darkish brown line.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 2.7–4.5 μm wide, not inflating, thin-walled to moderately thick-walled, branched, septate, with clamp-connections. Skeletal hyphae 2.2–6.7 μm wide, thick-walled to nearly solid. Context of spines similar. Basidia 13.5–18 × 3.6–4.5 μm, immature, clavate, 4-spored, with basal clamp. Spores 3.1–3.6 × 2–2.2 μm, ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia 3.5–4.5 μm wide, evenly distributed over spine but scattered, somewhat protruding, incrustated, cylindrical in distal part or gradually tapering towards obtuse apex.

Nikolajeva (1961: 143) tentatively placed *H. reflexum* in the synonymy of *Mycoleptodon rhois*.

#### STECCHERINUM RESUPINATUM G. H. Cunn. (p. 518)

Basidiome covering one side of decorticated twig fragment 65 × 10 mm, effused, closely adnate, only in few places somewhat separable from substratum, adhymental surface subtomentose to minutely porous, pale flesh colour or cream, margin finely and evenly fibrillose, pale cream. Spines up to 0.6 mm long, 0.1–0.3 mm broad, terete to flattened, straight or somewhat flexuous, simple or confluent or aggregated into groups, pulverulent to puberulous, flesh colour, tip hirsute, whitish. Context less than 0.5 mm thick, leathery, whitish.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 2.7–3.6 μm wide, not inflating, thin-walled, branched, septate, with clamp-connections. Skeletal hyphae 2.7–4.7 μm wide, thick-walled to solid. Context of spines similar. Basidia 11.5–15.5 × 3.6–4.5 μm, immature, clavate, with basal clamp. Spores

4.2–4.7 × 2–2.2  $\mu\text{m}$ , ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia 3.6–7.2  $\mu\text{m}$  wide, evenly distributed over spine or more numerous at tip, far protruding especially at tip, cylindrical, clavate, or fusiform in distal part, with obtuse apex, thick-walled to solid, incrustated.

It is certainly true that in general appearance the type of *S. resupinatum* looks different from specimens of *S. ochraceum* as commonly seen in Europe. But there is not a single character that offers a means of clear distinction between the two. The same can be said of Nos. 4936 and 17728 cited by Cunningham. The impression made by these collections is rather of a growth form developed under the stress of certain climatic, or at least environmental, conditions: macroscopically they are poor specimens of the species, but microscopically there is no difference.

#### HYDNUM RHOIS Schw. (p. 518)

Type only a triangular fragment of basidiome, about 12 × 10 mm. Pileus about 12 mm radius, flabelliform, narrowed behind; abhymenial surface partly destroyed by insects, partly collapsed, radiately rugulose and glabrous, towards margin sericeous, with two narrow concentric zones, silky, yellow-brown, margin involute, fringed with stiff whitish hairs. Spines less than 1 mm long, about 0.2 mm broad, decurrent, cylindrical or flattened, straight, simple, tough, pulverulent, yellowish brownish, tip (where not damaged or abraded) densely white-pubescent. Context duplex, pallid, firmer part separated from overlying tomentum by narrow, dark brown line.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae about 3.6  $\mu\text{m}$  wide, thin-walled. Skeletals 5.5–9  $\mu\text{m}$  wide, thick-walled (cell-walls up to 2  $\mu\text{m}$  thick). Spores 3.4–3.6 × 1.8  $\mu\text{m}$ , slender-ellipsoid, adaxially flattened, smooth, colourless, with oblique apiculus. Cystidia incrustated, restricted to tip of spine.

It is clear from Banker's exposition (1912: 311) that he was unable or not prepared to cut the Gordian knot formed by the three species *Steccherinum ochraceum*, *S. dichroum*, and *S. rhois*. Later authors were either non-committal or took care not to cut their own fingers in trying to undo the knot and get down to the bottom of the problem. Patouillard (1900: 117) simply gave a list of the members of *Mycocleptodon* in which *M. ochraceus* and *M. rhois* were enumerated as separate species. Bourdot & Galzin (1928: 440) were of the opinion that *M. dichroum* was distinct from *M. ochraceus*, their arguments being mainly framed in the words "Moins étendu et plus réfléchi." Miller (1935: 358, 359) made the guarded remark, later repeated by Miller & Boyle (1943: 48), that "*Hydnum flabelliforme* Berk. and *Hydnum Rhois* Schw. seem to refer to the more pileate variations of the species [= *S. ochraceum*]." Coker & Beers (1951: 7) accepted the name *Steccherinum rhois* but were well aware that the "present knowledge of this group of plants . . . is far from satisfactory." Cunningham (1958: 594) put *H. rhois* and *H. flabelliforme* as synonyms under *S. ochraceum* with no further comment. Parmasto (1968: 172, 173) in giving a list of the species of *Steccherinum* found in the U.S.S.R. enumerated *S. dichroum*, *S. ochraceum*, and *S. rhois* as independent species. Furukawa & Aoshima (1969: 144) took pains to demonstrate the alleged difference between *S. ochraceum* and *S. rhois* by placing the characters of both species side by side

in a table. They found the former to be characterized among other things by the lack of a stipe, woolly-haired pileus, and dimitic context; the latter by the presence of a stipe, stiff-haired pileus, and trimitic context. As regards the presence or absence of a stipe, this matter is dealt with below. In the redescription of the type (p. 540) the pileus of *Hydnum rhois* is shown to be sericeous but fringed with stiff hairs along the margin. This kind of pileal covering can equally well be found in typical specimens of *S. ochraceum* but simple observation shows that this covering undergoes drastic changes with age and by different external conditions. The question of the trinity of the context is discussed in the chapter 'Hyphal construction' (p. 446).

The following is an attempt at unravelling the tangle but it should be realized that the approach has been made from the conventional point of departure—the desk of the herbarium worker. It would certainly be more convincing if the theory could also be proved by experiments or cultures.

The investigation included the study of the following material: —

1. *Hydnum rhois*, part of type (K).
2. *Hydnum dichroum*, holotype (L).
3. *Hydnum flabelliforme*, holotype (K).
4. *Hydnum rhois* / *H. flabelliforme*, Carol. austr., M. A. Curtis (Herb. E. Fries, UPS).
- 5a. *Hydnum flabelliforme*, Ohio, dedit Berkeley (Herb. E. Fries, UPS).
- 5b. Another specimen, the same data.
6. *Hydnum rhois* / *H. flabelliforme*, Pennsylvania, misit M. A. Curtis (Herb. E. Fries, UPS).
7. *H. flabelliforme*, S. Carol., M. A. Curtis (Herb. E. Fries, UPS).
8. "*Mycoleptodon reflexus*", No. 488519, Carpatorossia, Trebušany, Aug. 1937, A. Pilát (UPS).
9. "*Mycoleptodon reflexus*", No. 488064, Carpatorossia, Trebušany, Aug. 1937, A. Pilát (UPS).
10. "*Mycoleptodon reflexus*", Asia orientalis, Distr. Amur, 28 July 1928, Krawtzev (Herb. Donk 5168, L).
11. *Hydnum rhois*, Illinois, Metropolis, 27 Oct. 1919, C. J. Humphrey 9593 (Herb. Donk, L).
12. *Steccherinum rhois*, Louisiana, Baton Rouge, 29 Dec. 1957, B. Lowy (L).
13. *Steccherinum rhois*, Great Smoky Mountains National Park, 11 Sept. 1935, A. J. Sharp (L).
14. *Steccherinum ochraceum*, France, Lougres, 14 Oct. 1955, H. S. C. Huijsman (L).
15. *Steccherinum ochraceum*, Netherlands, 's-Graveland, 18 Oct. 1958, J. Daams (L).
16. *Steccherinum ochraceum*, Netherlands, The Hague, 30 Sept. 1965, Miss J. M. Koutstaal (L).
17. *Steccherinum rhois*, U.S.A., North Carolina, Chapel Hill, Glen Barnet, 14 Oct. 1911, W. C. Coker 87 [apparently revised by Banker] (NCU).
18. *Steccherinum rhois*, U.S.A., North Carolina, Chapel Hill, Prof. Howell's yard, 10 Dec. 1914, W. C. Coker 1511 (NCU).
19. *Steccherinum rhois*, U.S.A., North Carolina, Chapel Hill, Battles Park, 22 Jan. 1920, H. R. Totten, No. 4000 (NCU).

At the outset it should be made very clear that owing to the paucity of the types and other authentic specimens usually only one spine in each case was sacrificed in order to gather information on spores and cystidia. This may explain why at first the impression was gained that the concentration of cystidia at the tip of the spine and the slenderness of the spores were features characteristic of *Hydnum rhois* (No. 1). The specificity of this combination of characters seemed the more plausible since it was also found in Nos. 5b and 7, and appears to be in striking contrast with the corresponding set of characters in Nos. 3, 4, and 5a. Doubt began to creep in when it was

found that cystidia, like those in No. 6, may be practically impossible to spot if they have lost their crystalline cover. This gave food to the supposition that perhaps the concentration of incrustated cystidia at the tip of the spine was attributable either to the cystidia in other parts of the spine having lost their crystals or to accidental disposition. Examination of a second spine of the same specimen in No. 5b satisfactorily answered this question: the distribution of the cystidia in the present species (or group of species) appeared to follow no definite pattern. As regards the slenderness of the spores, closer observation taught that the shape of the spore is at least in part dominated by its age, the younger spore being shorter, and consequently more broadly ellipsoid, than the older one. The difference in size, and in shape, of the spores may be exemplified by *S. ochraceum* of Nos. 14 and 16. The basidiome in No. 14 is mature and its spores measure  $3.6-4 \times 1.8-2 \mu\text{m}$ , while the basidiome in No. 16 is immature, with the spores c.  $3.1 \times 2 \mu\text{m}$ .

After it had become clear that the distribution of the cystidia and the shape of the spores (often immature in dried material) lack diagnostic value and vary independently of each other, nothing remained to distinguish *Hydnum dichroum* and *H. flabelliforme* from *H. rhois*, and the name of the latter would thus cover all specimens of Nos. 1-13 which have a flabelliform pileus in common.

Two thirds of Banker's knot having been untied, there now remained to decide on the relation between *S. rhois* and *S. ochraceum*. At first it had seemed to me that the two were perfectly good species, the more so after, in the types of Nos. 1 and 3, a dark line had been discovered that separated the tomentum from the firmer flesh of the pileus and seemed to be lacking in several collections of *S. ochraceum*. Subsequently a faint dark line was found in some pilei of No. 17 and in the reflexed portion of the basidiome of an indubitable *S. ochraceum* (No. 15), whereas there was none in No. 2. It would now seem that the shape of the basidiome constituted the sole difference between *S. ochraceum* and *S. rhois*, a difference that seemed clear enough in unconsciously or judiciously manipulated collections. 'Manipulation' may be quite unconscious in that it consists of the removal of some portions of the basidiome considered superfluous, anomalous, or ungainly; but it is also possible that the collector judiciously brings out a certain character by leaving out every non-conforming specimen. These are considerations to be reckoned with and they certainly helped change my views on the relation *S. ochraceum*—*S. rhois*. The turning-point hinged on two collections, Nos. 15 and 14, both clear examples of *S. ochraceum*.

No. 15 indicates that the development of the reflexed portion of the basidiome is controlled not only by age but, probably to a great extent, by the relative position of the fungus to its substratum. The underside of a fallen stick projecting obliquely from the ground would exclusively bear effused parts of a basidiome. Towards the sides of the stick reflexed pileoli would appear, justifying the qualification effused-reflexed. The upper side of the stick, finally, would bear imbricated pilei and, if indications are correctly interpreted, it would seem that the pilei have progressively smaller resupinate parts the nearer the stick approaches the vertical.

No. 14 is an example of the species found growing on partly decorticated wood of

a fallen branch. One side of the branch shows (Fig. 9) the effused-reflexed basidiome of the fungus, while somewhat higher on the branch three isolated pilei are attached to the wood. These pilei are conchiform and would have been named *Steccherinum rhois* if their apparent relation to the lower basidiome had gone lost. The pilei on the other side of the branch are much less clearly differentiated into two growth types but, since more is left of the original bark, its effect on the growth of the basidiome can be read with an even higher degree of plausibility. From the study of both Nos. 15 and 14 it would seem permissible to assume that a smooth surface of the substratum can only bear *S. ochraceum*, while obstruction (more especially of the kind that prevents the pilei from fusing laterally) favours the growth of *S. rhois*. Unfortunately there are comparatively few collections available that also contain a sufficiently large portion of the substratum to allow any conclusion to be drawn. The exceptions are Nos. 10, 11, 13, 18, and 19. In 10, 11, and 18 a pileus of the 'rhois' kind develops from a deep fissure or from beneath the bark. In No. 13 'rhois'-like pilei had apparently been hindered in the first stages of their growth by a vegetation of a moss and a lichen. No. 19 is an example of a substratum (bark of fallen beech) that by changing its position had induced several basidiomes to grow out into 'rhois'-like forms.

