

The Genus *Stereum* in South Africa.

By

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A preliminary examination of the many collections of *Stereum* in the National Herbarium, Pretoria, suggested that these were greatly in need of revision. The result of this work has been that of sixty-seven recorded names in *Stereum* only twenty-two are accepted here as good species for South Africa.

The task of untangling the South African records has been considerably lightened by Dr. E. M. Doidge's check lists of species and pertinent literature (in *Bothalia* 5, 1950). This immensely valuable book, being largely a compilation, is inevitably a record of wrong identifications as well as correct ones; but its value is that it is a faithful and virtually complete record. The reader is referred to Doidge's lists for literature relating to the species of the genus *Stereum* in South Africa. In much of the cited literature, the species are merely listed without description or illustration, but there are papers by van der Byl, Lloyd, and Wakefield, which treat of taxonomy and form the basis of our knowledge of this genus. Insofar as they affect South African species, Lloyd's comments are seldom very clear or disciplined.

In general the literature citations in this paper are limited to the original place of publication of a species or record, and a reference to Doidge's check lists (*Bothalia* 5, 1950). Any attempt to include full references to foreign descriptions of each species would have been thwarted by the absence here of much of the important literature. For the same reason the synonymy of each species is not given in full but is generally limited to species of which type or authentic material (denoted by an exclamation mark after the name of the species) has been seen by the writer.

Specimens are cited by number only, except for establishing synonyms. Unless otherwise denoted, these numbers refer to collections in the National Herbarium, Pretoria. A fuller citation may be traced by following up these numbers in Doidge's check lists.

In sorting out the herbarium material into taxonomic species before naming them, it was considered that minor variations in colour, size or hairyness were relatively unimportant. Habit and general appearance of the plants, linked with characteristic microscopic features, were the chief guide in grouping specimens into taxonomic species. Microscopic characters were stressed since in a group of species of the same habit they provide reliable constant differences. This treatment has possibly resulted in a certain amount of merging together of species, e.g. in the merging of *S. kalchbrenneri* with *S. hirsutum*. It was felt that this was desirable if not carried to extremes.

The materials used in this study were all dried herbarium specimens, unless otherwise stated. The mountant employed in microscopic work was 5 per cent potassium hydroxide solution with the addition of 1 per cent aqueous phloxine as stain. Measurements given for "thickness in section" exclude the hairy zone of the abhymenial surface. Such measurements were made on sections mounted as above, but not squashed out. For a clear view of the microscopic organs it is generally necessary to squash the sections gently under the cover glass.

The records of *Stereum* for South Africa are arranged in alphabetical order of the specific epithets. Synonyms and doubtful or excluded species are printed in italics; accepted species are printed in bold face. A key to the accepted species is given at the end of the paper.

For the loan of specimens, the author is much indebted to the following institutions: Herbarium Royal Botanic Gardens, Kew; Herbarium, Paris Natural History Museum; Herbarium, British Museum (Natural History); Herbarium, South African Museum; Mycological Herbarium, Department of Agriculture, Southern Rhodesia. Special thanks are due to Dr. R. W. G. Dennis for his kindness in comparing several specimens with material in Kew Herbarium.

Deur die goedgunstigheid van die trustees van die Herbarium P. A. van der Byl, en van die Stellenbosse Universiteitsraad, is 'n geleentheid vir die bestudering van wyle Prof. van der Byl se versamelings van Stereum soorte aangebied. Verwysing na hierdie monsters sal in verband met die verskillende soorte gevind word.

Stereum Persoon ex S. F. Gray, A Natural Arrangement of British Plants 1 (1821) 652; Persoon in Roemer Neues Mag. Bot. 1 (1794) 110, Obs. Myc. 1 (1796) 35.

Fructifications coriaceous, membranous or subligneous, stipitate, sessile, effuso-reflexed or resupinate, or dimidiate, or infundibuliform, simple or branched. Stem lateral or central or absent. Hymenium inferior, smooth, sometimes rugose or exceptionally tubercular. Flesh pale, the context usually having an intermediate layer of more or less horizontally arranged hyphae. Spores hyaline, smooth. Cystidia, gloeocystidia or vesicles present or absent. Setae absent. Annual or perennial, lignicolous or terrestrial.

The genus *Stereum* Pers. ex S. F. Gray is accepted as validly published without conservation and is typified by the species *S. hirsutum* (Willd.) Pers. ex S. F. Gray. Reasons for the selection of this species as the type are given by Rogers (in Farlowia 3, 1949, pp. 450 & 480) and by Donk (in Bull. Bot. Gard. Buitenzorg ser. iii, 18, 1949, pp. 98-99).

(1) *Stereum adnatum* Lloyd (!) Myc. Notes 7 (1925) 1336, Fig. 3093; Doidge loc. cit. p. 487.

= **Stereum rimosum** Berk. var. **africanum** Talbot (!), for reasons given in Bothalia 6 (1951) 39.

(2) **Stereum affine** Lév. in Ann. Sci. Nat. ser. iii, 2 (1844) 210; Saccardo Syll. Fung. 6 (1888) 559; Doidge loc. cit. p. 487.

FIG. 6.

Pileus thin, coriaceous, lignicolous, solitary or gregarious, stipitate, arising from a circular light-buff coloured mycelial pad 3-6 mm. in diam., the pad sometimes being common to more than one pileus and the pilei in this case sometimes uniting above. Pileus usually flabellate, rarely infundibuliform and then sometimes split down one side, radius 1-3 cm. (rarely up to 7 cm.) from attachment, width 0.5-2 cm. Large specimens may be deeply divided into a number of flabellate pileoli with a common cuneate base, but this condition is rare. Surface smooth, yellow-brown to bay or chestnut, with a "shot" lustre in a radial direction, not colour-zoned, sparsely pruinose with scanty hairs, glabrescent. Hymenium light buff, pinky buff or light red-brown when old, smooth. Margin concolorous or somewhat paler on the abhymenial surface, thin, undulate or with small incisions, often reflexed in infundibuliform specimens. Stipe 1-2.5 mm. in diam., 0.5-2 cm. long, light buff colour, minutely velutinate. Thickness in section 560-800 μ .

Basidia: 3.2-4 \times 23-27 μ , subcylindrical, compact.

Spores: abundant, 3.2 \times 4 μ , hyaline, subglobose, ovate or broad elliptical, smooth, frequently uniguttulate.

Gloeocystidia: (8)-9.6-12.8 \times 50-70-(100) μ , hyaline, with homogeneous, contents, subulate or fusoid or irregularly cylindrical, rounded at apex, base attenuated, found in the hymenium and arising from subhymenial hyphae, abundant.

Hyphae: Skeletal hyphae 3·2–4 μ wide, hyaline, thick-walled, not septate, unbranched, without clamps; Generative hyphae hyaline, 2·4–3·2 μ wide, thin-walled, septate, scantily branched, with rare clamp connections.

Tissue differentiation: A faint, narrow, yellowish zone subtends the abhymenial surface from which the scanty hairs arise.

Abhymenial hairs: 9·6–12·8 \times 50–180 μ , hyaline, scanty, solitary, thick-walled with wide lumen, septate or non-septate, simple or occasionally forking.

Specimens examined: 28310, 36716, 30880, 15555, 27774, 27335, 27336, 31653, 9206, 28911, 11628, 12048, 36799, 32474, 34227, 34952, 36869, 14909 (*a*): Universiteit van Stellenbosch, Herbarium P. A. van der Byl Nos. 145, 694, 514 (as *S. glabrescens*).

Several South African specimens filed under *Stereum glabrescens* B. & C. prove to be *S. affine*. Burt (in Ann. Mo. Bot. Gard. 7, 1920, 110) states that *S. glabrescens* lacks gloeocystidia, which are present in all the South African specimens which the writer has seen in this group. Wakefield (in Det. Kong. Norske. Vidensk. Selsk. Forh. 9, 1936, 52) suggested that the specimens referred to *S. glabrescens* by van der Byl (in Trans. Roy. Soc. S. Afr. 10, 1922, 151, Fig. 1 and in Ann. Univ. Stellenbosch 7, 1929, 37) were probably *S. affine*. The writer has examined v.d. Byl's material and confirms that it is *S. affine*, showing quite obvious gloeocystidia when stained with phloxine.

Apart from gloeocystidia, it is suggested that another difference between these two species is that *S. glabrescens* is always flabelliform while *S. affine* may sometimes be infundibuliform.

(3) *Stereum albo-badium* (Schw. ex Fr.) Fries: Recorded by Kalchbrenner in Grev. 10 (1881) 58; Doidge loc. cit. p. 491.

The material referred to by Kalchbrenner as "*Stereum albo-badium* Fr. Ep. 551 C.B. Spec. (sic.), in mont. Boschberg", was seen at Kew with the sheet annotated thus: "*Stereum albo-badium* Schwein. Afr. austral. Type of Kalchbrenner, Com. MacOwan 9/83".

This specimen lacks cystidia and branched paraphyses and cannot be *S. albobadium*. The material is so scanty that it probably cannot be named with certainty.

S. albobadium is a North American species of characteristic appearance. It is resupinate with a free margin. The hymenium is umber-bay in colour, and velvety. The margin is narrow and whitish. Microscopically it has brownish branched paraphyses and small encrusted cystidia. Ravenel material (not type) was seen at Kew.