It is only reasonable to expect that environmental factors are not the sole formative element to determine the growth of a fungus. There is no doubt that the genetic potential plays a role. It is not possible, of course, to tell from a herbarium specimen in what proportion each factor has affected the eventual shape of the basidiome. It would seem, however, that at least under certain conditions great emphasis lies on the formative influence of the substratum. It is for this reason that I decide against the acceptance of *Steccherinum rhois* as a separate species.

After this lengthy discourse it is certainly amusing to realize that this is the very same conclusion to which Lloyd (1921: 1084), irascible in his expressions as usual, had come already fifty years ago.

MYCOLEPTODON ROBUSTIOR John Erikss. & Lundell  
apud Lundell & Nannf. (p. 513)

Basidiome by confluence covering several cm<sup>2</sup>, effused, but with tendency of forming reflexed parts; margin of effused part easily separable; adhymental surface tomentose-membranous, smooth to areolate or slightly alveolate, brownish flesh colour, this colour vividly contrasting with fairly broad, white to cream, fimbriate margin; abhymental surface tomentose, delicately pale brownish orange. Spines up to 2 mm long, 0.1–0.2 mm broad, crowded, subulate to cylindrical or flattened, straight or somewhat flexuous, broader when confluent, pubescent to scabrous, of a vivid brownish flesh colour, dingy salmon, tip fimbriate, paler. Context about 0.2 mm thick, whitish flesh colour.

Context dimittic, consisting of generative and skeletal hyphae. Generative hyphae 3–4.5(–5.4)  $\mu$ m wide, not inflating, thin-walled to moderately thick-walled, branched, septate, with clamp-connections. Skeletal hyphae 4.5–7.2  $\mu$ m wide, thick-walled to solid, straight or flexuous, occasionally kinked or branched. Context of spines similar. Basidia 15–19  $\times$  4.5–5.5  $\mu$ m, clavate, 4-spored, with sterigmata 3.6–4.5  $\mu$ m long,

with basal clamp. Spores  $4-4.5 \times 2.7-2.9 \mu\text{m}$ , ellipsoid, adaxially flattened, smooth, colourless, with small oblique apiculus. Cystidia  $4.5-14 \mu\text{m}$  wide, evenly distributed over spine, although often scarcer or absent at tip, incrustated.

#### HYDNUM RUBICUNDUM Willd. (p. 517)

Persoon (1825: 203) in *Mycologia europaea* thought that *Hydnum rubicundum* Willd. was perhaps the same as *Sistotrema violaceum*. Fries (1830: 522) misusing the name as *Hydnum purpureum* Willd. regarded the species as identical with his own *Hydnum subcarnaceum*. Whereas it appears impossible to identify this last name with any degree of certainty, there would seem to me to be no serious objection to accepting *H. rubicundum* as identical with *S. ochraceum*.

#### 2d. EXCLUDED OR INSUFFICIENTLY KNOWN TAXA

Under this heading are assembled the names of the fungi which have been described in, or transferred to, *Steccherinum* but appear to belong elsewhere. Apart from these, many more species are discussed because of their suspected relation to *Steccherinum*. It happened often enough, however, that investigation showed the species concerned to be totally unrelated. Such cases must be put down to the difficulty of evaluating the original description. While it is now clear to me that I have asked on loan the types of an unnecessary great number of species, there still remains the probability of having overlooked others.

*a d u s t u l u s*. — *Steccherinum adustulum* Banker in Mem. Torrey bot. Club **12**: 133. 1906. — *Hydnum adustulum* (Banker) Sacc. & Trott. in Syll. Fung. **21**: 370. 1912. — Syntype: "New York, Mohawk, summer [18]90, Mrs. W. C. Lobenstine" (NY).

Banker, after having seen collections of *Hydnum pusillum* at Uppsala withdrew the name *Steccherinum adustulum* in favour of *S. pusillum*. Maas Geesteranus (1962: 399) confirmed that there was no difference between the two species except for the fact "that the American material possesses clamp-connections, which are absent from the European material." A satisfactory explanation of this difference has not been given.

*a d u s t u s*. — *Hydnum adustum* Schw. in Schr. naturf. Ges. Leipzig **1**: 103, pl. 2 figs. 7-9. 1822. — *Steccherinum adustum* (Schw.) Banker in Mem. Torrey bot. Club **12**: 132. 1906. — *Mycoleptonoides adusta* (Schw.) Nikol. in Bot. Mater. Inst. spor. Rast. **8**: 120, figs. 2, 3, pl. 44. 1952. — *Mycorrhaphium adustum* (Schw.) Maas G. in Persoonia **2**: 394. 1962. — Type: not known to be in existence, represented by von Schweinitz' pl. 2 figs. 7-9.

This was made the type species of the genus *Mycorrhaphium*, which differs from *Steccherinum* in the lack of skeletal hyphae in the context of the pileus.

*agaricoides*. — *Hydnum agaricoides* Sw., Nova Gen. Spec. Pl.: 149. 1788; Fl. Ind. occ. 3: 1927. 1806. — *Hydnum discolor* Fr., Syst. mycol. 1: 411. 1821 (name change). — *Steccherinum agaricoides* Sw. ex Banker in Mem. Torrey bot. Club 12: 130. 1906. — *Creolophus agaricoides* (Sw. ex Banker) Banker in Mycologia 5: 294. 1913. — Type locality: Jamaica.

Banker (1913: 294) held the view that the material of Murrill & Harris 1095 collected in Jamaica (and now preserved in NY) represented *Hydnum agaricoides*, since it "appears to answer in every essential feature the descriptions of Swartz and of Berkeley." The description of the last named author is irrelevant here, while the diagnosis of Swartz indicates two characters of the original material that do not tally with the specimen collected by W. A. Murrill and W. Harris. Swartz described his fungus as smooth and bicolorous ("laeve pallidum, subtus ferrugineum"), whereas the note accompanying Murrill & Harris 1095 reads "white thro out hirsutetomentose above." On account of these discrepancies the identification of Swartz's fungus with Murrill & Harris 1095 (which actually represents *Climacodon pulcherrimus*!) would seem too much of a speculation. Also the connection with *Steccherinum reniforme*, a species known to occur in Jamaica, is too slight for complete certainty. Therefore, *Hydnum agaricoides*, and consequently *H. discolor*, must remain a nomen dubium.

*analogus*. — *Hydnum analogum* Berk. apud Cooke in Grevillea 20: 1. 1891. — Holotype: "*Hydnum analogum*, B. / Neilgherries 1869. E. S. B." (K).

A pencil-written annotation accompanying the type packet reads "no noteworthy characters seen." The original hydneous fungus has been completely overgrown by a mould which produced cadmium yellow spores. Berkeley's description concerns two discordant elements belonging to different species, consequently the specific epithet must be rejected (Art. 70 of the Code).

*annamensis*. — *Mycoleptodon annamensis* Har. & Pat. in Bull. Mus. natn. Hist. nat. 20: 154. 1914. — Holotype: "*Mycoleptodon annamense* P. et H. / Annam / M. Eberhardt" (FH).

Holotype consisting of a basidiome (or, more probably, of only a fragment of a basidiome) crudely torn from its support, and made up of several imbricate pileoli, the whole measuring 45 × 25 mm. Pileoli narrow-spathulate, repeatedly branched and slit into 3–5 mm wide, strap-like lacinae, appearing even narrower because of tendency of sides to curl upwards; surface in places radiately wrinkled, otherwise smooth, glabrous, somewhat shiny, dark red-brown; margin somewhat broadened, flabelliform, more or less deeply incised, glabrous, red-brown to orange-brown. Spines up to 1 mm long, 0.1–0.2 mm broad, decurrent, exceedingly crowded, subulate, terete or flattened, minutely puberulous, ochraceous yellow-brown, with acute tip. Context up to 1.5 mm thick, horny and blackish, torn strands ragged-fibrillose and brownish.

Context monomitic, consisting of generative and connecting hyphae (possibly also tendril hyphae). Generative hyphae 3.6–6.3 μm wide, not inflating, thin-walled to

solid, branched, septate, with single clamp per septum. Context of spines similar. Basidia not discernible. Most spores seen probably being alien conidiospores ( $2.7-3.6 \times 2.2-2.9 \mu\text{m}$ ). Cystidia  $3.6-7.2 \mu\text{m}$  thick, numerous, evenly distributed over entire spine, more or less projecting, thickly incrustated (strikingly resembling those in *Steccerinum*), cylindrical or somewhat fusiform in distal part, thick-walled to solid, with acute apex or mucronate. Crystalline matter dissolving completely in KOH.

From the characters indicated above it is clear that the present species is a member of *Climacodon*. It is less easy to decide, however, whether or not it is one of the known species (Maas Geesteranus, 1971: 132). Nothing is known of the texture of the upper surface of the pileus (which seems to have collapsed owing to bad drying technique), of its colour, and of the spores. On the other hand, taking account of the few features that can be checked (pileus lobes deeply slit into narrow laciniae, thin context not more than 1 mm thick, thick-walled to solid *Steccerinum*-like cystidia completely covered with crystalline matter, which dissolves in KOH), it appears that this combination of characters removes the species from the others. Consequently, ***Climacodon annamensis*** (Har. & Pat.) Maas G., *comb. nov.* (basionym: *Mycoleptodon annamensis* Har. & Pat., l.c.) is here formally accepted as the seventh species of this genus.

*balloui*. — *Steccerinum balloui* Banker in Bull. Torrey bot. Club **36**: 341, pl. 24. 1909. — *Radulum balloui* (Banker) Lloyd, Mycol. Writ. **3** (Lett. 29): 1. 1910. — *Hydnum balloui* (Banker) Sacc. & Trott. in Syll. Fung. **21**: 370. 1912. — Holotype: not seen (NY).

Gross (1964: 5) transferred this species to *Echinodontium*, a genus characterized by perennial basidiomes and strongly amyloid spores. Apart from these two features the present species has a woody context and a stratified subhymenium, both of which are not characters of *Steccerinum* either. A further and most distinctive feature of *Echinodontium balloui* is that this species is known only as a parasite of *Chamaecyparis* (see also Stevens, 1913: 416).

*cervinus*. — *Hydnum cervinum* Berk. in Hook., Fl. Tasm. **2**: 256. "1860" [1859]; not *Hydnum cervinum* Pers., Mycol. eur. **2**: 158. 1925. — Holotype: "*Hydnum cervinum*, B. / Tasmania" (K).

On a slip of paper attached to the type packet Dr. D. A. Reid has made the suggestion "I suspect a member of the Tremellales." Cunningham (1953: 279) stated that it "appears to be a portion of a *Grandinia*." Neither supposition is capable of being verified as the material lacks basidia and spores.

*cesatii*. — *Hydnum cesatii* Berk. apud Cesati in Atti Accad. Sci. fis. mat., Napoli **8**(3): 9. 1879. — *Odontia cesatii* (Berk. apud Cesati) Rick in Egatea **18**: 43. 1933. — Holotype: "Suppl. 4 / *Hydnum membranaceum* Bull. / Sarawak / *Hydnum Cesati*, B." (K).



Basidiome effused, closely adnate to substratum, smooth, shiny, ochraceous to warm yellow-brown. "Spines" up to 2 mm long, 0.2–0.3 mm broad, distant, irregularly disposed, simple or forked, terete and dark red-brown, or fusiform and concolorous with subiculum.

Context monomitic, made up of 2.7–5.4  $\mu\text{m}$  wide, very much tangled hyphae, which are thick-walled to solid, flexuous to kinked, rarely divaricately branched and, as far as could be ascertained, without septa. Spores not seen.

A slip of paper is stuck to the package with the indication "*= H. sclerodontium*, B. & Mont." written in pencil. *Hydnum sclerodontium* was described by Montagne & Berkeley (in London J. Bot. 3: 333. 1844) from Java. There is such a remarkable correspondence of their description to the type of *H. cesatii* that I have no doubt as to the accuracy of the pencilled indication. In this connection also it is interesting to note that Boedijn (1940: 382) never succeeded in finding spores in his material of *H. sclerodontium*.

Lloyd at first suggested that *H. sclerodontium* was better placed in *Pterula* (Mycol. Writ. 6: 931. 1920), later he became convinced that the species belonged to that genus (Mycol. Writ. 7: 1153, fig. 2247. 1922; 7: 1340, fig. 3123. 1925). As far as the type of *H. sclerodontium* is concerned, he may well be right, but Corner (1950: 536) observed that "The Malayan specimens, so named by Lloyd, are a Tremellaceous fungus, for which I have not found a genus."

*chariensis*. — *Mycoleptodon chariensis* Har. & Pat. in Bull. Mus. natn. Hist. nat. 15: 91. 1909. — Holotype: "*Mycoleptodon chariensis* n. sp. / Chari / Chevalier / 11492" (FH).

Basidiome consisting of fragment measuring c. 20 × 10 mm, effused. Adhymenial surface minutely furfuraceous, white to yellowish. Spines up to 1 mm long, 0.1–0.2 mm broad, crowded in some places, distant in others, subulate, terete or flattened, straight or flexuous, tuberculate, yellowish flesh colour, with concolorous tip. Context soft, friable, white.

Context monomitic, consisting of generative hyphae thickly covered in crystalline matter. Generative hyphae 2.2–4.5  $\mu\text{m}$  wide, slightly inflating, occasionally somewhat constricted at septa, thick-walled (cell-walls up to 1.3  $\mu\text{m}$  thick), branched, septate at short intervals, with clamp-connections. Context of spines similar, generative hyphae thick-walled to almost solid. Basidia collapsed. Spores not seen. Cystidia none.

The monomitic construction of the context and the lack of cystidia are sufficient proof that the present species does not belong to *Steccherinum*.

*cirrhatus*. — *Hydnum cirrhatum* Pers. in Neues Mag. Bot. 1: 109. 1794 ("*cirrhatum*"); ex Fr., Syst. mycol. 1: 411. 1821. — *Creolophus cirrhatus* (Pers. ex Fr.) P. Karst. in Meddn Soc. Fauna Fl. fenn. 5: 41. 1879; Finl. Basidsv.: 144, pl. 7 fig. 100. 1899. — *Dryodon cirrhatus* (Pers. ex Fr.) Quél., Ench. Fung.: 193. 1886. — *Pleurodon cirrhatus* (Pers. ex Fr.) Ricken, Vadem. Pilzfr.: 241. 1918. — *Heridium cirrhatum* (Pers. ex Fr.) Nikol. in Trudy bot. Inst. Akad. Nauk SSSR (II Spor. Rast.) 5: 343. 1950. — *Steccherinum cirrhatum* (Pers. ex Fr.) Teng, High. Fungi China: 433, 763. 1964. — Type locality: Germany.

From the redescription given in an earlier paper (Maas Geesteranus, 1962: 381) it is clear that the present species has no connection with *Steccherinum*.

*cohaerens*. — *Hydnum cohaerens* Berk. & Curt. *apud* Cooke in Grevillea 20: 1. 1891. — Holotype: "*Hydnum cohaerens* B. & C. / No. 133 Venezuela" (K). — Figs. 21–23.

Basidiome about 22 × 15 mm, effused, not easily separable, consisting of a felted, pale ochraceous subiculum, which tends to form stolons. Spines confined to isolated patches scattered over subiculum, up to 0.9 mm long, 0.1 mm broad, crowded to subsistant, subulate, terete, pruinose, ochraceous or slightly flushed flesh colour, tip entire.

Context monomitic, consisting of generative hyphae. Hyphae 3.6–4.5  $\mu$ m wide, thick-walled (cell-walls up to c. 1  $\mu$ m thick), much branched, frequently anastomosing, septate, with clamp-connections. Context of spines similar, hyphae thinner-walled. Basidia 3.6–4.5  $\mu$ m wide, not easily separable, clavate, with constriction in middle, 2–4-spored. Sterigmata 2.7–3.6  $\mu$ m long. Spores 3.1 × 1.8–2.2  $\mu$ m, adaxially flattened, finely echinulate, colourless, not amyloid or cyanophilous. Cystidia none, but tip of spine made up of sterile, variously formed hyphal ends. Spines covered with scattered clumps of crystalline matter.

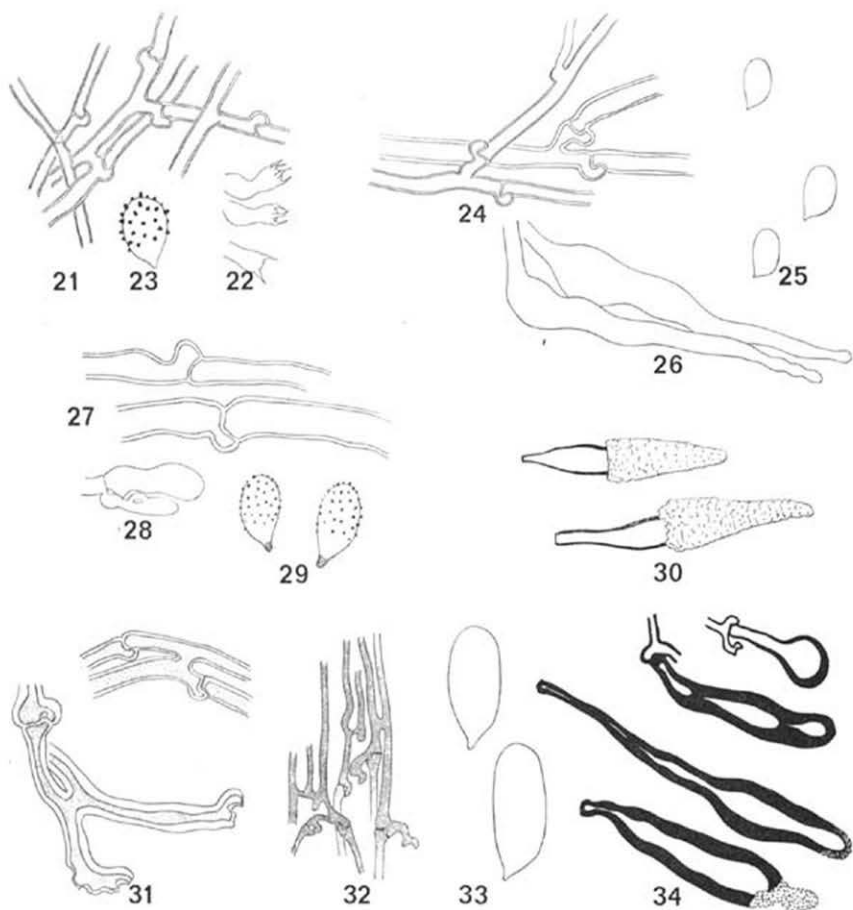
This seems to be a species of *Cristella* Pat., although I failed to find the characteristic, inflated portions of the hyphae at the septa. In this connection attention may be drawn to the monotypic genus *Byssochristella*, recently erected by M. P. Christiansen & J. E. B. Larsen (1970: 313) and stated to differ from *Cristella* in the lack of ampullaceous swellings. It does not seem permissible, however, to conclude that *H. cohaerens* automatically belongs to *Byssochristella*. First, the differences between *H. cohaerens* and the type species of the new genus may well turn out to be of fundamental significance. Secondly, the lack of swellings to the hyphae may prove an insufficient basis to warrant generic separation.

*conchatus*. — *Hydnum conchatum* Fr. in Nova Acta reg. Soc. Sci. upsal. III 1: 106. 1851. — Type locality: Hawaiian Islands, Oahu.

Since Fries' description seems to apply equally well to species of both *Stecchericium* and *Steccherinum* (Maas Geesteranus, 1967a: 52), the specific epithet must remain a nomen dubium.

*corneus*. — *Mycoleptodon corneus* Pilát in Bull. trimest. Soc. mycol. Fr. 49: 306, fig., pl. 18 fig. 2. 1934. — *Steccherinum corneum* (Pilát) Parm., Consp. Syst. Cortic.: 173. 1968. — Holotype: "*Mycoleptodon corneum* Pilát / *Prunus Padus* / Sibiria. Distr. Toms / Ad fl. Tschulym / IX. [19]31 / Krawtzev" (PR 156145).

In some respects Pilát's description is likely to give an incorrect impression of this fungus. The context was said to be made up of "hyphis . . . brunneis . . . haud septatodosis." Actually, the brown colour seems to have been caused by advanced age and slow drying, while the hyphae possess clamps at all septa. The structure of the context is monomitic, the generative hyphae are thin- to thick-walled, occasionally



Figs. 21-23. *Hydnum cohaerens* (holotype). — 21. Generative hyphae of the context. — 22. Basidia. — 23. Spores. (Figs. 21, 22,  $\times 700$ ; Fig. 23,  $\times 2800$ .)

Figs. 24-26. *Hydnum dissitum* (syntype, Trail 76). — 24. Generative hyphae of the context. — 25. Spores. — 26. Gloeocystidia. (Figs. 24, 26,  $\times 700$ ; Fig. 25,  $\times 1400$ .)

Figs. 27-29. *Hydnum informe* (holotype). — 27. Hyphae of the tomentum taken from the base of the basidiome. — 28. Basidia. — 29. Spores. (Figs. 27, 28,  $\times 700$ ; Fig. 29,  $\times 1400$ .)

Fig. 30. *Hydnum webbii* (holotype). — Incrustated subhymenial cystidia ( $\times 700$ .)

Figs. 31-34. *Hydnum setulosum* (holotype). — 31. Generative hyphae of the context. — 32. Lumina of generative hyphae in a spine, showing the complex construction. — 33. Spores. — 34. Cystidia after treatment in KOH. (Figs. 31, 32, 34,  $\times 700$ ; Fig. 33,  $\times 2800$ .)

even almost solid. It is on account of these features that the species is here excluded from *Steccherinum*.

Nikolajeva (1964: 170) placed this species in the synonymy of *Mycoleptodon fuscoater* (which is actually a *Mycoacia*), an interpretation which seems to be correct in view of the presence of thin-walled subulate cystidia in addition of the incrusted hyphal ends at the tip of the spine.

*crassiusculus*. — *Steccherinum crassiusculum* K. Harrison in Can. J. Bot. **42**: 1207. 1964. — Type: not seen.

The following information can be summarized from the original description: context greyish near the margin of the pileus, darker towards the centre and in the stipe, monomitic; generative hyphae with clamps; spores finely verrucose; cystidia lacking. The author of the species observed that his fungus did not seem to have "a close relationship with any of the numerous genera recently proposed by European workers for many of the various species in the genus *Steccherinum* (sensu lato)." His species, is not a *Steccherinum*, the generic name should have been used between quotation marks.

*dentiger*. — *Mycoleptodon "dichroum f. dentigerum"* Malençon in Bull. trimest. Soc. mycol. Fr. **73**: 330, 318. 1958 (corrected f. *dentiger*, in Index Fungi **2**: 440. 1958). — Holotype: "2044 / *Mycoleptodon dichroum* fa. *dentigerum* nob. / sur rameaux morts de *Cytisus Battandieri* / cédraie de Melcaïd, au-dessus d'Azrou (M.A.) alt. ±1850 m / 23 Avril 1951" (MPU).

Malençon supplied a very detailed French description, a significant detail of which is the part where the hyphae are stated to have "parois tenaces ou solides et cloisons bouclées." This is exactly what characterizes his fungus: a monomitic context made up of thin- to thick-walled or even solid hyphae with clamps to the septa. On account of this character forma *dentiger* is here excluded from *Steccherinum* and tentatively referred to the genus *Radulomyces* M. P. Christ.

While discussing this taxon in a former paper (Maas Geesteranus, 1963: 455), the name was inadvertently changed into f. *setiger*, an unaccountable error.

*denudatus*. — *Hydnum fimbriatum*  $\beta$  *denudatum* Pers., Mycol. eur. **2**: 187. 1825. — Type locality: Europe.

This variety is not represented by any material in Herb. Persoon so that its true identity must remain obscure.

*discolor*. — *Hydnum discolor* Fr., Syst. mycol. **1**: 411. 1821.

For a discussion, see under *agaricoides*.

*dissitus*. — *Hydnum dissitum* Berk. & Cooke in J. Linn. Soc. (Bot.) **15**: 387. 1876. — *Odontia dissita* (Berk. & Cooke) Rick in Egatea **18**: 46. 1933; in Iheringia

(Bot.) No. 5: 159. 1959. — Syntypes: (1) "4/12/74 *Hydnum dissitum* B. & Cooke / Camana / Trail 94" and (2) "*Hydnum dissitum* B. & Cooke / Brazil / Trail 76" (K). — Figs. 24–26.

Basidiome about 40 × 28 mm, effused, partly separable, felted to subceraceous, more loosely fibrillose to almost byssoid towards margin, pale ochraceous with slight brownish hue. Spines up to 1.5 mm long, 0.1–0.2 mm broad, some with base enlarged up to 0.5 mm, distant, subulate, terete, finely pruinose, ochraceous flesh colour, tip entire or fimbriate. Context soft, pale ochraceous, resting on spongy, brownish subiculum, not amyloid.