(4) *Stereum amoenum* Kalchbr. & MacOwan (!) in Grev. 10 (1881) 58; Theumen in Flora 59 (1876) 424; Doidge in loc. cit. p. 490 (Nec. *S. amoenum* Lév.).

This species was described from South Africa. As this name was preoccupied, Saccardo redescribed the species under the name *Stereum kalchbrenneri* Sacc. (in Sacc. Syll. Fung. 6, 1888, 568). *S. amoenum* is thus an obligate synonym of *S. kalchbrenneri*. Lloyd (Myc. Notes 4, 1915, L. 60, 10, Note 341) notes these name changes under *S. kalchbrenneri*.

The writer has examined authentic material of *S. amoenum* in Herb. Macowanianum Nos. 1084 & 1086 sub Herb. S.A. Museum No. 34269 as *S. kalchbrenneri*. On the herbarium sheet, van der Byl has noted that *S. kalchbrenneri* is very close to *S. hirsutum* and differs virtually only in having a more luxuriant fructification and darker hairs on the upper surface than is usual in *S. hirsutum*. He added that they could scarcely be considered as separate species.

The writer's impression of *S. kalchbrenneri*, gained from examining MacOwan's specimens, is that this species is characterised by a combination of luxuriant growth, rather dark brown hairs, a reddish hymenium and a tendency to develop cystidioid hyphae. The hymenial colour varies between pinkish buff, cinnamon, mikado brown and russet (Ridgway Pls. xxix & xv) while the colours seen on the abhymenial surface are warm buff, clay colour, dark sudan brown (Ridgway Pls. xv, xxix, iii) and whitish.

In the National Herbarium, Pretoria, the specimens showing the best agreement with MacOwan's material of *S. kalchbrenneri* are Nos. 31454, 11255 and 13793. However, it is quite impossible to separate this species from *S. hirsutum* owing to the considerable variation and intergrading seen in the specimens assigned to each. This is illustrated by comments on the herbarium sheets such as "pallid form of *S. kalchbrenneri*" and "dark form of *S. hirsutum*". Since no constant difference can be demonstrated between the two, it is thought best to refer *S. amoenum* and *S. kalchbrenneri* to ***Stereum hirsutum*** (Willd.) Pers. ex S. F. Gray.

It may be noted here that Bresadola (in Ann. Myc. 14, 1916, 232) cites *S. amoenum* Kalchbr. & MacOwan and *S. vellereum* Berk. as synonyms of *S. friesii* Lév. The writer doubts whether this can be substantiated.

(5) *Stereum atrocinerum* (Masse) van der Byl in Ann. Univ. Stellenbosch 7 (1929) 44; Doidge loc. cit. p. 493.

Peniophora atrocinerea Masse (!) in Journ. Linn. Soc. Bot. 25 (1889) 141.

As noted by Doidge, this is a synonym of *Stereum schomburgkii* Berk. (!). Reasons for this conclusion were given by the writer in Bothalia 6 (1951) 44.

The material of Herb. MacOwanianum No. 1197 sub Herb. S.A. Museum No. 34284, on which van der Byl based his description of *S. atrocinerum*, is undoubtedly part of the type number of *Peniophora atrocinerea*, which the writer has also seen in Kew Herbarium. The part in Herb. S.A. Museum shows spores which are hyaline, cylindrical-depressed or broad elliptical, $3.4 \times 6.8 \mu$.

As previously recorded, MacOwan's material is a pale form of *S. schomburgkii*, which in turn is now found to be synonymous with *Stereum fulvum* (Lév.) Sacc. *Stereum atrocinerum* is accordingly referred to ***Stereum fulvum*** (Lév.) Sacc. (see p. 315).

(6) ***Stereum australe*** Lloyd (!) in Lloyd Myc. Notes 4 (1913) L. 48, 10, Note 115; Ibid. 4(1915) L. 60, 15, Note 387; Ibid. 5(1917) L. 65, 2; Doidge loc. cit. p. 487.

Stereum tenebrosum Lloyd (!) *nomen nudum* in Lloyd Myc. Notes 5(1918) L. 67, 16, Note 692; Doidge loc. cit. p. 493.

As "*Stereum lobatum* with *cinereous hymenium*", Lloyd in Lloyd Myc. Note 4(1913) L. 46, 3.

As "*Stereum lobatum* (Kunze) Fr. var. *cinereum* Lloyd", Doidge loc. cit. p. 487.

Stereum transvaalium v.d. Byl (!) in Ann. Univ. Stellenbosch 7(1929) 41; Doidge loc. cit. p. 494.

Fig. 13

Pileus tough, coriaceous, lignicolous, solitary or more often gregarious, often laterally connate, occasionally imbricate, flabellate or cuneate, attached by a reduced base, or reflexed and attached by a long narrowly-effused base, or occasionally orbicular and sessile attached by a central umbo; 2.5-4 cm. radius \times 3-5-(10) cm. wide. Surface concentrically furrowed and zoned with velutinate hairs of reddy-brown to light yellow-brown to greyish colour, becoming worn off and smooth in the ridges when old and weathered. Hymenium reddish-brown when moist becoming cinereous to cinereous-buff on drying, smooth, reflecting the abhymenial furrows, "bleeding" red when fresh and bruised. Thickness in section 640-1000 μ .

Basidia: compact, hyaline, clavate, $4-4.8 \times 30 \mu$.

Spores: uncertain. Possibly $2.5 \times 5.6 \mu$, hyaline, smooth, elliptical, with one side depressed. ($3 \times 4 \mu$ fide van der Byl; $4 \times 6 \mu$ fide Lloyd).

Conductors: originating as modified skeletal hyphae in the trama and subhymenium, curving into but not beyond the hymenium, thick-walled, non-septate, contents brownish, walls hyaline, lumen often widening towards the apex, $4.8-6.4 \mu$ diam.

Hyphae: Skeletal hyphae thick-walled, non-septate, unbranched, hyaline or sometimes dilutely coloured, 6.4μ diam.; Generative hyphae rather thin-walled, hyaline, septate, without clamps, 3.2μ diam. The two hyphal types are intertwined throughout the trama.

Tissue differentiation: Tissue hyaline above a horizontal yellow-brown zone which subtends the abhymenial hairs.

Abhymenial hairs: hyaline, thick-walled ($3.2-4.8-6.4 \mu$ diam.), fasciculate.

Specimens examined: 27519, 27520, 31033, 30890, 27522, 28490, 15557, 26390, 31816, 28966, 27611, 27721, 15559 (2 specimens), 30269, 30270, 28848, 31852, 40218 (T.R.L. 202), 40219 (T.R.L. 69), 40220 (T.R.L. 2); 8847, 1464 (as *S. tenebrosum* det. Lloyd); Universiteit van Stellenbosch, Herbarium P. A. van der Byl No. 1472 (Type of *S. transvaalium*).

In Lloyd's writing cited above, there is a slight ambiguity in Letter 48, but the writer takes this letter to mean that Lloyd recognised *S. australe* and *S. tenebrosum* as the same species, i.e. that they are both the same as his "*S. lobatum* with cinereous hymenium" mentioned in Letter 46. This opinion is confirmed by examination of specimens in Herb. Pretoriae which were determined by Lloyd variously as *S. australe* and *S. tenebrosum* and which the writer is confident represent only one species.

S. australe is well characterised by its smallish brown, velutinate pilei, the cinereous hymenium (when dry) and the presence of conductors. Old specimens may weather greyish with bare chestnut zones and then resemble *S. fasciatum* externally.

Regarding the inclusion of *Stereum transvaalium* as a synonym of *S. australe*, see notes given under the former species on p. 328.

(7) *Stereum bellum* (Kunze) Saccardo, Syll. Fung. 6(1888) 563; Doidge loc. cit. p. 488.

Thelephora bellum Kunze in Flora (1830) 370.

Fig. 8

Pilei small, dimidiate, sessile, laterally connate, imbricate, lignicolous, about 1 cm. radius from attachment and attenuated towards the base thus somewhat cuneate in single specimens, rigid, tough and not flexible. Surface reddy-brown, often concentrically zoned and with a relatively wide light tan coloured margin, rather sparsely velutinate. Hymenium smooth, yellow-orange colour. Thickness in section $720-1200 \mu$.

Basidia: (immature) cylindrical, $20 \times 3.2 \mu$.

Spores: few seen, hyaline, ovate or subglobose, $2 \times 2.5 \mu$.

Gloeocystidia: quite numerous in the hymenium, hyaline, thinwalled, deep-staining, pyriform to fusoid or ventricose, $7.5-12 \times (12)-15-25-(40) \mu$.

Cystidia: rare (see comment below), hyaline, thickwalled, apically encrusted or smooth ($6.5-10-12 \times 30-37 \mu$; in the hymenium, fusoid to conical).

Hyphae: all hyaline and closely intertexted; skeletal hyphae non-staining, non-septate, very seldom branching, thick-walled with a narrow or occasionally fairly wide lumen, $3.2-4.8 \mu$ wide; generative hyphae thin-walled, deep-staining, tortuous, with clamps, branched, $2.4-3.2 \mu$ wide.

Tissue differentiation: tissues uniformly composed of closely intertexted hyphae without a notably differentiated abhymenial zone.

Abhymenial hairs: hyaline to pale straw colour, thickwalled with narrow lumen, usually widening somewhat towards the apex; apex rounded or sometimes pointed; hairs usually with 2-4 septa, $3.5-8 \mu$ wide and projecting $80-104 \mu$ from the surface.