Context monomitic, consisting of generative hyphae. Hyphae 2.5–7.2 μm wide, not inflating, thin- to thick-walled (cell-walls up to 1.3 μm thick), branched, septate, with clamp-connections, copiously filled with oily matter. Context of spines similar. Basidia 15–18 × 3.6 μm, immature, cylindrical-clavate, with basal clamp. Spores 5.2–5.4 × 3.4–3.6 μm (possibly not mature), ellipsoid, adaxially flattened, smooth, fairly thick-walled, with a small oil drop, strongly amyloid. Gloecystidia 6–12.5 μm wide in ventricose part, 2.5–3.6 μm wide at tip, thin-walled, numerous, very conspicuous, projecting up to c. 20 μm beyond basidia, densely filled with oily matter, which stains deep wine red, finally even violet-black, in sulpho-anisaldehyde.

The two syntypes mentioned above are identical and it is merely its better general appearance that decided in favour of Trail 76 being redescribed.

The genus that answers to the above description is *Dentipellis*; the following recombination is accordingly proposed: ***Dentipellis dissita*** (Berk. & Cooke) Maas G., *comb. nov.* (basionym: *Hydnum dissitum* Berk. & Cooke, l.c.).

The vinaceous discolouration of the oily matter in the gloecystidia is in keeping with the experience related in a former paper (Maas Geesteranus, 1971: 63).

To judge from a collection of *D. separans* (Peck) Donk (1962: 235) in Herb. Donk (collected by L. W. Miller in North Liberty, Iowa, and identified by him as *Oxydonia macrodon*), this species would differ from *D. dissita* in thinner-walled hyphae of the context and slightly broader spores. It should be remembered, however, that the spores in the type material of *D. dissita* may not be fully ripe, as are those of Miller's collection. This would render a separation of the two species much more critical.

*fistulatus*. — *Steccherinum fistulatum* G. H. Cunn. in Trans. R. Soc. N.Z. 85: 598, fig. 6. 1958. — *Steccherium fistulatum* (G. H. Cunn.) D. Reid in Kew Bull. 17: 270. 1963. — Holotype: Australia, North Queensland, Stony Creek, June 1955, W. Pont (PDD 17709).

This species was shown to be inseparable from *Steccherium seriatum* (Lloyd) Maas G. (1971: 62).

*flavicans*. — *Hydnum flavicans* Bres. in Atti I. R. Accad. Sci. Agiati, Rovereto III 3: 95. 1897. — Holotype: "Fungi schemnitzzienses / *Hydnum flavicans* Bres. n. sp. / Subter corticem *Quercus* put. / Prenčow "na haj." 2 Decem. 1890 / Legit Andr. Kmet." (S); part of holotype (UPS).

The following microscopic details may be added to the somewhat meagre description given by Bresadola.

Context monomitic, made up of generative hyphae 2.7–5.4  $\mu\text{m}$  wide, thick-walled to solid, sparingly branched, septate, without clamps. Basidia immature, without clamps. Spores not seen. Cystidia none.

These features, although giving an incomplete redescription, go to prove that the present species is not a member of *Steccherinum*.

*f u s c e s c e n s*. — *Sistotrema fuscescens* Schw. in Schr. naturf. Ges. Leipzig 1: 102. 1822. — *Hydnum fuscescens* (Schw.) Spreng., Syst. Veg., Ed. decima sexta, 4(1): 482. 1827. — *Hydnoporia fuscescens* (Schw.) Murrill in N. Am. Fl. 9(1): 3. 1907. — ? Part of holotype: "*Hydnum fuscescens* / Salem / *Sistotrema* / Schweinitz" (Herb. E. Fries, UPS).

There seems to have been some uncertainty in connection with *Sistotrema fuscescens* Schw. (1822) and *Irpex fuscescens* Schw. (1832: 164; see p. 479) which, while actually representing the same fungus, were originally described as two separate species.

(1) Careful reading of both descriptions reveals several differences. (2) In describing his later *Irpex fuscescens*, von Schweinitz did not refer to an earlier publication, as he did in the case of *Irpex tulipiferae* and *I. cinerascens*. (3) Banker (1914: 233), who consulted the Schweinitz Herbarium, pointed out that it contained a specimen marked "580-7. Syn. Fung. *I. cinnamomeus* Epic. 19. *Irpex fuscescens* Schw. Beth." On the evidence presented above it seems justified to conclude that von Schweinitz was not aware of the relation between his *Sistotrema fuscescens* and *Irpex fuscescens*.

Banker, thinking that there was no type specimen of *S. fuscescens*, must have overlooked the material in Uppsala, which may well represent part of the original collection. The presence in the hymenium of very thick-walled, dark red-brown setae shows the fungus a member of the Hymenochaetaceae and, to be more precise, of *Hydnochaete* Bres. In this genus the correct name of the species is *Hydnochaete olivaceum* (Schw.) Banker (1914: 234), a redescription of which was recently published by Burdsall (1971: 240).

*f u s c o - a t e r*. — *Hydnum fusco-atrum* Fr., Novit. Fl. Suec. 2: 39. 1814; ex Fr., Syst. mycol. 1: 416. 1821. — *Hydnum castaneum* var. *atrofuscum* [sic!] (Fr. ex Fr.) Pers., Mycol. eur. 2: 188. 1825. — *Acia fusco-atra* (Fr. ex Fr.) P. Karst. in Meddn Soc. Fauna Fl. fenn. 5: 42. 1879. — *Odontia fusco-atra* (Fr. ex Fr.) Bres. in Atti I. R. Accad. Sci. Agiati, Rovereto III 3: 97. 1897. — *Mycocacia fusco-atra* (Fr. ex Fr.) Donk in Meded. Ned. mycol. Ver. 18-20: 152. 1931. — *Mycoleptodon fusco-ater* (Fr. ex Fr.) Pilát in Bull. trimest. Soc. mycol. Fr. 51: 401. 1936. — *Steccherinum fusco-atrum* (Fr. ex Fr.) Gilbertson in R. H. Petersen (Ed.), Evol. high. Basidiomyc.: 294. 1971. — Type locality: Sweden.

Guided by the presence of incrusting cystidia at the tips of the spines, Pilát was led to regard this species as a member of *Mycoleptodon*. This genus, however, now merged with *Steccherinum*, is characterized by the presence of skeletal elements in the context, whereas these are absent from the context of *Hydnum fusco-atrum*. The correct place of the present species is in *Mycocacia*, a disposition that has been almost universally recognized.

*gelatinosus*. — *Hydnum gelatinosum* Scop., Fl. carniol., Ed. 2, 2: 472. 1772; ex Fr., Syst. mycol. 1: 407. 1821. — *Steccherinum gelatinosum* (Scop. ex Fr.) S. F. Gray, Nat. Arrang. Br. Pl. 1: 651. 1821. — *Pseudohydnum gelatinosum* (Scop. ex Fr.) P. Karst. in Not. Sällsk. Fauna Fl. fenn. Förh. 9: 374. 1868. — Type locality: Yugoslavia.

For the full synonymy of this heterobasidiomycetous species the reader is referred to Donk (1966: 173).

*helvolum*. — *Hydnum helvolum* Zipp. ex Lév. in Anns Sci. nat. (Bot.) III 2: 204. 1844. — *Steccherinum helvolum* (Zipp. ex Lév.) S. Ito, Mycol. Fl. Japan 2(4): 197. 1955. — Holotype: "*Hydnum helvolum* Zp." (L 910.252-508).

Although there are thick-walled hyphae in the context of the type, they are not true skeletal. Also, several of the generative hyphae appear to have numerous secondary septa (Maas Geesteranus, 1967a: 54). Since these features are not known among the characters of *Steccherinum*, the transfer to this genus proposed by Ito is an error.

*herpetodon*. — *Hydnum herpetodon* Lév. in Anns Sci. nat. (Bot.) III 5: 145. 1846. — *Odontia herpetodon* (Lév.) Rick in Egatea 18: 45. 1933; in Iheringia (Bot.) No. 5: 158. 1959. — Holotype: "Planta Javanica a cl. Zollingero lecta. / No. 86 [crossed out] Z 2041 *Hydnum herpetodon* Lév. / Tjikoya" (PC).

Basidiome roughly 7.5-4 cm, much broken, effused, ceraceous, dull, dingy ochraceous to yellowish brown, alveolate, sides of alveoles grown out to form dentate plates and spines up to 2 mm long.

Context monomitic, consisting of generative hyphae, ruined by the use of mercuric chloride. Generative hyphae 2.7-3.6  $\mu$ m wide, slightly inflating, thin-walled, branched, very frequently anastomosing, septate, with clamp-connections. Basidia with basal clamp, collapsed. Spores not seen. Cystidia absent.

From the characters indicated above, it is clear that the present species is not a member of *Steccherinum*. It is not possible to offer a more positive suggestion.

*hololeucus*. — *Hydnum hololeucum* Pat. in Mém. Acad. malgache 9(6): 19, pl. 1 fig. 1928. — Type locality: Madagascar, Prov. de Diégo-Suarez, Sakaramy.

The type material of this species was reported absent from both FH and PC. Judged by the description given by Patouillard, who stated that cystidia were lacking, the probability of the species being a member of *Steccherinum* seems rather slight. On the other hand, cystidia may be difficult to find in old material, and in any case the possibility cannot be conclusively disposed of. *Hydnum hololeucum* must remain a nomen dubium.

*hypoleucus*. — *Hydnum hypoleucum* Berk. & Br. in J. Linn. Soc. (Bot.) 14: 60. 1873. — *Odontia hypoleuca* (Berk. & Br.) Rick in Egatea 18: 42. 1933. — Lectotype: "No. 179B. *Hydnum hypoleucum*, B. & Br. / Ceylon G. H. K. T [hwaites] Nov. 1867" (K).

Basidiome covering some cm<sup>2</sup> distributed over two bits of bark and wood, effused, arachnoid-floccose, pale ochraceous. Spines up to 0.6 mm long, 0.1–0.2 mm broad, crowded, cylindrical, smooth to verrucose-uneven, ochraceous.

Context monomitic, consisting of generative hyphae. Generative hyphae 1.8–3.1  $\mu$ m wide, not inflating, thin- to thick-walled, branched, septate, with clamp-connections. Context of spines also monomitic but strikingly different as generative hyphae are 2.7–5.4  $\mu$ m wide, and very thick-walled to almost solid. Basidia c. 13.5  $\times$  3.5–4.5  $\mu$ m, immature, with 4 incipient sterigmata in some, with basal clamp. Spores 2.8–3.1  $\times$  2.2  $\mu$ m, ellipsoid, echinulate with very small spines less than 0.5  $\mu$ m long. Cystidia absent.

Some of the characters of this fungus are so unusual that it may well represent an undescribed genus.

The type packet contains a second fungus, here designated No. 179A, which does not agree with the original diagnosis (“*aculeis brevibus . . . e strato . . . farinaceo tomentoso oriundis*”), and differs from *H. hypoleucum* among other things in having very conspicuous, incrusting cystidia. No. 179 A is not a *Steccherinum* as its context proves devoid of skeletal hyphae.

*in c a n u s*. — *Hydnum incanum* Lév. in *Annls Sci. nat. (Bot.)* III 5: 144. 1846. — Type locality: Brazil.

The original description at first sight suggests a *Steccherinum* or a *Stecchericum* so that it certainly is disappointing to learn that no material can be found in the herbarium at Paris.

In Rick's herbarium (PACA) there are three collections, Nos. 16518, 16521, 16581, under the name *Hydnum incanum*, all from [Santo do] Pinhal and all representing the same species. Whether these collections are conspecific with Lévillé's species is very difficult to say but the possibility cannot be excluded. If they are, the type of *H. incanum* would be a *Dentipellis*, and a most unusual one in view of its frankly pileate basidiome. The description of Rick's material, briefly, runs: basidiome pileate, 'rhois'-like. Context monomitic. Generative hyphae 2.7–5.4  $\mu$ m wide, thick-walled to almost solid, with clamp-connections. Gloeoplerous hyphae up to 6.3  $\mu$ m wide, very thick-walled. Spores 3.1–3.6  $\times$  2.2–2.7  $\mu$ m, thick-walled, ellipsoid, amyloid. Gloeocystidia 2.7–4.5  $\mu$ m wide, torulose at the tip.

*in f o r m i s*. — *Hydnum informe* Rick in *Egatea* 17: 2. 1932; in *Iheringia (Bot.)* No. 5: 143. 1959. — Holotype: “No. 16539. *Hydnum informe* Rick / Typus / S. Leopoldo / Rick” (PACA). — Figs. 27–29.

Holotype consisting of two fused squat basidiomes cut in half lengthwise. Pileus of larger specimen up to about 38 mm across, more or less plane, wrinkled, in some places tomentose or felted, for the greater part turned into glabrous, somewhat shiny pellicle, dingy yellow-brown to reddish brown. Margin blunt, very thick. Stipe hardly differentiated, hence basidiome turbinata. Adhymenial surface tomentose, bright ochraceous. Spines 1–1.5  $\times$  0.2–0.3 mm, decurrent, distant, simple, subulate, terete, concolorous with adhymenial surface. Context spongy-tough, fibrillose, indistinctly zoned, dingy ochraceous yellow-brown.



Context monomitic, made up of generative hyphae, 3.6–7.2  $\mu\text{m}$  wide, somewhat inflating, thin-walled (those taken from tomentum at base of basidiome moderately thick-walled, cell-wall up to 1  $\mu\text{m}$  thick), anastomosing, branched, septate, with large clamp-connections, more or less clearly constricted at septa. Basidia 25–30  $\times$  8–9  $\mu\text{m}$ , immature, clavate, with basal clamp (easily missed in later stages), a few seen with four incipient sterigmata. Spores 6.1–8.1  $\times$  4.3–5.2  $\mu\text{m}$ , broadly ellipsoid, adaxially flattened, finely verrucose-spinulose, with yellowish spore-wall and oily contents, with stout oblique apiculus, not amyloid, cyanophilous. Cystidia none.

From the original description of the spores, which were described as "leviter asperis," it was sufficiently clear that *H. informe* would have no relation with *Steccherinum*. It was not until actual examination, however, that the affinity of the species to *Beenakia* was elucidated. It is here formally transferred to that genus as ***Beenakia informis*** (Rick) Maas G., *comb. nov.* (basionym: *Hydnum informe* Rick, l.c.).

A green discolouration of the context in ferric sulphate solution was not observed.

The cyanophily of the spore-wall is rather weak and best observed in the ornamentation and in the base of the apiculus.

Close observation of the cut surface of the basidiome suggests that the context owes its firmness partly to the presence of connecting or, perhaps, tendril hyphae. The poor condition of the context, however, prevented these from being distinguished under the microscope.

The discovery in South America of a member of the genus *Beenakia* is of importance phytogeographically. It strengthens the belief that *Beenakia* is a genus of the southern hemisphere (compare Maas Geesteranus, 1967b: 80).

*i n t e g e r*. — *Hydnum ochraceum* var. *integrum* Alb. & Schw., *Consp. Fung.*: 268. 1805; *Hydnum ochraceum* \**integrum* Alb. & Schw. *ex Pers.*, *Mycol. cur.* 2: 177. 1825. — Type locality: Germany, Ober-Lausitz, Schöpswiesen.

In their description von Albertini & von Schweinitz stated that this variety was centrally stipitate and terrestrial. Although centrally stipitate basidiomes in *S. ochraceum* are rare, they do occur (see Fig. 11). They are not, however, known to grow on the ground. Unless variety *integrum* happened to grow on a bit of wood buried in the earth, of which there is no proof, this taxon is here excluded from *Steccherinum*.

*i n v e s t i e n s*. — *Hydnum investiens* Berk. in *J. Bot.*, London 4: 57. 1845. — *Mycocleptodon investiens* (Berk.) Boedijn in *Bull. Jard. bot. Buitenz.* III 16: 382. 1940 (misapplied). — *Steccherinum investiens* (Berk.) Boedijn in *Sydowia* 5: 213. 1951 (misapplied). — Holotype: "*Hydnum investiens*, Berk. / Swan River on Black Boys. no. 138" (K).

Basidiome measuring approximately 30  $\times$  13 mm, effused, partly poroid and partly irpicoid. Spines up to 1.5 mm long, 0.2–0.4 mm broad, crowded in places, subulate, terete or flattened and confluent to form 1 mm broad plates, smooth, with more or less fimbriate tip, ochraceous. Context soft, pale ochraceous.

Context monomitic, consisting of generative hyphae. Generative hyphae 3.5–8  $\mu\text{m}$  wide, inflating, thin- to thick-walled (cell-walls up to 1.5  $\mu\text{m}$  thick), infrequently

branched, septate, without clamp-connections. Context of spines similar. Basidia about  $13.5 \times 3.5 \mu\text{m}$ , immature, slender clavate, without basal clamp. Spores not seen. Cystidia absent.

This is some polyporaceous fungus, not related to either *Steccherinum* or *Irpex*.

Boedijn (l.c.) gave no description of the material on which he based his recombination but his collection from Krakatau (Boedijn 2758, in Herb. Donk) proves to belong to a very different species which has narrow, thin-walled, clamped hyphae and gloecystidia. The affinities of the latter species have not been further investigated but the fungus is not a *Steccherinum* either.

Patouillard redescribed a collection of what he considered to be *H. investiens* from Cambodia (1923: 53). The description contains too little information on essential data to ascertain the correctness of the identification.

*isidioides*. — *Hydnum isidioides* Berk. in Lond. J. Bot. 4: 58. 1845. — Type: not seen.

This was transferred by Reid (1956: 641) to the genus *Sarcodontia*.

*kavinae*. — *Mycoleptodon kavinae* Pilát in Bull. trimest. Soc. mycol. Fr. 51: 400, fig. 11, pl. 8 fig. 2. 1936. — *Steccherinum kavinae* (Pilát) M. P. Christ. in Dansk bot. Ark. 19(2): 328. 1960; Parmasto, Consp. Syst. Cortic.: 173. 1968 (recombination preoccupied). — Holotype: "*Mycoleptodon Kavinae* Pilát/ad ligna *Fagi silvaticae* in silvis supra Německá Mokrá, distr. Tiačovo Carpatorossiae, in alt. ca 1000 m.s.m. VII-1932. A. Pilát" (PR 496802).

Subiculum very thin, arachnoid. Adhymenial surface porous. Spines moderately crowded (certainly not "densissimi"). Context and spines dimitic, made up of generative and skeletal hyphae. Generative hyphae  $2.7-4.5 \mu\text{m}$  wide, some of them or sections of them inflated up to  $9 \mu\text{m}$ , without clamps. Skeletal hyphae  $2.7-6.3 \mu\text{m}$  wide, many with cross-walls, sometimes branched. Incrusted cystidia not found, all cystidia-like elements projecting beyond hymenium being more or less inflated generative hyphae, whereas the skeletal remain embedded.

The additional information given above should help the original description give a clear picture of the present species. The main points that prevent the present species from being included in either *Irpex* or *Steccherinum* are the thinness of the subiculum, the partially inflated generative hyphae, and the different construction of the spines.

No suggestion is here offered as to what genus the species might belong. It should be pointed out that the collection M. P. Christiansen 454 (in C), identified by Pilát as *Mycoleptodon kavinae*, is an entirely different species which keys out as *Phanerochaete*.

*lachnodontium*. — *Hydnum lachnodontium* Berk. apud Cooke in Grevillea 20: 2. 1891. — Holotype: "*Hydnum lachnodontium* B. / No. 17. / Neilgherries E. S. B." (K).

The type, consisting of a dense and compressed mass of woolly-hirsute, cinnamon brown, rather more *Ozonium*-like than spine-like excrescences, is so unlike a hyd-naceous fungus that any possible thought of a *Steccherinum* is immediately banished.

The mass is made up of a single kind of hyphae, which are 3.5–9  $\mu\text{m}$  wide, thick-walled (cell-walls yellowish, up to 2.7  $\mu\text{m}$  thick), and clamped. Spores are numerous, but do not seem to be basidiospores.

The sheet contains, apart from the type, a second envelope with two further specimens, which differ from the type as much as they do from each other. They have no relation to *Steccherinum* either.

*lateritius*. — *Odontia lateritia* Berk. & Curt. *apud* Berk. in Grevillea 1: 147. 1873. — Holotype: "No. 6084 / *Odontia lateritia* B. & C. / Alabama Peters in *Quercum* deject." (K).

Gilbertson (1965: 857) gave a redescription of this fungus, of which he later (1971: 303) said that "it could most logically be placed in *Steccherinum*." However, *Steccherinum* as defined in the present paper has a dimitic hyphal construction with skeletal hyphae in the context of both the pileus and the spines, whereas *Odontia lateritia* is monomitic. Peck regarded the species as identical with *Phlebia hydnoidea* Schw., a view later shared by Cooke (1956: 401).

*leptodon*. — [*Hydnum membranaceum* var. *dryinum* *sensu* Montagne in *Annl. Sci. nat. (Bot.)* II 3: 351. 1835. — *Hydnum leptodon* Mont. in *Annl. Sci. nat. (Bot.)* II 20: 366. 1843; *apud* Gay, *Hist. Chile (Bot.)* 7: 371. 1850; *Syll. Gen. Spec. cryptog.*: 173. 1856. — Holotype: "*Hydnum leptodon* Mtg!" (PC).

The material examined consists of two portions of (presumably) the same fungus, one representing the marginal area with scattered and short but fertile spines, the other densely beset with long, old, conglutinate, and partly moulded spines.

Basidiome effused, not easily separable from substratum, membranaceous-felted, pale cream. Spines up to about 10 mm long, 0.1–0.2 mm broad, pendent, crowded, very slender, smooth, faintly pruinose, brownish flesh colour. Context not amyloid.

Context monomitic, consisting of generative hyphae. Generative hyphae 2.7–4.5  $\mu\text{m}$  wide, with slight tendency to inflation in places, thin-walled, branched, septate, with clamp-connections. Context of spines similarly made up, generative hyphae somewhat narrower. Basidia difficult to discern, clavate. Spores 3.8–4.5  $\times$  2.7–3.1  $\mu\text{m}$ , ellipsoid, adaxial side flattened, punctate with minute warts, amyloid. Gloecystidia up to 6.5  $\mu\text{m}$  wide, very conspicuous.

On my request I received the above material for study but I was at first in doubt whether it really represented the type. The two fragments are glued to the back side of a used herbarium label which bears the indications "Herbarium Steudel" (in red ink) and "*Hydnum leptodon* Mtg!" (in pencil). Both are in a handwriting differing from each other and equally different from Montagne's. There is neither a reference to the collector, Carlo Bertero, nor to his collector's number, No. 1717. On the other hand, considering that Montagne's description fits the material very well (with the exception of the overall size, but it is possible, of course, that Montagne had retained only a portion of the material), we must, until proof is given to the contrary, accept its authenticity.

While most of the characters described above agree well with those of *Dentipellis*,

there is one — the punctate spore-wall — that reminds of some species of the corticoid genus *Gloeocystidiellum* Donk (1956b: 8). However, trying to force *H. leptodon* with its long and well developed spines into this genus, which is known to have "irregular minute teeth" at best, would certainly disturb the homogeneity of the generic picture. Inclusion, on the contrary, of a species with punctate spores in *Dentipellis*, a genus thus far known to be only smooth-spored, would introduce a character which is not too alien. *Dentipellis*, it should be remembered is a genus of the Hericiaceae, and in this family smooth and finely warted spores are known to occur even in the same species. *Hydnum leptodon*, therefore is here transferred to *Dentipellis* as ***Dentipellis leptodon*** (Mont.) Maas G., *comb. nov.* (basonym: *H. leptodon* Mont., l.c.). It differs from the type species, *D. fragilis* (Pers. ex Fr.) Donk (1962: 233) in the punctate, ellipsoid, and more slender spores.

*licentii*. — *Mycoleptodon licentii* Pilát in *Annls mycol.* **38**: 68, pl. 3 figs. 3, 4, 1940. — Holotype: "*Mycoleptodon licentii* Pilát / China: Mandchouria, Mao eull chan prope Charbin / 11 VIII 1928, E. Licent 1454" (PR 501089).

Pilát's original description requires some supplementary details for the species to be properly identifiable. Pileus not glabrous, as stated by Pilát, but minutely tomentose with glabrescent concentric zones. Upper surface, instead of "albis vel albidis, minime subbrunneis," definitely pale dingy ochraceous, with concentric zones of more yellowish brownish colour. Context of pileus monomitic, consisting of generative and tendril hyphae. Generative hyphae 3.6–5.4  $\mu\text{m}$  wide, not inflating, thin-walled, branched, septate, with clamp-connections, filled with oily matter near margin, empty farther back. Context of spines dimitic, consisting of generative and skeletal hyphae. Skeletal hyphae 2.7–5  $\mu\text{m}$  wide, thick-walled to solid, their tips not curved into hymenium. Basidia intermixed with protruding, oil-filled ends of ordinary generative hyphae, which behave like gloeocystidia.