Specimens examined: Universiteit van Stellenbosch, Herbarium P. A. van der Byl No. 645.

In the absence of other material for comparison there is some doubt whether this specimen is correctly named, but it is thought best to record this under van der Byl's determination as *Stereum bellum*. The specimen shows several features which suggest an affinity with *Stereum involutum*, yet is sufficiently different in detail to be held apart. It is noted by Lloyd (Syn. Stip. Stereum, 1913, 41) that *S. bellum* sensu Bresadola non Kunze is *Stereum bresadoleanum*, a species synonymous with *S. involutum*. See also under *S. friesii* (p. 314).

The cystidia described above were clearly seen in only one section made from this specimen and may be merely a thickened and encrusted form of the gloeocystidia. Gloeocystidia were seen in all sections. As far as habit is concerned, this specimen might be taken casually for a small and immature *S. hirsutum*, but its reddish velutinate surface is different, and the microscopic structure quite different. Saccardo (loc. cit.) mentioned that *S. bellum* has an affinity with *S. hirsutum*.

(8) *Stereum bicolor* (Pers. ex Fr.) Fries, Epicrisis (1838) 549, Hym. Eur. (1874) 640; Doidge loc. cit. p. 488; Talbot in Bothalia 6 (1951) 39.

Thelephora bicolor Persoon, Syn. Meth. Fung. (1801) 568, Myc. Eur. 1 (1822) 122; Fries, Syst. Myc. 1 (1821) 438.

Stereum laxum Lloyd (!) in Lloyd Myc. Notes 4 (1915) L. 60, 10, Note 339; Doidge loc. cit. p. 491.

Stereum fuscum (Schrad.) Quelet, Flor. Myc. de Fr. (1888) 14.

Stereum coffeatum Berk. & Curt. (!) in Grev. 1 (1873) 164.

Stereum pannosum Cooke (!) in Grev. 8 (1879) 56.

FIG. 21.

Occasionally entirely resupinate, usually resupinate-reflexed, sometimes pileate, imbricate, soft, spongy texture. Abhymenial surface snuff-brown, concentrically furrowed, floccose, becoming smooth; margin paler. Hymenium smooth, whitish to creamy, not furrowed, sometimes rimose when dry, rather velvety. In section up to 1000 μ thick; hymenial layer hyaline, circa 100 μ thick, the remaining tissues coloured brownish. Not adnate.

Basidia: 3.5-5.5 \times 22-27 μ , cylindrical, with 2-4 sterigmata.

Spores: hyaline, smooth, elliptical, unilaterally depressed, or oblong, frequently uniguttulate, 3-4.5 \times 2-3 μ .

Gloeocystidia: very abundant in the hymenium, not usually emergent, hyaline, very refractile, thinwalled, cylindrical, fusoid or somewhat ventricose, about 4-11 \times 90 μ , borne on very narrow hyaline hyphae about 2 μ wide, contents homogeneous when young but appearing to solidify and become fragmented when old and then resembling cystidia or mineral concretions.

Hyphae: all smooth, thin-walled, with occasional to numerous clamp connections, much branched, septate; Subhymenial hyphae colourless or pale brownish; Tramal hyphae brown, 3-6 μ wide, loosely intertexted.

Tissue differentiation: There is no dark compact zone subtending the abhymenial surface; that surface is floccose and composed of ordinary brown hyphae.

Specimens examined: 27596, 28964 (T.R.L. 200), 35422, 30891, 27784, 28555, 27766, 31728, 31851, 30698; van der Byl (2239) in Kew; MacOwan (1244) C.B.S. in Kew; MacOwan (1244) as *Thelephora biennis* Fr. sub *Stereum fuscum* in Herb. S.A. Museum No. 34292.

The type number of *Stereum laxum* Lloyd, 31321, *A. V. Duthie* (56), on decaying leaves and twigs, Stellenbosch, agrees in every respect with *S. bicolor* and is accordingly reduced to synonymy. Lloyd (loc. cit.) wrote that *S. laxum* has no cystidia, but its gloeocystidia are quite obvious. His suggestion that *S. laxum* resembles an *Hypochnus* in context, is also rather misleading.

S. bicolor has also appeared in South African literature (and elsewhere) under the name *S. fuscum* (Schrad.) Quel., but the latter is nomenclaturally unacceptable (see Talbot, loc. cit.). Doidge (loc. cit. p. 488) lists records of *S. bicolor* which were improperly placed by other authors under *Thelephora biennis*.

(9) *Stereum bresadoleanum* Lloyd (!), Syn. Stip. Stereum in Lloyd Myc. Notes 4 (1913) 41; Doidge loc. cit. p. 488.

= *Stereum involutum* (Klotzsch) Fries; see p. 317.

(10) *Stereum caperatum* Lloyd (!) in Lloyd Myc. Notes 4 (1916) 549, Fig. 751. [non *S. caperatum* (Berk. & Mont.) Masee]; Doidge loc. cit. p. 494.

As this name was a later homonym of *S. caperatum* (Berk. & Mont.) Masee, Lloyd subsequently changed to it *Stereum turgidum* Lloyd (!), (Lloyd in Myc. Notes 5, 1916, L. 63, 15, Note 502). For reasons given in *Bothalia* 6 (1954), p. 339, the latter species is regarded as synonymous with *Stereum cinerascens* (Schw.) Masee (!). See also the following description.

(11) *Stereum cinerascens* (Schw.) Masee (!) in Journ. Linn. Soc. Bot. 27 (1890) 179; Doidge loc. cit. p. 488; Talbot in *Bothalia* 6 (1951) 40 and *Ibid.* 6 (1954), p. 339.

Thelephora cinerascens Schwein. in Amer. Phil. Soc. Trans. n.s. 4 (1832) 167.

Stereum turgidum Lloyd (!) in Lloyd Myc. Notes 5 (1916) L. 63, 15, Note 502; Stevenson & Cash in Bull. Lloyd Library 35 (1936) 58; Doidge loc. cit. p. 494.

Stereum caperatum Lloyd (!) in Lloyd Myc. Notes 4 (1916) 549, Fig. 751 [non *S. caperatum* (Berk. & Mont.) Masee].

Lopharia mirabilis (B. & Br.) Patouillard in Bull. Soc. Myc. de Fr. 11 (1895) 14, Pl. 1; Doidge loc. cit. p. 501; Talbot in *Bothalia* 6 (1951) 56 and *Ibid.* 6 (1954), p. 339.

Radulum mirabile Berk. & Br. (!) in Journ. Linn. Soc. Bot. 14 (1873) 61.

Lopharia lirellosa Kalchbr. & MacOwan (!) in Grev. 10 (1881) 58.

FIG. 18.

Fructifications coriaceous, resupinate, effused with a narrow reflexed margin, or effuso-reflexed; not adnate. Abhymenial surface (when exposed) ochraceous, ashen or warm buff, tomentose, obscurely zoned or concentrically furrowed. Hymenium first smooth and whitish, later creamy-ochraceous or pinkish buff. Hymenial variations include smooth or slightly scabrid states, papillate or tubercular developments, or strongly developed warts or teeth or incised ridges arranged irregularly or in somewhat concentric patterns and sometimes forming incomplete shallow pores. Thickness in section, excluding ridges or teeth, 250–800 μ .

Basidia: 40–65–(80) \times (5)–9–11 μ , clavate, with 4 sterigmata.

Spores: hyaline, smooth, oblong-cylindric or oblong-elliptical, often with one side depressed, 5.5–14.3 \times 4.4–8.8 μ (usually 10.6–11.8 \times 6.1 μ).

Cystidia: embedded or projecting, heavily encrusted with large crystals, thick-walled, often faintly coloured at the base, conical or subfusiform, apex blunt or pointed, 50–150 \times 12–24 μ . They may be emergent up to 50 μ or embedded in stages throughout the trama.

Hyphae: 3–5 μ diam., hyaline or faintly coloured, rather opaque and thick-walled, those next to the substratum forming a denser, coloured layer.

Abhymenial hairs: adpressed or suberect, coloured, 3.5–5 μ diam.

Specimens examined: As *S. cinerascens* 28688, 28498, 28926, 34377, 35421, 35309, 33077, 33213, van der Byl (2732); As *S. turgidum* Lloyd & *S. caperatum* Lloyd, type number 31332 (A. V. Duthie, 74); As *Lopharia lirellosa*, type, P. MacOwan, C. Bon. Spei, in Herb. Kew; As *Lopharia mirabilis*, type, Thwaites 328, Peradeniya, Ceylon, 1868, in Herb. Kew; 27797, 28302, 27799, 31309, 31356, 31911, 27769, 28697, 31397, 28299, 34553, 36786, 33205, 36785, van der Byl (2261, 2620, 551, 1429); as *Radulum lirellosa*, 31309; as *Radulum* sp., 27556.

An extensive comparison of this species with *Lopharia mirabilis* and *Stereum turgidum*, leading to the sinking of the genus *Lopharia*, is given by the writer in *Bothalia* 6 (1954), p. 339. There, the variability of this fungus is discussed and reasons are given for associating under one name, *S. cinerascens*, what at first sight appear to be totally disrelated forms, some with smooth hymenia and some with highly convoluted hymenia apparently characteristic of the Hydnaceae. That these form the extremes of a graded series with identical microscopic characters, is only realised when a large number of collections have been seen and carefully studied.

(12) *Stereum cinereum* Lév.; recorded by van der Byl in *Trans. Roy. Soc. S. Afr.* 10 (1922) 153, f. 4; listed as doubtful by Doidge loc. cit. p. 488.

The collection cited by van der Byl as the basis of this record is apparently not to be found in any herbarium. This species is omitted from van der Byl's later summary of the South African Thelephoraceae (in *Ann. Univ. Stellenbosch* 7, 1929) as though he were doubtful of the determination.

(13) *Stereum concolor* (Jungh.) Sacc., *Syll. Fung.* 6 (1888) 561; Doidge loc. cit. p. 491.

Lloyd recorded some of van der Byl's collections under this name; for references see Doidge loc. cit. Doidge lists this species doubtfully as a synonym of *Stereum lobatum* (Kunze ex Fr.) Fr. Van der Byl omits reference to *S. concolor* in his writings, and the specimen in his herbarium No. 807 which was determined by Lloyd as *S. concolor* has been annotated by van der Byl as a "young condition of *S. lobatum*". The writer has seen this specimen and taken alone it could well be referred to *Stereum concolor*, for this species is distinctive enough in typical specimens to warrant a name of its own. However, there is little doubt that *S. concolor* is in fact only a young stage of *S. lobatum*. This is confirmed by the finding of collections, part of which could be confidently referred to *S. concolor* and part to *S. lobatum*, e.g. No. 11291 in the National Herbarium. The principal differences between these growth forms are in their colour and hairyness.

Forms classed as *S. concolor* have a uniform, even, velvety brown tomentum on the surface, ranging in colour from light yellow-brown to a somewhat deeper brown spaced wide apart in concentric zones. The impression is a continuous tomentum of a rather light brown colour. In forms classed as *Stereum lobatum* the tomentum is frequently interrupted by bare or glabrescent zones and the colour zonation includes brownish, greyish or greeny-grey, and narrow hazel or chestnut stripes. There are no apparent microscopic differences between these forms.

In view of the above, *S. concolor* is treated here as a synonym of ***Stereum lobatum*** (Kunze ex Fr.) Fr.

(14) *Stereum cyphelloides* Berk. & Curt. in Journ. Linn. Soc. Bot. 10 (1868) 331; Saccardo, Syll. Fung. 6 (1888) 558; Burt in Ann. Mo. Bot. Gard. 7 (1920) 112; Martin Lloydia 7 (1944) 76.

FIG. 5.

Fructifications soft, terrestrial, flabellate, attached by a reduced base which is vaguely continued into a faint mycelial pad, laterally substipitate; radius 4–8 mm. from the attachment, width 5–9 mm. Stem flattened, 1.5–3 mm. wide. Surface radially striate with appressed fibrils which anastomose towards the base, lacking a cuticle, the context hyphae merely running out into the surface fibrils; colour light creamy-yellow all over. Hymenium concolorous, smooth. Margin not noteworthy. Thickness in section 580–750 μ .

Basidia: compact, hyaline, cylindrical, $3.2 \times 29 \mu$.

Spores: smooth, hyaline, typically pip-shaped with an attenuated apiculus, $2.4-3.2 \times 5.6-7.2 \mu$.

Hyphae: all of one kind, hyaline, thin-walled, branched, septate, without clamps, $2.4-3.2 \mu$ wide.

Tissue differentiation: No bordering zone beneath the abhymenial surface. Texture soft and absorbent, the tissues fairly compact but easily teased apart into individual hyphae.

Specimens examined: 31419; 11528 (sub *Thelephora*).

The species is distinctive for its small whitish pilei, the soft texture and the peculiar pip-shaped spores. In No. 31419 all the spores seen were pip-shaped, but in No. 11528 many of them exhibited the "curiously angled and distorted" character described and figured by Martin loc. cit. The writer is indebted to Dr. R. W. G. Dennis for comparing No. 31419 with type material in Kew Herbarium.

The literature references given by Doidge loc. cit. p. 488, for this species, are incorrect, but the writer has not been able to trace the correct reference.

(15) *Stereum diaphanum* (Schw.) Cooke ex Saccardo in Syll. Fung. 6 (1888) 558; Doidge loc. cit. p. 488.

Thelephora diaphana Schweinitz apud Berk. & Curt. in Acad. Nat. Sci. Philad. Journ. 2 (1853) 278 (fide Burt in Ann. Mo. Bot. Gard. 7, 1920, 98).

FIG. 4.

Fructifications coriaceous to fibrous and brittle when dry, terrestrial, growing on humus and buried wood, centrally stipitate, deeply infundibuliform, usually single, occasionally two pilei fusing above. Pileus (0.4)–2.5 cm. diam., (0.3)–1.8 cm. radius from attachment; surface creamy to pale yellowish, silky-fibrillose, radially linear-striate, sometimes showing one or two obscure concentric colour zones of a slightly darker yellow-brown. Hymenium smooth, creamy, cracking radially when dry and revealing a silky-fibrillose trama; margin sometimes entire, more often undulating and shortly lacinate or splitting down the radius into lobes, very thin, sometimes involute. Stipe 1–2 mm. wide \times 7–10 mm. long, light creamy colour, clothed with short, fine hairs especially near the base, where there is usually a small mycelial pad. Thickness in section 480–800 μ .

Basidia: cylindric-clavate, about $35 \times 3.2-4.8 \mu$.

Spores: $3.2-4 \times 6.4-8 \mu$, elliptic-oblong with one side depressed and the end attenuated into a lateral apiculus, hyaline, smooth, abundant.

Gloeocystidia: $8-9.6-(16) \times 58-86 \mu$, subcylindric or clavate, hyaline, smooth, thinwalled, with homogeneous contents, immersed in the hymenial layer or often projecting up to $32-48 \mu$ beyond it.

Hyphae: hyaline, branched, septate, with thin, firm walls, $3.2-6.4 \mu$ wide, lacking clamps but with occasional H-anastomoses, all of one type.

Tissue differentiation: there are no abhymenial hairs and no compact tissue differentiated just below the abhymenial surface.

Specimens examined: 21099, 21208, 23160, 14516, 20403, 31858: Universiteit van Stellenbosch, Herbarium P. A. van der Byl No. 662 (as *S. pusillum* Berk.).

The pilei of this species have a well-marked tendency to split radially down the striae. They are brittle, and creamy in colour, when dry. Our description differs from that of Burt (loc. cit.) in spore size and thickness of the pilei. Burt has referred to the "hairlike cystidia", which are here called gloeocystidia. Although these may be emergent, their smooth walls and homogeneous, readily stained contents suggest gloeocystidia. These organs are similar to those found in *Corticium praetermissum* (= *Peniophora tenuis*) and it is somewhat a matter of personal taste what they shall be called.

This species is known so far from the Fountains-Groenkloof valleys near Pretoria, where it is fairly common, and from Durban, where one collection has been made.

The writer is indebted to Dr. R. W. G. Dennis for comparing Nos. 21099, 21208, with Schweinitz material in Kew Herbarium. Spores were lacking in the last-mentioned, but otherwise there was very close agreement.

(16) *Stereum durbanense* van der Byl (!) in Trans. Roy. Soc. S. Afr. 10 (1922) 155, Fig. 8, in Ann. Univ. Stellenbosch 7 (1929) 45; Doidge loc. cit. p. 489.

Stereum tomentosum van der Byl (!) in Trans. Roy. Soc. S. Afr. 10 (1922) 156, Fig. 9, in Ann. Univ. Stellenbosch 7 (1929) 45; Doidge loc. cit. p. 493.

FIG. 12.

Fructifications corky, drying tough, brittle and woody, lignicolous, somewhat orbicular, attached by the centre and partly resupinate over wide areas then widely reflexed, pilei sometimes connate and occasionally imbricate over the main pileus, overall size up to 7 × 12 cm. Surface with a thick pad-like tomentum of closely matted hairs, ochraceous to cinnamon, becoming greyish, if rubbed showing bright cinnamon-ochre colour, concentrically furrowed with more or less glabrous areas in the furrows and hence somewhat colour-zoned, colour lighter near the margin. Hymenium light-brown to light-fawn colour, smooth or slightly rimose or convoluted in places into small tubercles or larger humps, reflecting the abhymenial furrows near the margin, cracking a little on drying. Margin acute, undulate or lobed, usually a little darker than the rest of the hymenium. Thickness in section excluding tomentum 950–1500 μ , the tomentum itself 1000–2000 μ thick.

Basidia: hyaline, cylindric-clavate, forming a dense palisade, 3.2 × 17–26 μ .

Spores: hyaline, smooth, oblong-cylindric with a small lateral apiculus, 3.2 × 4.8–6.4 μ (3–4 μ diam. fide van der Byl).

Hyphae: of two kinds. Skeletal hyphae unbranched, 5.6–8 μ wide, dilutely to darkly coloured, thick-walled, with narrow or wider lumen, showing septa in the wider parts of the lumen and with contents darker brown than the walls. Generative hyphae 3.4–4 μ wide, branched, clearly septate, subhyaline to hyaline, thin-walled with wide lumen.

Tissue differentiation: hyphae compact and very closely interwoven; a dark zone subtends the abhymenial surface.

Abhymenial hairs: very thick and closely matted, dark red-brown, thick-walled, 4.8–8 μ wide.