These features clearly identify the species as *Mycorrhaphium adustum* (Schw.) Maas G. The material also bridges the gap that had seemed to exist between *M. adustum* and *M. species 1* (Maas Geesteranus, 1971: 157).

*ljubarskyi*. — *Mycoleptodon ljubarskyi* Pilát in *Bull. trimest. Soc. mycol. Fr.* **52**: 326, figs. 35, 38. 1937. — *Hydnum ljubarskyi* (Pilát) Zhuravlev in *Opred. nižs. Rast.* **4**: 146. 1956 (not validly published). — Holotype: "*Mycoleptodon Ljubarskyi* Pilát, typus! / *Acer Mono* / Asia orientalis. Schkotowo / 25. VIII. [19]35. Ljubarsky" (PR 25042); part of holotype (UPS).

The scantiness of the material at Uppsala made it advisable to treat it with more than usual economy. Instead of making an extensive hyphal analysis, operations were restricted to checking and confirming the original description. The only additional information that can be given is that in some of the hyphae of the subiculum there is a marked tendency to inflation, while the context lacks skeletal hyphae. From this information and the data supplied by Pilát it is obvious that *M. ljubarskyi* is not a *Steccherinum*. It seems to key out as a species of *Mycoacia*.

The description was subsequently checked once again with the holotype received on loan from PR at a much later date.

*luteo-pallidus*. — *Hydnum luteo-pallidum* Schw., Syn. Fung. Am. bor. (=in Trans. Am. phil. Soc., N.S. 4): 163. 1832. — (Part of?) holotype: "*Hydnum luteo-pallidum* Schwein! / Bethl. / Spec. ex Herb. Schwein. / Misit M. A. Curtis (Herb. E. Fries, UPS).

The partial microscopic redescription of the fragment at Uppsala runs as follows. Context monomitic, made up of generative hyphae. Hyphae 1.8–3.6  $\mu\text{m}$  wide, thin-walled or with slightly thickened cell-walls, branched, septate, with clamp-connections. Basidia up to 6  $\mu\text{m}$  broad, easily collapsed, with basal clamp. Spores 4.6–5.4  $\times$  4–4.7  $\mu\text{m}$ , broadly ellipsoid, smooth, colourless. Cystidia none.

From this it is obvious that *H. luteo-pallidum* does not belong to *Steccherinum*.

*microcystidium*. — *Mycolepton* "*microcystidius*" M. P. Christ. in *Friesia* 4: 329. 1953. — *Steccherinum microcystidium* (M. P. Christ.) M. P. Christ. in *Dansk bot. Ark.* 19(2): 324. 1960. — *Mycocacia stenodon* var. *microcystidium* (M. P. Christ.) Parm. in *Eesti NSV Tead. Akad. Toim. (Biol.)* 16: 388. 1967. — Syntype: "Sjaelland, Hareskoven, 5.10.1949, M. P. Christiansen 455, on *Fagus*" (C).

The author of the present species apparently considered the specific epithet ("microcystidius, -um") to be adjectival in form. This is not correct; it is a noun and should be used undeclined.

I have not examined the holotype as it was sufficiently clear from a study of the original description, followed by an investigation of the collection Christiansen 455 and four collections received on loan from the "Plantepatologisk Afdeling, Kgl. Veterinaer- og Landbohøjskole", Copenhagen (including part of a collection from Britain, redescribed by Reid, 1958: 437), that the species has no relation to *Steccherinum*. The hyphal structure is monomitic throughout and on account of this character the species seems best referred to *Hyphodontia*.

*minutissimus*. — *Steccherinum minutissimum* Snell & Dick in *Lloydia* 21: 35. 1958. — Holotype: "Cryptogamae yungenses et amazonicae (praec. Fungi) / *Stecc. minutissimum* sp. nov. / On very rotten wood / Carmen Pampa, Prov. Nor-Yungas, Dpto. La Paz, Bolivia / 1 II 1956 / R. Singer, no. B 810 / No notes, has hardly changed" (WHS 3147, BRU).

The following microscopic details may be added to the original description.

Context monomitic, consisting of generative hyphae. Generative hyphae 3.6–5  $\mu\text{m}$  wide, flexuous, made up of fairly short closely agglutinated elements (cells 30–40  $\mu\text{m}$  long, many inflating upwards), thin-walled, occasionally anastomosing, branched, septate, without clamp-connections, more or less constricted at septa, towards base of stipe giving rise to dense palisade of much shortened dark brown hyphae (cells 12–20  $\times$  5–6.5  $\mu\text{m}$ , moderately thick-walled, clavate to ventricose, simple or branched). Basidia without basal clamp. Spores not amyloid. Cystidia absent.

From the characters described above it is obvious that the present species does not belong to *Steccherinum*.

*multifidus*. — *Thelephora multifida* Kl. in *Linnæa* 25: 375. 1852. — *Hydnum multifidum* (Kl.) P. Henn. *apud* Bres. & al. in *Bot. Jb.* 17: 493. 1893. — *Steccherinum*

*multifidum* (Kl.) Banker in *Mycologia* 4: 317. 1912. — Type: "No. 14c. / *Thelephora* (*Merisma*) *multifida* Kl. / Portorico / Schwanecke" (B, according to Banker, l.c.).

This was shown by Fidalgo (1963: 715) to be the same as *Hydnopolyporus palmatus* (Hook. apud Kunth) O. Fidalgo. See also under '*plumarius*'.

**m u s c o r u m.** — *Hydnum ochraceum* var. *muscorum* Alb. & Schw., *Consp. Fung.*: 268. 1805; *Hydnum ochraceum* \**muscorum* Alb. & Schw. ex Pers., *Mycol. eur.* 2: 177. 1825. — Type locality: Germany, Ober-Lausitz, Jähkendorf.

This variety was said to be found spreading over *Fissidens sciuroides* ("Tota est resupinata, muscis superstrata"), a moss that grew on the bole of an old elm. It is certainly true that in *Steccherinum ochraceum* the margin of the resupinate portion of the basidiome is easily lifted from its substratum but otherwise the fungus is firmly attached to bark or wood, and not known to grow over mosses. The information supplied by von Albertini & von Schweinitz consequently suggests that their fungus is not related to *S. ochraceum*.

**m y c o p h i l u s.** — *Mycoleptodon mycophilus* Pilát in *Bull. trimest. Soc. mycol. Fr.* 51: 398, fig. 10, pl. 8 fig. 4. 1936. — Lectotype: "W 21 / Flora Sibirica / *Mycoleptodon mycophilus* Pilát sp. n. / Sibiria: Wasjuganje, ad corticem *Salicis* sp. et *Fomitum igniarium* I. X. 1934. Krawtzev" (PR 156143); syntype: W 83 (PR 156142).

The following discussion was mainly based on the original description but much later, on receipt of the type material, checked by examination of the microscopic details.

Although Pilát supplied but meagre information, some characteristic features can be pointed out. The margin of the basidiome is said to be fleshy-membranaceous, drying hard. The hyphae in the core of the spine, although shown without clamps, possess clamp-connections at all septa. The hyphal structure of the spine appears to be monomitic. Thick-walled cystidia are lacking, but certain elements called cystidioles are described as thin-walled and shown to be devoid of a crystalline cover, although the context is stated to be full of crystalline matter. To judge from these features, the species does not belong to *Steccherinum*.

Nikolajeva (1964: 170) considered this to be the same as *Sarcodontia stenodon* (Pers.) Nikol., which is a synonym of *Mycocacia stenodon* (Pers.) Donk. In view of the small, somewhat curved spores, characteristically provided with a small drop near one or both of the poles, I agree with this identification.

**n o t h o f a g i.** — *Odontia nothofagi* G. H. Cunn. in *Trans. R. Soc. N.Z.* 86: 88, fig. 14, pl. 10 fig. 4. 1959. — Holotype: "*Odontia nothofagi* G. H. Cunn. on *Nothofagus menziesii* / Otago, Woodlaw / November 1948 / G. B. Rawlings" (PDD 7281).

Since Cunningham treated *Odontia nothofagi* as the first species to follow *O. fimbriata*, of which he failed to mention the skeletal hyphae (see remark under this species, p. 510), and since his illustrations give but little information on the actual hyphal

construction, some closer investigation seemed advisable. However, the context in the type material appears to have a monomitic construction, being made up of thin-walled hyphae filled with a yellowish to brownish oily matter. The species, therefore, is not related to *Steccherinum*.

*ohiense*. — *Hydnum ohiense* Berk. in J. Bot., London 4: 307. 1845. — Holotype: "No. 41 / *Hydnum* sp. / *Hydnum Fernandesianum*, Mont. var. *ohiense*, Berk. / Resupinate, spreading on the underside of a rotting log, pale yellow, hymen: light brown March (rare)" (K).

Basidiome roughly 50 × 35 mm, effused, adhymental surface dingy ochraceous or yellow-brown. Spines up to 4 mm long, 0.1–0.2 mm broad, moderately crowded, subulate, terete, smooth, horny. Context about 0.5 mm thick, spongy-tough, yellow-brown.

Context monomitic, apparently treated with mercuric chloride, but showing little deterioration. Generative hyphae 1.8–2.7 μm wide, not inflating, thin-walled to moderately thick-walled, frequently branched, septate, with clamp-connections. Cell-walls yellow in transmitted light. Basidia not seen (apparently ruined by mercuric chloride). Spores 4.3–4.5 × 3.1–3.6 μm, few seen, broadly ellipsoid, smooth, somewhat thick-walled (2 spores), with very small oblique apiculus. Cystidia not seen.

The characters described above suggest that the species is a member of *Gyrodontium* Pat.

*pergameneus*. — *Hydnum pergameneum* Yasuda in Bot. Mag., Tokyo 33: (75). 1919 (Japanese text). — *Steccherinum pergameneum* (Yasuda) S. Ito, Mycol. Fl. Japan 2(4): 197. 1955. — *Creolophus pergameneus* (Yasuda) Imazeki apud Imazeki & Hongo, Col. Ill. Fungi Japan 2: 129, pl. 41 fig. 250. 1965. — *Mycoleptodonoides pergameneae* (Yasuda) Aoshima & Furukawa in Trans. mycol. Soc. Japan 7: 140. 1966. — Isotype: "No. 203,151 / *Hydnum pergameneum* Yasuda / Japan, Gunma Pref., Mt. Agaki, May 12, 1918, leg. K. Tsunoda" (TNS).

As pointed out earlier (Maas Geesteranus, 1971: 151) it seems doubtful whether the present species belongs at all to the homobasidiomycetous fungi. But even if that should prove the case, the species certainly is not a member of *Steccherinum* on account of its different microscopic construction.

*pithyophilus*. — *Hydnum pithyophilum* Berk. & Curt. in Hook. J. Bot. 1: 235. 1849. — Type: not seen.

Gilbertson (1965: 861–862) found the isotype (in FH) a typical specimen of *Odontia spatulata* (Schröd. ex Fr.) Litsch. Shortly afterwards this species was transferred to *Hyphodontia* first by Parmasto (1968: 123), then again by Gilbertson (1971: 300).

*plumarius*. — *Hydnum plumarium* Berk. & Curt. in J. Linn. Soc. (Bot.) 10: 324. 1868 (not *Hydnum plumarium* Berk. & Curt. apud Berk. in Grevillea 1: 97. 1873). —

*Steccherinum plumarium* (Berk. & Curt.) Banker in Mem. Torrey bot. Club **12**: 134. 1906. — Isotype: C. Wright 205 (FH).

Fidalgo (1963: 715) placed the name *Hydnum plumarium* (1868) in synonymy with *Hydnopolyporus palmatus*. Gilbertson (1965: 862), redescribing one of the isotypes, made no comment to this disposition. See also under 'multifidus'.

**pronus.** — *Hydnum pronum* Berk. & Br. in J. Linn. Soc. (Bot.) **14**: 59. 1873. — *Odontia prona* (Berk. & Br.) Rick in Iheringia (Bot.) No. 5: 161. 1959. — Holotype: "Ceylon / No. 975 *Hydnum decurrens*, B. & Br." (K).

Basidiome covering two pieces of wood, one 50 × 30 mm and the second 15 × 10 mm, effused, finely felted, pale dingy ochraceous. Spines up to 4 mm long and almost 1 mm broad, subdistant, cylindrical, almost full length adnate to adhymental surface or hardly raised above it, finely pruinose, slightly more brownish than adhymental surface, dark brown where bruised or abraded. Context up to about 2 mm thick, fairly soft, friable, pallid.

Context monomitic, consisting of generative hyphae. Hyphae 2.2–5.4 μm wide, inflating?, thin-walled, branched, septate, with clamp-connections. Context of spines similar. Basidia (immature) about 14 × 3.6–4.5 μm, slender-clavate, with basal clamp. Spores not seen with certainty. Gloecystidia 7–9 μm wide in ventricose part, gradually tapering to 4–5 μm wide, obtuse tip, originating in subhymenium or deeper in context.