Specimens examined: 15613 (three specimens ex Natal Herb. 471, originally determined by Lloyd as *S. subpileatum* Berk. and changed by van der Byl to *S. durbanense* van der Byl); 31852 (N.H. 606); 31898 (N.H. 692); 35559 (W. G. Rump, 756); 32007 (N.H. 904); 32478 (N.H. 341) as *Stereum tomentosum* van der Byl; 15601 (N.H. 341)

as *Stereum* sp.; Universiteit van Stellenbosch, Herbarium P. A. van der Byl No. 293 (Type of *S. durbanense*), 294, 517; Herbarium P. A. van der Byl No. 305, 132 (as *S. tomentosum*).

Careful microscopic examination of material of *Stereum tomentosum* has failed to distinguish it from *Stereum durbanense*, while it is believed that the minor macroscopic differences (in colour of the surface and the hymenium) are of no specific significance. They may have been more apparent in the fresh material but are now hardly distinguishable in the dry specimens. Since *S. durbanense* has page priority in the original place of publication of these two species, *S. tomentosum* is relegated to synonymy. Incidentally the latter is a more suitable epithet, especially as the species is not limited to the vicinity of Durban.

Authentic material of *S. durbanense* was found in the National Herbarium under No. 15613 (Natal Herb. 471) split up into three separate packets. This material had been determined by Lloyd as *Stereum subpileatum* Berk. (Lloyd Myc. Notes 5, 1917, L. 66, 15, Note 634; listed by Doidge loc. cit. p. 489). In assigning some of van der Byl's collections to this species, Lloyd noted that they differed from *S. subpileatum* in the absence of cystidia. Thus van der Byl (1922, loc. cit.) described the new species *S. durbanense* to accommodate them, and later (van der Byl, 1929, loc. cit.) noted that *S. durbanense* possessed a few hairlike cystidia, but that these were not encrusted as in *S. subpileatum*. The writer has seen material of *S. subpileatum* in Kew Herbarium, and there were bottle-brush paraphyses as well as cystidia. It is quite certain that *S. durbanense* is different, and that *S. subpileatum* must be excluded from South African lists.

The writer was unable to find in any of the material of *S. durbanense* the cystidia which van der Byl described as "20-60 \times 6-4 μ , emergent up to 8 μ , hairlike, colourless, not encrusted, very few found, only in parts of the hymenium". There were, however, scanty cystidioid hyphae which intruded into the hymenium but not beyond it. These were smooth, almost colourless, thick-walled, cylindrical, about 4.8 \times 48 μ , and were probably a form of skeletal hypha.

The absence of conductors differentiates *S. durbanense* from *S. rimosum*, *S. rimosum* var. *africanum*, and *S. rugosum*, with which it might be confused. Small specimens, though uncommon, might be confused with thick forms of *Stereum australe*, but for the absence of conductors. The species is quite distinctive and the microscopic check for conductors is seldom necessary. A further characteristic is that *S. durbanense* has a rather narrow hyaline hymenium above a brownish context, when viewed with the naked eye.

(17) *Stereum duriusculum* Berk. & Br. (!) in Journ. Linn. Soc. Bot. 14 (1873) 66; Doidge loc. cit. p. 489.

FIG. 22.

In *Bothalia* 6 (1951) 51-53, the writer described and discussed this species, and related ones, and proposed the new combination *Asterostromella duriuscula* (B. & Br.) Talbot. It is clear that *Stereum* is an unsatisfactory genus for the reception of this species, while many people will no doubt think the same of *Asterostromella*. What is needed is a study of the genera *Dichostereum* Pilat and *Vararia* Karsten, where possibly the true affinities of *Stereum duriusculum* will lie. For the present this species is left as *Asterostromella duriuscula*, and the reader is referred to the above paper for a description. For convenience the species is keyed out with other *Stereum* species in this paper.

(18) *Stereum elegans* Mey.; recorded by Kalchbrenner in Grev. 10 (1881) 58; Saccardo Syll. Fung. 6 (1888) 553; Doidge loc. cit. p. 493.

Kalchbrenner's record of this species referred to MacOwan's collection No. 1232. Doidge loc. cit., notes this material under *S. thozetii* Berk., which was the determination

given it by van der Byl on the sheet in Herb. S.A. Museum No. 34266. Having studied MacOwan's material, and had cospecific material checked at Kew, the writer confirms its determination as *Stereum thozetii* Berk.

Another collection, J. M. Wood No. 396 (National Herbarium Pretoria No. 10653) is filed in Pretoria and at Kew under *Stereum nitidulum*. This collection was cited by Bottomley (in S.A. Journ. Sci. 13, 1916, 440) as "*Stereum elegans* = *Stereum nitidulum* B.", and the sheet at Kew is annotated "= *Stereum elegans*", by Bresadola. This material certainly does not correspond with Petch's description of *S. elegans* (in Ann. Roy. Bot. Gard. Perad. 9, 1924, 260). The writer enlisted the aid of Dr. R. W. G. Dennis in comparing this specimen with material of *S. elegans* at Kew and was informed that it was a good match with *S. nitidulum* but not with *S. elegans*. It is dealt with in this paper under *S. nitidulum*.

It would appear that *Stereum elegans* must be excluded at present from South African lists.

(19) *Stereum fasciatum* (Schw.) Fr., Epicr. Syst. Myc. (1838) 546; Doidge loc. cit. p. 489.

The writer has seen no South African material which he can confidently refer to *S. fasciatum*. Many specimens are so named in the herbaria, particularly in Herbarium P. A. van der Byl. At first, van der Byl (in Trans. Roy. Soc. S. Afr. 10, 1922, 155, Fig. 7) classified his specimens as *Stereum lobatum*. Later (in Ann. Univ. Stellenbosch 7, 1929) he referred them all to *S. fasciatum*, commenting that up till then he had seen no typical specimens of *S. lobatum* in South Africa, although *S. fasciatum* was common in parts.

The writer has examined van der Byl's specimens in the Universiteit van Stellenbosch, Herbarium P. A. van der Byl. Most of them are undoubtedly *Stereum lobatum*; a few are rather small forms which may possibly be called *S. fasciatum*, but there are many intermediate forms and nowhere to draw the line between the two extremes. Furthermore these small forms are not altogether like North American specimens of *S. fasciatum*. Still other specimens labelled *S. fasciatum* have proved on examination to be *Stereum australe*.

In Bothalia 6 (1951) 45 and 50 the writer cited a collection of J. M. Wood No. 163 (under *Stereum luteobadium*) as *Stereum fasciatum*. This was an error, and re-examination of that collection has failed to distinguish it from *S. lobatum*.

It is felt that *Stereum fasciatum* must be listed as a doubtful species for South Africa. Notes differentiating *S. fasciatum* and *S. lobatum* are given under the latter species (p. 319).

(20) *Stereum friesii* L veille. Zoll. Verz. p. 17; Saccardo, Syll. Fung. 6 (1888) 266; Doidge loc. cit. p. 489.

FIG. 9.

Pileus sessile, lignicolous, slightly effused, not flexible, semi-dimidiolate or broadly spathulate, 1-3 cm. \times 1-1.5 cm., sometimes laterally connate. Surface velutinate or with a somewhat thicker tomentum, concentrically zoned, brown and light yellow-brown. Margin light brown, broad in young specimens, narrower in old. Hymenium creamy to cinnamon-cream, shading off near the attachment to a bay colour with a smoky violet tint. Margin wide and creamy in colour on the hymenial side. Sections 700-1000 μ thick.

Basidia: small, cylindrical, 12-16 \times 2.5-3.2 μ .

Spores: quite abundant, hyaline, smooth, ovate to subglobose, (1.7)-2.4 \times 3.2 μ or about 2.5-3 μ diam.

Cystidia: in the hymenium, projecting 11-18 μ , or embedded, hyaline, fusoid with fairly thin walls and wide lumen; walls minutely rugose and encrusted, easily losing the encrustation and then smooth, 27-38 \times 10-12 μ .

Gloeocystidia: smooth, thin-walled, deep-staining, embedded, fusoid, $7.5-8 \times 12-30 \mu$.

Hyphae: skeletal hyphae $3.3-4-4.8 \mu$ wide, hyaline, smooth, unbranched, without septa, thick-walled with a narrow lumen, the lumen occasionally wider; generative hyphae thin-walled, deep-staining, much branched, with occasional clamps, somewhat tortuous, $2.4-3.2 \mu$ diam.

Tissue differentiation: all tissues are rather compact and densely interwoven. There is no denser, coloured zone differentiated below the surface.

Abhymenial hairs: rather scanty, hyaline, thick-walled at the base with a wide lumen, the walls narrowing and the lumen widening towards the apex; 6.4μ diameter.

Specimens examined: Universiteit van Stellenbosch, Herbarium P. A. van der Byl No. 378.

This specimen is undoubtedly one of the same species as van der Byl No. 645 as *Stereum bellum*. It is not yet known whether *S. bellum* or *S. friesii* is applicable to the species, if either name is.

(21) *Stereum fulvum* (Lév.) Sacc., in Saccardo Syll. Fung. 6 (1888) 570; Doidge loc. cit. p. 489.

Telephora (Stereum) fulva Leveille (!) in Ann. Sci. Nat. ser. iii, 5 (1846) 149.

Stereum schomburgkii Berkeley (!) in Journ. Linn. Soc. Bot. 13 (1873) 168; Saccardo, Syll. Fung. 6 (1888) 568; Doidge loc. cit. p. 493; Talbot in Bothalia 6 (1951) 43.

Stereum atrocinerum (Masse) van der Byl in Ann. Univ. Stellenbosch 7 (1929) 44.