The mercuric chloride used for poisoning has badly affected the material and renders the observation of microscopic structures very difficult.

This is not a *Steccherinum* but I can offer no suggestion as to what genus it might belong.

In the diagnosis given by Berkeley & Broome the number 975 and the locality Ceylon were mentioned, and both are to be found written in pencil on the piece of paper which bears the type. The words written in ink, *Hydnum decurrens*, B. & Br., are in strange contrast with the indication on the type cover, and the only reasonable explanation would seem to be that Berkeley later changed his mind but omitted to cross out the specific epithet *decurrens*.

**pulcherrimus.** — *Hydnum pulcherrimum* Berk. & Curt. in J. Bot. Kew Gdn Misc. **1**: 235. 1849. — *Steccherinum pulcherrimum* (Berk. & Curt.) Banker in Mem. Torrey bot. Club **12**: 129. 1906. — *Creolophus pulcherrimus* (Berk. & Curt.) Banker in Mycologia **5**: 294. 1913. — *Dryodon pulcherrimus* (Berk. & Curt.) Pilát in Bull. trimest. Soc. mycol. Fr. **49**: 315. 1934. — *Donkia pulcherrima* (Berk. & Curt.) Pilát in Bull. trimest. Soc. mycol. Fr. **52**: 328. 1937. — *Climacodon pulcherrimus* (Berk. & Curt.) Nikol. in Fl. sporov. Rast. SSSR **6**(2): 194. 1961. — Holotype: "*Hydnum pulcherrimum* B. & C. / No. 1648 / Santee River" (not seen, K).

The above gives a good impression of the various genera to which in the past the species has been assigned. Even in recent times the species is by some being maintained in the genus *Steccherinum*. Its hyphal construction and sporal characters, however, are clearly those of *Climacodon* (see Maas Geesteranus, 1971: 130).



*pusillus*. — *Hydnum pusillum* Brot., Fl. lusit. 2: 470. 1804; ex Fr., Syst. mycol. 1: 407. 1821. — *Leptodon pusillus* (Brot. ex Fr.) Quél., Ench. Fung.: 192. 1886. — *Steccherinum pusillum* (Brot. ex Fr.) Banker in Mycologia 4: 313. 1912. — *Pleurodon pusillus* (Brot. ex Fr.) Bourd. & Galz. in Bull. trimest. Soc. mycol. Fr. 30: 275. 1914. — *Mycoleptodon pusillus* (Brot. ex Fr.) Bourd. in Bull. trimest. Soc. mycol. Fr. 48: 220. 1932. — *Mycorrhaphium pusillum* (Brot. ex Fr.) Maas G. in Persoonia 2: 398. 1962. — Type locality: Portugal, near Coimbra.

On account of its different hyphal construction, this species was removed from *Steccherinum* and transferred to the genus *Mycorrhaphium*.

*pyramidatus*. — *Hydnum pyramidatum* Berk. & Curt. in J. Linn. Soc. (Bot.) 10: 326. 1868. — *Odontia pyramidata* (Berk. & Curt.) Rick in Egatea 18: 127. 1933. — Holotype: "239 / *Hydnum pyramidatum* B. & C. / Cuba / C. Wright" (K).

Context monomitic, made up of generative hyphae 2.7–5.4  $\mu$ m wide, moderately inflating, thin- to moderately thick-walled, branched, septate, with clamp-connections. Gloecystidia 4.5–8  $\mu$ m wide, cylindrical or fusiform or lageniform, thin-walled, with obtuse tip.

The above lines are given to supplement Gilbertson's redescription (1965: 862).

The very slender excuse to say a few words about this species in the present paper is that two features mentioned in Gilbertson's account are characteristic of *Stecchericum*, a genus which in comparatively recent times was separated from *Stecyperinum* (Reid, 1963: 270). It was felt that no opportunity should be lost to examine a possible member of the genus *Stecchericum* that is still so poor in species.

One of the elements mentioned by Gilbertson is the presence of hyphae of two types, one of them said to be thick-walled and apparently aseptate. I have been unable to find this kind, however, and there is a label attached to the type-packet, signed by Dr. J. Boidin, with the remark "hyphes d'un seul type." I may add here that in *Fungi cubenses wrightiani* No. 352 (W) these thick-walled, aseptate hyphae were not found either. Boidin (1966: 20) suggested that the species might belong to *Dentipellis* Donk and there are certainly points in favour of this view, the presence of gloecystidia being one of them. Although, of course, inclusion of the species in this genus would introduce a character thus far not known in *Dentipellis*—viz. the rather coarse ornamentation of the spores—, it should be borne in mind that smooth and finely punctate spores are known to occur in the related genus *Hericium* Pers. ex S. F. Gray, and finely to coarsely warted spores in *Stecchericum*. See also *Dentipellis leptodon* (p. 558). The truly awkward obstacle, however, for transference of the present species to *Dentipellis* is the poor condition of the type. The two copies of *Fungi cubenses wrightiani* No. 352 (W) are in no way better, as they too have been treated with mercuric chloride. My failure to find the "thick-walled, aseptate hyphae" may be due to this unsatisfactory condition. If, however, Gilbertson's observation is correct, *Hydnum pyramidatum* would not be a member of *Dentipellis* but of *Gloeodontia* Boidin instead.

*quercinus*. — *Steccherinum quercinum* S. F. Gray, Nat. Arrang. Br. Pl. 1: 651. 1821.

This is a name change for *Hydnum erinaceus* Bull., the basionym of *Hericium erinaceus* (Bull. ex Fr.) Pers.

*radicalis*. — *Corticium radicale* Berk. in Hooker's Lond. J. Bot. 4: 59. 1845. — *Stereum radicale* (Berk.) Masee in J. Linn. Soc. (Bot.) 27: 187. 1890. — Holotype: "*Corticium radicale* Berk. / Swan River No. 162" (K).

Holotype consisting of two fragments, which offer very little externally for a description. Context monomitic, consisting of generative hyphae, which are 2.7–3.6  $\mu\text{m}$  wide, rather flaccid, not inflating, flexuous, moderately thick-walled to thick-walled (cell-walls up to somewhat over 1  $\mu\text{m}$  thick), occasionally furcate, with rare and inconspicuous septa, without clamp-connections.

Cunningham (1953: 289 and 1963: 339) stated that the "type in Kew herbarium . . . is a fragment of *Steccherinum ochraceum* (Pers.) Gray." The description given above plainly indicates that this statement is without any foundation. I have no opinion about its true affinities but *C. radicale* obviously is not a *Steccherinum*.

*rhizoideus*. — *Mycoleptodon rhizoideus* Pilát in Bull. trimest. Soc. mycol. Fr. 51: 406, fig. 15, pl. 9 fig. 4. 1936. — Holotype: "No. 3133 / *Mycoleptodon rhizoideum* Pilát / *Abies sibirica* / Sibiria. Distr. Narym / 15.X.[19]33. Krawtzev" (PR 156152).

The following notes drawn up from a fragment of the holotype are given to supplement the original description.

Subiculum dimittic, consisting of generative and skeletal hyphae. Generative hyphae 4.5–6.3  $\mu\text{m}$  wide, very much collapsed and difficult to follow, somewhat inflating, thin-walled, anastomosing, branched, more or less constricted at septa, with clamp-connections. Skeletal hyphae 3.6–5  $\mu\text{m}$  wide, thick-walled to solid. Context of spines similar, generative and skeletal hyphae somewhat narrower. Basidia collapsed. Spores not seen. Cystidia 4.5–7  $\mu\text{m}$  wide, scattered, not protruding or very little so, thickly incrustated, cylindrical to somewhat fusiform in distal part, with obtuse apex.

The author of the species did not explain his choice of the specific epithet, but this becomes at once apparent on examination of the material. The way the spines emerge from the subiculum, often two or more combining and fusing to form a thicker structure, the distance between them, and their flaccid nature, these are all features that make the spines resemble rhizoids.

These macroscopic characteristics, combined with such microscopic features as inflation and anastomosis of the generative hyphae, and cohesion of the cystidia, furnish clear evidence that *M. rhizoideus* is not a *Steccherinum*.

*rimosus*. — *Odontia fimbriata* var. *rimosa* Peck in Rep. N.Y. St. Mus. nat. Hist. 40: 76. 1887. — Type: not seen.

This may be little else than a form of *Steccherinum fimbriatum*. The request for a loan was ignored.

*rufulus*. — *Hydnum rufulum* Lév. in *Annls Sci. nat. (Bot.)* III 2: 205. 1844. — Holotype: "3506 Zollinger Plantae javanicae / *Hydnum rufulum* Lév. / Ad [letter crossed out] putridos M. / Prabakti 3000' / 31.1.48" (PC, isotypes in G).

Basidiome roughly 35 × 27 mm, effused, closely adnate, suborbicular, ceraceous, somewhat shiny, smooth, reddish brown, margin similar, yellowish. Spines up to 3 mm long, up to 0.5 mm broad, widely apart, subulate, terete, hard, brittle, dark reddish brown, but mostly covered with whitish hyphae of an alien fungus.

Context dimitic, consisting of generative and skeletal hyphae. Generative hyphae 2.7–3.4 μm wide (difficult to find as most are collapsed), not inflating, thin-walled, with clamp-connections. Skeletals up to 6.5 μm wide, thick-walled to solid. Context of spines similar. Basidia and spores not seen. Cystidia indicated by incrustated parts, but nowhere seen to reach surface or to project beyond it.

The species is here, with some doubt, excluded from the genus *Steccherinum* mainly on account of its entirely different aspect macroscopically. The difficulty to make a proper hyphal analysis and the lack of information on the basidia and spores prevent further identification.

*sacchari*. — *Hydnum sacchari* Spreng. in *Vet. Akad. Handl.*: 51. 1820; *ex Fr.*, *Syst. mycol.* I: 416. 1821. — Holotype: "*Hydnum sacchari* Bert. / Sprengel" (Herb. E. Fries, UPS).

The material is very scanty, but only a few spores are needed to demonstrate that the species is a *Gyrodontium*. The spores measure 4.3–4.5 × 2.7–3.1 μm and they are smooth, fairly thick-walled, yellow under the microscope.

*secernibilis*. — *Odontia secernibilis* Berk. *apud* Hook. fil., *Fl. Tasm.* 2: 257. "1860" [1859]. — Holotype: "*Odontia secernibilis* B. / Tasmania" (K).

Basidiome approximately 80 × 40 mm, effused, very little separable, practically completely covered by spines, ochraceous with slight pinkish hue, margin very narrow, arachnoid-byssoid, whitish. Spines 0.2–0.4 mm long, 0.1–0.3 mm broad, crowded, wart-like or subulate to almost plate-like, densely hirsute, concolorous.

Context monomitic, consisting of generative hyphae. Generative hyphae 2.7–3.6 μm wide, not inflating, thin-walled, branched at short intervals, septate, with clamp-connections, very much incrustated. Basidia 3.6–4.5 μm wide, hard to see, immature or collapsed. Spores not seen. Cystidia 3.6–5.4 μm wide, crowded, protruding, fusiform or lageniform, thick-walled to almost solid, very much incrustated, tapering to fairly narrow apex.

Banker who saw the type made the pencilled annotation "*=Odontia fimbriata* Pers." Cunningham (1953: 293) apparently accepted this identification without further comment. Both erred. *Odontia secernibilis* is a member of the genus *Hyphodontia*, characterized by monomitic context, unless the thick-walled cystidia are regarded as much shortened skeletal hyphae. In any case, *O. secernibilis* differs from *Steccherinum fimbriatum* in (i) the lack of rhizomorphic strands, (ii) the lack of a broad margin, (iii) the poor separability from the substratum, (iv) the poorly developed context with short generative hyphae and no skeletals at all, (v) the very copious crystalline

matter that persisted practically without change after treatment in KOH (and had eventually to be removed by dissolving it in HCl in order to make the hyphae visible at all).

*septentrionalis*. — *Hydnum septentrionale* Fr., Syst. mycol. 1: 414. 1821. — *Climacodon septentrionalis* (Fr.) P. Karst. in Revue mycol. 3/No. 9: 20. Jan. 1, 1881 & in Meddn Soc. Fauna Fl. fenn. 6: 15. 1881. — *Steccherinum septentrionale* (Fr.) Banker in Mem. Torrey bot. Club 12: 130. 1906. — *Creolophus septentrionalis* (Fr.) Banker in Mycologia 5: 293. 1913. — Type locality: North Sweden.

Like *Hydnum pulcherrimum* the present species has been regarded in American literature as a member of *Steccherinum*. On account of its characters, I prefer to keep the species well outside this genus, and I think its disposition as the type-species of *Climacodon* a most satisfactory solution.

*setulosus*. — *Hydnum setulosum* Berk. & Curt. apud Berk. in Grevillea 1: 100. 1873. — *Odontia setulosa* (Berk. & Curt. apud Berk.) Rick in Egatea 18: 127. 1933. — *Steccherinum setulosum* (Berk. & Curt. apud Berk.) L. W. Miller in Mycologia 27: 362. 1935. — Holotype: "6086. *Hydnum setulosum* B. & C. / Alabama / Peters / in *Liquidamb.*" (K). — Figs. 31-34.

Basidiome roughly measuring 24 × 20 mm, effused, membranaceous-tomentose, ochraceous yellow-brown, gradually passing into very thin, dingy whitish margin. Spines up to about 3 mm long, 0.5 mm broad, not very crowded, subulate, terete or often flattened, densely and conspicuously setulose. Context whitish.

Context monomitic, consisting of generative hyphae and numerous "bridge hyphae" (Teixeira, 1961: 38). Generative hyphae 2.7-6 μm wide, not inflating, thick-walled (cell-walls up to 2 μm thick), branched, septate, frequently more or less widened at septa, with clamp-connections. The ramification and the numerous connections formed by the bridge hyphae cause the structure of the context to become increasingly intricate going from margin to centre (Fig. 32, which illustrates a similar situation in the context of a spine; since the cell-walls become much less stained than the contents of the hyphae, it was found much more convenient to show the course of the hyphae by indicating only their deeply coloured lumina). Context of spines similar, but hyphae narrower. Basidia not properly seen, with basal clamp. Spores 5.4-6.5 × 2.7-3.6 μm, narrowly ellipsoid, adaxially flattened, smooth, colourless, not amyloid. Cystidia up to 170 μm long and 7-12(-16) μm wide, very numerous, originating in subhymenium or somewhat deeper in trama of spine, thick-walled to almost solid, thickly incrustated, but smooth or almost so in KOH.

A redescription of the isotype was given by Gilbertson (1965: 864), but it lacks information on some details now considered important. There is no mention of (i) the numerous bridge hyphae, (ii) the characteristic mode of ramification, and (iii) the shape of the basidia. Features (i) and (ii) have particular significance since they are responsible for the complexity of the hyphal structure. Although the basidia in the holotype are badly preserved, a peculiar constriction in the lower half is clearly visible in some. These characteristics, combined with the lack of skeletal and the thick cell-walls of the generative hyphae, are all features that do not tally with

*Steccherinum*. Instead they show the type to belong to *Hyphodontia*, to which genus the species is here formally transferred as ***Hyphodontia setulosa*** (Berk. & Curt. apud Berk.) Maas G., *comb. nov.* (basonym: *Hydnum setulosum* Berk. & Curt. apud Berk., l.c.).

*stalagmodes*. — *Hydnum stalagmodes* Berk. & Curt. in Proc. Am. Acad. Arts Sci. 4: 123. circa 1858. — Holotype: "*Hydnum stalagmodes* / Bonin / U.S. Expl. Exped." (K).

This appears to be a heterobasidiomycetous fungus.

*stevensonii*. — *Hydnum stevensonii* Berk. & Br. in Ann. Mag. nat. Hist. IV 15: 31. 1875. — Holotype: "*Hydnum Stevensonii*, B. & Br. / Glamis March 1874" (K).

Basidiome covering some cm<sup>2</sup> distributed over a number of separate bits of wood, effused, filmy to arachnoid, dingy ochraceous. Spines up to about 1 mm long, 0.1–0.2 mm broad, soft and fragile, scattered to crowded, subulate, terete, smooth, ochraceous.

Context monomitic, consisting of generative hyphae. Generative hyphae 1.8–3.6  $\mu$ m wide, thin-walled, frequently anastomosing, often intricately branched, with clamp-connections at septa, not infrequently with ampullaceous swellings up to 5.5  $\mu$ m wide at one or both sides of septa, occasionally also with curved secondary septa. Context of spines similar, hyphae more tightly packed. Basidia about 4.5  $\mu$ m wide, clavate, with basal clamp, with 2–4 somewhat curved sterigmata 2.7–3.8  $\mu$ m long. Spores 3.4–4  $\times$  2.5–2.7  $\mu$ m, ellipsoid, adaxially flattened, echinulate, colourless (?), with oblique apiculus. Cystidia absent.

This is clearly a *Cristella* and its characters agree very well with those of *C. farinacea* (Pers. ex Fr.) Donk as redescribed by Bourdot & Galzin under *Grandinia* (1928: 412). Consequently *Hydnum stevensonii* is here reduced to the synonymy of this species. The pencil-written indication "=farinaceum" on a small slip of paper stuck to the type packet shows that a previous investigator (Dr. D. A. Reid?) had come to the same conclusion.

*strigosus*. — *Hydnum strigosum* Sw. in Kgl. VetAkad. Nya Handl.: 250. 1810; ex Fr., Syst. mycol. 1: 414. 1821. — *Gloiodon strigosus* (Sw. ex Fr.) P. Karst. in Meddn Soc. Fauna Fl. fenn. 5: 28. 1879. — *Sclerodon strigosus* (Sw. ex Fr.) P. Karst. in Bidr. Känn. Finl. Nat. Folk 48: 361. 1889. — *Mycolepton strigosus* (Sw. ex Fr.) Pat., Essai tax. Hym.: 117. 1900. — *Steccherinum strigosum* (Sw. ex Fr.) Banker in Mem. Torrey bot. Club. 12: 128. 1906. — Type locality: Sweden.

*Hydnum strigosum* has been made the type species of *Gloiodon*, a genus that differs in many ways from *Steccherinum*. Some of the more important differentiating characters are provided by its spores, which are asperulate and amyloid.

*subcrinalis*. — *Hydnum subcrinale* Peck in Bull. N.Y. St. Mus. 167: 27. 1913. — *Odontia subcrinalis* (Peck) Gilbertson in Mycologia 54: 671, fig. 4. 1963. — Type: not seen.

In his redescription of the type Gilbertson stated that the subiculum hyphae were of two kinds, the thin- to moderately thick-walled kind having "occasional simple septa." This observation is sufficient to exclude *H. subcrinale* from *Steccherinum*. Later, however, Gilbertson (1971: 295) thought that the species "could logically be placed in *Steccherinum*" on account of its characters, although he clearly saw the obstacle in that *H. subcrinale* "has only rare clamp connections on the generative hyphae." Assuming that the two descriptions are not contradictory, it is the very scarcity of the clamp-connections that prevents *H. subcrinale* from being included in *Steccherinum*, for in this genus the generative hyphae possess a clamp to every septum.

*tenuidens*. — *Hydnum tenuidens* Rick in Iheringia (Bot.) No. 5: 145. 1959. — Lectotype: "*Hydnum tenuidens* Rick / In ligno frondoso / Bagé 1936 / Rick" (PACA).

Basidiome covering a piece of bark about 90 × 50 mm, effused, floccose tomentose, yellow-brown. Spines up to 1.5 mm long, 0.1–0.3 mm broad, scattered to more or less crowded, straight, tomentose, yellow-brown, with acute tip. Context c. 0.5 mm thick, soft, friable, yellow-brown.

Context monomitic, consisting of generative hyphae. Generative hyphae 3.6–6 μm wide, with a tendency to become inflated, frequently constricted at septa, thin- to fairly thick-walled, with yellowish cell-walls, anastomosing, branched, septate, with rare clamp-connections. Context of spines largely similar, but subhymental elements invariably with clamps. Basidia not developed. Cystidia 4.5–10.5 μm wide, thick-walled (cell-walls 1.8–2.7 μm thick).

Rick described the spores of this species. Although they were not found in the lectotype, it is clear that *H. tenuidens* is not a *Steccherinum*.

*tropicalis*. — *Hydnum tropicale* Pat. & Gaill. in Bull. Soc. mycol. Fr. 4: 38. 1888. — *Mycoleptodon tropicalis* (Pat. & Gaill.) Pat., Essai tax. Hym.: 117. 1900. — Type locality: Venezuela, Atures.

An unknown species, the type material of which cannot be traced (Maas Geesteranus, 1967a: 70).

*vagans*. — *Hydnum vagans* Petch in Ann. R. bot. Gdns Peradeniya 9: 315. 1925. — Holotype: "No. 6633 / *Hydnum vagans* Petch / on tea prunings / Palmgarden / August 1923" (K).

To the brief macroscopic description published by Petch the following microscopic details may be added. Context monomitic, consisting of generative hyphae 3.6–9 μm wide, inflating, thin-walled to moderately thick-walled, branched, septate, without clamp-connections. Context of spines similar, hyphae more closely adhering, with occasional clamps, sometimes even with clamps on opposite sides. Basidia not seen with certainty. Spores 4.5–4.9 × 2.7 μm, ellipsoid, adaxially flattened, smooth, thin-walled, not amyloid, presumably propiogenic.

*Hydnum vagans* is not a *Steccherinum*. No suggestion is here given as to its possible relationship.

*webbii*. — *Hydnum webbii* Berk. in J. Bot., London **3**: 194. 1844. — Holotype: "No. 2172 / *Hydnum Webbii*, Berk." (K).

Basidiome approximately 25 × 20 mm, effused, very dark brown under whitish pubescence, which imparts leaden grey colour to adhymenial surface, densely covered with papillae. Papillae up to 1 mm long, cylindrical and 0.1–0.3 mm broad or grown together to form subglobose clumps up to 1 mm diameter, apices brownish flesh-colour.

Context very probably monomitic, either horny from slow drying or badly affected by mercuric chloride. Hyphae hardly discernible, about 3–4.5 μm wide, inflating (?), thin-walled, with clamp-connections. Basidia and spores not seen. Cystidia 45–60 μm long, of subhymenial origin, very numerous (with several previous generations embedded in the thickened hymenium), the incrustated part 27–31 × 9–10 μm.

Although the information gained from the study of the type is very probably insufficient for the identification of the species, two elements — the papillae and the cystidia — clearly indicate that *Hydnum webbii* does not belong to *Steccherinum*.

*westii*. — *Steccherinum westii* Murrill in Bull. Torrey bot. Club **67**: 276. 1940. — *Hydnum westii* (Murrill) Murrill in Bull. Torrey bot. Club **67**: 281. 1940. — Holotype: "*Hydnum westii* sp. nov. / Oak log / Newnan's Lake / West & Murrill / 7-30-[19]38" (FLAS F18006).

A few supplementary notes are required to characterize the present species. Context of pileus monomitic, consisting of generative and gloeoplerous hyphae. Generative hyphae 2.7–5.4 μm wide, not inflating, moderately thick-walled to nearly solid, branched, septate, with clamp-connections. Gloeoplerous hyphae (Donk, 1967: 49, note) 3.6–5.4 μm wide, originating from generative hyphae, extremely long without showing cross-walls (properly speaking, therefore, better termed gloeoplerous cells), thin-walled to moderately thick-walled, very conspicuous on account of their refractive contents. Context of spines similar, gloeoplerous cells numerous, terminally curved outwards into hymenium and forming gloecystidia about 4.5 μm wide, blunt-tipped, little protruding, not stained by sulpho-anisaldehyde. Basidia clavate, with basal clamp. Spores 2.5–3.1 × 1.8–2.4 μm, ellipsoid, adaxially somewhat flattened, very finely verruculose (warts rounded), thick-walled, strongly amyloid.

The characters described above inevitably separate this species from *Steccherinum*. It is obviously identical with *Stecchericum seriatum*, the collection being, most unexpectedly, a new record of the species for the North American area.

*species*. — *Steccherinum species*, M. P. Christ. in Dansk bot. Ark. **19**(2): 328, fig. 326. 1960.

On requesting the loan of the material of this species (MPC 2947), the reply was received from C that the collection could not be found. The original description gives insufficient microscopic detail to permit identification.

*species*. — *Steccherinum species*, Maas G. in Bull. Jard. bot. natn. Belg. **37**: 106. 1967.

The material of this species must remain unidentified until a revision of the African collections is undertaken.

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EXPLANATION OF PLATE 40

Fig. 1. *Steccherinum laeticolor*. Fimbriate margin of the effused portion of a basidiome (Fungi exs. succ. præes. upsal. 2147, UPS).

Fig. 2. *Steccherinum ochraceum*. Even or delicately scalloped margin of the effused portion of a basidiome (Switzerland, Canton Bern, Murtensee, 13 Febr. 1971, H. Schaeren, L).

Both figs.,  $\times 15$ .