Peniophora atrocinerea Masse (!) in Journ. Linn. Soc. Bot. 25 (1889) 141.

Stereum retirugum Cooke (!) in Proc. Roy. Soc. Edinb. (1882) 456; Saccardo Syll. Fung. 23 (1925) 510; Doidge loc. cit. p. 492.

Hymenochaete olivaceum Cooke (!) in Grevillea 14 (1885) 11.

FIG. 20.

Resupinate or resupinate-reflexed, or conchiform and attached by a small umbo, orbicular-confluent, thin, coriaceous or papyraceous, loosely attached to the substratum. Reflexed surface tomentose, glabrescent when old, buffy-brown, concentrically furrowed in pileate specimens, the troughs being paler. Hymenium smooth, or more usually furrowed concentrically and cracking radially; colour very variable, through umber, brown, olive brown, light yellow-brown, brownish slate, depending on the state of development. Margin narrow, yellowish, finely fibrillose, usually free. Context concolorous, $200-500 \mu$ thick in section.

Basidia: clavate, $4.5-6 \times 20-25 \mu$, in young stages in a regular palisade, later interrupted and exceeded by the setoid hyphae.

Spores: $3.2 \times 6.4-6.8 \mu$, hyaline, broad elliptical or cylindrical-depressed, smooth.

Setoid hyphae: $3.5-8 \mu$ wide, cylindrical, often with a fusoid apex, brown, minutely rugulose near the apex, thick-walled with a very narrow lumen which sometimes expands at the apex, immersed or emergent up to 16μ , originating as skeletal hyphae which curve upwards into the hymenium, total length variable and indeterminate, very densely arranged, darkening in alkali.

Hyphae: skeletal hyphae brown, thick-walled, smooth, without clamps, of the same dimensions as the setoid hyphae; generative hyphae hyaline to light yellow-brown intermeshing with the skeletal, $3.5-4.5 \mu$ diam., often indistinct, thin to thicker-walled, with occasional clamp connections.

Tissue differentiation: The hyphae form a more or less horizontal weft without a darker or more compact basal layer.

Abhymenial hairs: pallid to light yellow-brown, 5 μ diam., fairly thick-walled, septate, with occasional clamp connections.

Specimens examined: Type of *Thelephora* (*Stereum*) *fulva* Lév., Drège 9441, Cap-de-Bonne-Esperance, in Herb. Mus. Paris; Type of *Stereum schomburgkii*, Schomburg, Australia, in Herb. Kew.; Type of *Peniophora atrocinerea* Masee (sub "*Corticium atrocinereum* Kalchbr."). *P. MacOwan*, Cape Province, in Herb. Kew.; as *Stereum atrocinereum* (Masee) van der Byl, *MacOwan* 1197 (Herb. S. Afr. Mus. No. 34284); as *Stereum membranaceum*, A. Pegler (1234) in National Herbarium Nos. 8414 and 34454; 31863, 8756, 35237, 28942, 20944, 27644, 27544, 27552, 28496, 28499, 28304, 28504, 28687, 34951, 36800, 36801, 11968, 11770, 28565, 27758, 27607, 28493, 30881, 33074, 33565, 34454, 8414, 2301, 33990, 33179; Höeg F. 67 in Herb. Kew.

This species is well known under the name *Stereum schomburgkii*. Recent examination of the type of *S. fulvum* Lév., borrowed from Herb. Mus. Paris, has shown that the two are synonymous, and consequently the earlier epithet must now be taken into use.

In *Bothalia* 6 (1951) 44, the writer gave reasons for reducing *S. atrocinereum* (Masee) van der Byl to synonymy, and also reasons for the variation in colour of the specimens. The material which van der Byl described as *S. atrocinereum* has now been seen, in Herb. S. Afr. Mus. 34284. It corresponds with the material of *Peniophora atrocinerea* in Herb. Kew, and is almost certainly part of the same collection.

Doidge's record of *Stereum retirugum* refers to Mocambique only, but it is confirmed that Cooke's type of the species in Herb. Kew is synonymous with *S. fulvum*.

The only record of *S. membranaceum* Fr. for South Africa (Pole Evans and Bottomley in Ann. Bolus Herb. 2, 1918, 192) is based on a pale form of *S. fulvum* and not on the species suggested. Lloyd (in Lloyd Myc. Notes 6, 1920, 960) suggests that *S. schomburgkii* differs mainly from *S. membranaceum* in having an amber hymenium instead of one which is violaceous but fades when old. Actually *S. membranaceum* is a synonym of *Stereum papyrinum*, a species not unlike *Stereum umbrinum*.

The type number of *Stereum fulvum*, Drège No. 9441, is cited in mistake for Drège No. 9442 under *Stereum murrayi*, by Doidge loc. cit. p. 491.

(22) *Stereum fuscum* (Schrad.) Quélet, Flor. Myc. de Fr. (1888) 14; Doidge loc. cit. p. 488.

Doidge lists the South African records of this species and correctly indicates that it is a synonym of *Stereum bicolor* (Pers. ex Fr.) Fr.

MacOwan's specimen No. 1244 (as *Thelephora biennis*, Herb. S. Afr. Mus. 34292), determined by van der Byl as *S. fuscum*, is *S. bicolor*. A note on the nomenclature of this species was given in *Bothalia* 6 (1951) 40.

(23) *Stereum glabrescens* Berk. & Curt.; Recorded by van der Byl in Trans. Roy. Soc. S. Afr. 10 (1922) 151, Fig. 1, and in Ann. Univ. Stellenbosch 7 (1929) 37; Doidge loc. cit. p. 487.

A wrong record based on specimens of *Stereum affine* (see p. 305). *Stereum glabrescens* is not known to occur in South Africa.

(24) *Stereum hirsutum* (Willd.) Pers. ex S. F. Gray, A Natural Arrangement of British Plants 1 (1821) 652; Persoon in Roemer Neues Mag. Bot. 1 (1794) 110; Saccardo Syll. Fung. 6 (1888) 563; Doidge loc. cit. p. 489.

Thelephora hirsuta Willdenow, Flor. Berol. Prod. (1787) 397; Fries, Syst. Myc. 1 (1821) 439; Persoon, Syn. Meth. Fung. (1801) 570, Myc. Eur. 1 (1822) 116.

Stereum amoenum Kalchbr. & MacOwan (!) in Grev. 10 (1881) 58; Doidge loc. cit. p. 490 (nec *S. amoenum* Lév.).

Stereum kalchbrenneri Saccardo, Syll. Fung. 6 (1888) 568; Doidge loc. cit. p. 490.

FIG. 11.

Fructifications coriaceous, lignicolous, gregarious, usually laterally connate, imbricate, effuso-reflexed or dimidiate, occasionally semi-resupinate and attached by an umbo; radius 1–4 cm. from attachment, 0·7–5 cm. wide or several centimetres wide by lateral confluence. Surface covered with strigose-fasciculate or matted hairs, showing concentric zonation, concentrically furrowed, coloured greyish, light yellow-brown, or a deeper reddish-brown. Hymenium smooth, creamy to buff, cinnamon or light orange colour. Margin thin, entire to undulate or lobed, not notably differentiated. Thickness in section 600–800 μ .

Basidia: cylindric-clavate, 25–35 \times 3·5–4·8 μ .

Spores: hyaline, cylindrical, sometimes slightly bent, smooth, 2·4 \times 6·4–8 μ .

Hyphae: generative hyphae hyaline, smooth, thin-walled with wide lumen, septate, branching, lacking clamps, 2·4–3·2–(4) μ wide; skeletal hyphae hyaline, smooth, thick-walled with narrow lumen, occasionally septate, unbranched, without clamps, 6·4–8 μ wide.

Cystidioid hyphae: present in many but not all specimens, arising as skeletal hyphae and curving into the hymenium but not beyond it, hyaline, thick-walled with a narrow lumen except at the apex where the lumen expands, contents of lumen hyaline to yellow-brown, up to 9·6–(16) μ wide at apex.

Tissue differentiation: A compact golden coloured dense zone subtends the abhymenial surface; the trama is composed of closely intertwined hyphae arranged more or less horizontally.

Abhymenial hairs: 6·4–9·6 μ diam., hyaline or rarely dilutely coloured, smooth, thick-walled with narrow lumen, occasionally septate, intertwined and matted or arranged somewhat parallelly.

Specimens examined: 34953, 23374, 27517, 24822, 11292, 11255, 34956, 31525, 24873, 31298, 34955, 11290, 34479, 34957, 34954, 12173, 31709, 17299, 9060, 31234, 23670, 11290, 30516, 27722, 30720, 30261, 30803, 9148, 27539, 24822, 1952, 8776, 8773, 2344, 27518, 34072, 30735, 27538, 33067, 26697, 17803, 18151, 20586, 23671, 17101, 27518, 11255, 30948, 31454, 13793, 31737, 28967, 28880, 27647, 27340, 25879, 15484, 2344 (in part), 23474, 22085, 18146, 30893, 36707, 34200, 31031, 1017, 11292, 23374, 29719, 13073, 33067, 28859, 28835, 28756, 17788, 15496, 28951, 30719, 31298, 31807, 31892, 32504; Sub. *S. spadiceum*, 13793, 12993, 5651, 1707.

Reasons for sinking *S. amoenum* and *S. kalchbrenneri* in synonymy are given in the notes on those species.

Compared with European specimens of *S. hirsutum*, the majority of South African material is more luxuriant, not so generally greyish in surface colour, and very frequently shows a strong development of cystidioid hyphae. These are features which contributed to the erection of the species *S. kalchbrenneri*, but the species is so variable and merges so closely into more typical *S. hirsutum* that it is felt that a separate name is not warranted. See also notes on *S. vellereum*, p. 329.

(25) "*Stereum hirsutum* forma *kalchbrenneri*". In S. Afr. Journ. Sci. 42 (1946) 133, Simpson & Talbot listed a collection under the name "*Stereum hirsutum* (Willd.) Fr. *kalchbrenneri* forma", under the impression that *S. kalchbrenneri* had already been proposed as a form of *S. hirsutum*. It is possible that this citation constituted the proposal of a *nomen nudum* for a new form. The material referred to may be included in the species *S. kalchbrenneri* which we here regard as a synonym of ***Stereum hirsutum*** (Willd.) Pers. ex S. F. Gray.

(26) ***Stereum involutum*** (Klotzsch) Fries, Epicrisis (1836–38) 546; Saccardo, Syll. Fung. 6 (1888) 560; Lloyd, Syn. Stip. Stereum, in Lloyd Myc. Notes 4 (1913) 40; Doidge loc. cit. p. 490.

Thelephora involuta Klotzsch (!) in Linnaea 7, p. 499.

Lloydella involuta (Kl.) Bresadola in Ann. Myc. 18 (1920) 60.

Stereum bresadoleanum Lloyd (!), Syn. Stip. Stereum in Lloyd Myc. Notes 4 (1913) 41; Stevenson & Cash in Bull. Lloyd Library 35 (1936) 51; Doidge loc. cit. p. 488.

Stereum proximum Lloyd, Syn. Stip. Stereum in Lloyd Myc. Notes 4 (1913) 40; Doidge in loc. cit. p. 488.

FIG. 7.

Fructifications coriaceous, drying tough and with a horny hymenium, lignicolous, gregarious, attached by a reduced base, usually several pilei attached by reduced bases and laterally connate above, semiflabellate or petaloid, radius 1-3 cm. from the attachment, width 1.5-3.5 cm. Surface very finely velutinate, marked with very narrow concentric zones coloured tawny, yellowy-orange, greyish or light brown, not distinctly furrowed, general effect tawny when young becoming darker brown when old. Hymenium waxy, reddish-bay colour, smooth, paler towards the margin, drying darker and distinctly horny. Margin paler on both surfaces, involute or slightly crimped, very thin. Thickness in section up to 1000 μ .

Basidia: closely packed, rather indistinct, about $3 \times 16-20 \mu$.

Spores: uncertain, thought to be about $1.6-2 \times 2.4-3 \mu$, elliptical, hyaline.

Cystidia: fusoid, thick-walled, hyaline, staged in the hymenium, embedded, scarcely ever emergent, encrusted at the apex or smooth, encrustation soluble in KOH, always abundant, $10-15 \times 27-66 \mu$.

Gloeocystidia: usually subulate with a swollen base, sometimes more cylindrical or fusoid, thin-walled, with homogeneous contents, hyaline, embedded in the hymenium and subhymenium, abundant in thicker parts of the specimens seen, $7.3-10 \times 40-66 \mu$.

Hyphae: generative hyphae thin-walled, hyaline, with occasional septa, branches and clamp connections, $3.2-4 \mu$ diam.; skeletal hyphae thick-walled, hyaline, without septa, rarely branched, without clamps, $3.2-4.8 \mu$ diam. The two hyphal types are densely intermingled.

Tissue differentiation: There is no well-marked colour zone subtending the abhymenial surface. Unmounted sections show the dark, waxy hymenium and sometimes a similar dark abhymenial zone.

Abhymenial hairs: hyaline to very dilutely coloured, free or fasciculate, thick-walled, $8-10-12 \mu$ diam.

Specimens examined: 14909 b, 31956, 31750, 15556; Type of *Thelephora involuta* Kl., Mauritius, in Herb. Kew.; Universiteit van Stellenbosch, Herbarium P. A. van der Byl Nos. 192, 193 (as *S. proximum*).

Specimens comprising this taxonomic species were found distributed in the National Herbarium under the names *S. proximum*, *S. bresadoleanum* and *S. involutum*, among which was authentic material of *S. bresadoleanum*.

Van der Byl (in Ann. Univ. Stellenbosch 7, 1929, 38) described *S. proximum* and distinguished it from *S. involutum* by the more finely velutinate surface of the former. In the absence of authentic material of *S. proximum*; the writer must follow published synonymy. By Lloyd's own admission (in Lloyd Myc. Notes 7, 1922, 1115, Fig. 2095), *S. proximum* Lloyd is a synonym of *S. bresadoleanum* Lloyd, which he previously suggested (in Syn. Stip. Stereum in Lloyd Myc. Notes 4, 1913, 40) was a form *S. involutum*. Bresadola (in Ann. Myc. 18, 1920, 60) united *S. bresadoleanum* and several other species under the name *Lloydella involuta*, whose specific epithet is accepted here. Having compared type material of *S. involutum*, the writer agrees that *S. bresadoleanum* is synonymous.

The species is characterised by its finely velutinate surface and the waxy, reddish bay hymenium, also by possession of cystidia, gloeocystidia and a dual hyphal system. Gloeocystidia do not appear to be mentioned in available descriptions. They are usually abundant, but might easily be missed without the use of a stain like phloxine.

(27) *Stereum kalchbrenneri* Saccardo (!), Syll. Fung. 6 (1888) 568; Doidge loc. cit. p. 490.

= *Stereum hirsutum* (Willd.) Pers. ex S. F. Gray. See further notes under *Stereum amoenum* (p. 305) and *Stereum hirsutum* (p. 316).

(28) *Stereum laxum* Lloyd (!) in Lloyd Myc. Notes 4 (1915) L. 60, 10, Note 339; Doidge in loc. cit. p. 491.

= *Stereum bicolor* (Pers. ex Fr.) Fr. See p. 308.

(29) *Stereum lobatum* (Kunze ex Fr.) Fries, Epicr. (1838) 547; Saccardo, Syll. Fung. 6 (1888) 568; Doidge loc. cit. p. 491.

Thelephora lobata Kunze in Weigelt Exsiccati, 1827; Fries in Linnaea 5 (1830) 527.

FIG. 10.

Fructifications coriaceous, sessile, typically wedge- or fan-shaped, tapering to a reduced base which is attached by a small umbo (one centrally attached, infundibuliform specimen was seen), often produced singly, sometimes laterally connate, the connate pileoli produced from one or more umbo. There is very infrequently any resupinate part. Size varying from 4–10 cm. radius \times 2–10–20 cm. in width. Surface concentrically furrowed and colour-zoned, with a thin velvety tomentum of closely matted hairs inclined to rub off easily in old specimens leaving at least some bare zones. Colour of surface uniform light yellow-brown to somewhat deeper brown, reddy brown grey or greeny-gray, especially becoming greyish with hazel or chestnut coloured rubbed zones. Hymenium smooth or reflecting slightly the surface furrows, coloured creamy to light buff, not dark coloured or cinereous. Margin acute, entire or undulate, or vaguely lobate in connate specimens. Thickness in section 700–900 μ .

Basidia: 3.5–5 \times 24–33 μ , cylindrical-clavate, compact.

Spores: 2.7–3.3 \times 5.3–(8) μ , hyaline, cylindrical with one side a little depressed, or oblong or broad-elliptical, smooth.

Hyphae: hyaline or some very dilutely coloured, unbranched, without clamps. thin-walled, 2.5–4 μ diam., septate, sometimes with expanded parts up to 8 μ diam. Other hyphae are thin- to thick-walled with a wide lumen, up to 8 μ diam. Some of the thick-walled hyphae about 6.4 μ diam., curve up and intrude into the hymenium.

Tissue differentiation: a yellow-brown zone is present beneath the layer of abhymenial hairs.

Abhymenial hairs: 3.2–6.4 μ diam., yellowish, thick-walled, septate, somewhat fasciculate.

Specimens examined: 13794, 33379, 31559, 27332, 30741, 28971, 17098, 34950, 34126, 36615, 34210, 34196, 28503, 36613, 11544, 23347, 17811, 9150, 23232, 31560, 27537, 31667, 31296, 30837, 11291, 31559, 11523, 12049, 34516, 14907, 10654 (J. M. Wood, 163), 20972 (MacOwan, 1269); Herb. S.A. Museum 34265 (MacOwan 1163, 1276, as *S. versicolor* then det. van der Byl as *S. fasciatum*).

There is difficulty in separating *S. lobatum*, *S. fasciatum* (Schw.) Fr. and *S. concolor* (Jungh.) Sacc.

The above taxonomic species is composed of specimens which are large and flabellate or slightly lobed, and not effuso-reflexed. They are all rather thin and with a thin, velvety tomentum. Single, typical specimens of *S. concolor* may be held apart from *S. lobatum* on account of their uniform light brown tomentum, but there is little doubt that such forms merely represent a young stage in the growth of *S. lobatum* (see p. 310). The latter is typically greyish or greeny-gray with hazel or chestnut coloured rubbed zones, but specimens with a brownish surface have also been included here under *S. lobatum*.

Stereum fasciatum is without doubt very close to *S. lobatum*, but differs principally in being thicker, with a thicker, shaggy tomentum, and in frequently being effuso-reflexed when young, in which state it is strongly reminiscent of *S. hirsutum*. Frms referred to *S. lobatum* are larger, thinner and more flexible and have a finer, softer, adpressed tomentum which rubs off with age leaving the pileus with smooth shining chestnut-brown zones.

There is apparently no distinguishing microscopic character, but it may be convenient to retain the two names for the extreme forms which look very different. Intermediates are to be found, but on the whole *S. fasciatum* is smaller and most frequent in the temperate regions, whereas *S. lobatum* is typically a tropical fungus and sometimes becomes very large.

Some of the differences noted above are based on notes kindly supplied by Miss E. M. Wakefield. Compare also the discussion under *S. fasciatum* (p. 314).

(30) *Stereum lobatum* (Kunze) Fr. var. *cinereum* Lloyd ex Doidge in Bothalia 5 (1950) 487, *nomen nudum*.

Lloyd did not publish the varietal epithet which is attributed to him by Doidge. As Doidge (loc. cit.) noted, this variety is a synonym of *Stereum australe* Lloyd.

(31) *Stereum luteobadium* Fries: recorded by Kalchbrenner in Grev. 10 (1881) 58; Bottomley in S.A. Journ. Sci. 13 (1916) 440.

The collection (Wood 163, National Herbarium 10654, and in Kew Herbarium under *Hymenochaete luteobadia*) cited in the above papers was referred to *Stereum fasciatum* by van der Byl (in Ann. Univ. Stellenbosch 7, 1929, 50) and by Doidge (loc. cit. p. 485), and also by Talbot (in Bothalia 6, 1951, 45 & 50). The writer would now refer it to *Stereum lobatum*. In Herb. Kew there is also a specimen "leg. P. MacOwan, 9/83, C.B.S., Herb. Kalchbrenner" as *S. luteobadium* in the *Hymenochaete luteobadia* folder. This too is *S. lobatum*. *Hymenochaete luteobadia* (Fries) Höhnelt & Litsch. does occur in South Africa.

(32) *Stereum membranaceum* Fr. Recorded by Pole Evans & Bottomley in Ann. Bolus Herb. 2 (1918) 192.

The collection referred to (A. Pegler, 1234, in National Herbarium Nos. 8414 & 34454) is a pale form of *Stereum fulvum* Lev. (!) (see p. 315) with setoid hyphae rather more encrusted than usual. This correction was noted by Doidge loc. cit. p. 493 under *S. schomburgkii*, a synonym of *S. fulvum*.

(33) *Stereum murrayi* (Berk & Curt.) Burt in Ann. Mo. Bot. Gard 7 (1920) 131 (as *S. murrayi*); Rogers & Jackson in Farlowia 1 (1943) 290; Doidge loc. cit. p. 491.

Thelephora murrayi Berk. & Curt. in Journ. Linn. Soc. Bot. 10 (1868) 329.

FIG. 16.

Fructifications lignicolous, resupinate, effused, becoming rarely slightly reflexed at the margin, rather tough, woody to corky. Surface hard, crustose, uneven, black, showing as a narrow black seam when resupinate. Hymenium creamy to tan or buff colour, smooth or uneven or somewhat tubercular, becoming shallowly cracked. Margin entire. Thickness in section up to about 5 mm. Context with a veined, mottled or marbled appearance.

Basidia: not seen.

Spores: not seen. (Hyaline, smooth, flattened on one side, $4.5-5 \times 2.5 \mu$, fide Burt).

Vesicles: embedded in strata, very numerous, hyaline, with thin firm walls, homogeneous contents, pyriform, $11-15 \times 12-25 \mu$. Sometimes the vesicles are elongated, subcylindrical, or ventricose or fusoid thus appearing like gloeocystidia and then $8-14 \times 40-60 \mu$.

Hyphae: hyaline, suberect, densely interwoven; some are branched, septate, tortuous, submoniliform, deep-staining, up to $5\ \mu$ diam. Others are straight, much branched, filamentous, not staining, $1\text{--}2\ \mu$ diam.

Tissue differentiation: The context is divided into strata at the junctions of which the vesicles are most numerous. Much mineral matter is present.

Specimens examined: Universiteit van Stellenbosch, Herbarium P. A. van der Byl No. 708; 39709 (J. Weese, Eumycetes selecti exsiccati No. 548).

Van der Byl's collection No. 708 of this species is old and in poor condition. Apart from its greater thickness and the presence of only a few vesicles in good condition, this collection is a good match with *S. murraini*. It is probable that the numerous air spaces which are present in van der Byl's material represent vesicles which have degenerated with age, and the context is not as hard as described for *S. saxitias* Burt (Burt loc. cit. p. 134).

The above description was drawn mainly from European material in the National Herbarium. In it, the elongated form of vesicle was common. As noted by Rogers and Jackson (loc. cit.) this kind of vesicle is encountered in the form of *S. murraini* which was known as *Corticium effusum* Overholts.

(34) *Stereum nitidulum* Berk.; Saccardo Syll. Fung. 6 (1888) 552; Doidge loc. cit. p. 491.

FIG. 2.

Fructifications terrestrial among grass roots, coriaceous, centrally stipitate, infundibuliform, radius $0.7\text{--}1.2$ cm., $0.6\text{--}1.2$ cm. wide. Stipe $5\text{--}7$ mm. long, 1 mm. diam., light tan colour, smooth, glabrous. Surface glabrous, smooth, concentrically zoned with bay and light yellow-brown bands. Margin thin, indented to shortly lacinate. Hymenium light yellow-brown showing one or two darker bands corresponding to the darkest of the bands on the abhymenial surface, i.e. the pileus is semi-translucent. Thickness in section $500\text{--}800\ \mu$.

Basidia: cylindrical to clavate, $20\text{--}30 \times 3\text{--}4.5\ \mu$, sometimes showing a basal clamp connection.

Spores: hyaline, smooth, ovate, subglobose, or uncommonly broad-elliptical, $3.2\text{--}4 \times 4.4\text{--}8\ \mu$, or about $4.5\ \mu$ diam.

Gloeocystidia: abundant, thin-walled, with homogeneous contents, flexuous, subcylindrical to subfusoid or ventricose, embedded in and just beneath the hymenium, $40\text{--}80 \times 7\text{--}10.5\ \mu$.

Hyphae: generative hyphae hyaline, thin-walled, branched, staining deeply, septate, with occasional clamp connections, up to $3.2\text{--}4.8\ \mu$ diam., but mostly collapsed, intermingled throughout with the skeletal hyphae which are $3.2\text{--}4.8\ \mu$ wide, hyaline, thick-walled, with lumen narrow or invisible, not staining, unbranched, not septate, without clamps.

Tissue differentiation: There are no abhymenial hairs and no compact zone subtending the abhymenial surface.

Specimens examined: 10653 (J. M. Wood No. 396); Wood A396, Inanda, Natal, in Herb. Kew.

This species is not unlike *S. thozetii* but has spores only about half the size of those of the latter. The sub-translucent character of the pileus is also characteristic, so that the pileus appears brownish on both surfaces. Dr. R. W. G. Dennis kindly compared our material with the type of *S. nitidulum* and found that they were a good match. (See also under *S. elegans*, p. 313).

The material of *S. nitidulum* corresponds very closely with Welwitsch 427, British Museum, as *Stereum ravenelii*, the latter differing only in having gloeocystidia about twice as large and having skeletal hyphae in which the lumen is usually rather wide. The size of the gloeocystidia in these stipitate Stereums is known to vary greatly (cfr.

Martin in *Lloydia* 7, 1944, 75) but with only a single specimen of each species available for study the limits of variation remain unknown, and for that reason Welwitsch 427 is treated in this paper as *S. ravenelii*.

(35) *Stereum notatum* Berk. & Br.: Recorded by Kalchbrenner in Grev. 10 (1881) 59; Saccardo Syll. Fung. 6 (1888) 581; Doidge loc. cit. p. 491.

The specimens backing this record have been examined. They are J. M. Wood No. 109 (Herb. S.A. Museum No. 34285), and MacOwan No. 1091 in Kew Herbarium, ex Herb. Kalchbrenner.

The description of this species given in Saccardo would apply to practically any young, effuso-reflexed *Stereum*, but according to Petch (in Ann. Roy. Bot. Gard. Perad. 9, 1925, 264) *Stereum notatum*, a Ceylon species, is a "bleeder". There is no indication of conducting vessels or discolouration of the hymenium in either of the two South African specimens under this name. The writer considers that both these specimens are merely young immature, examples of *Stereum hirsutum*, and that *S. notatum* should not appear in South African lists.

(36) *Stereum ochraceo-flavum* Schw. ex Peck; Burt in Ann. Mo. Bot. Gard. 7 (1920) 183.

Doidge (in Bothalia 5, 1950, 491) cites two specimens as the basis of this record for South Africa. One of these, No. 30822, is a pale form of *Stereum hirsutum*. Of the other, No. 22001 (MacOwan, 1091 b), all material is missing except two slides with a few sections on each. The sections do not show the cystidia which Burt (loc. cit.) describes for the species. *S. ochraceo-flavum* is thus considered a very dubious record.

(37) *Stereum ostrea* (Blume & Nees) Fr.; Recorded by Lloyd in Lloyd Myc. Notes 6 (1920) 952; Listed by Doidge loc. cit. p. 489 as a synonym of *S. fasciatum*.

The writer has not seen the specimen cited by Lloyd. Burt (in Ann. Mo. Bot. Gard. 7, 1920, 155) gives *S. ostrea* as a synonym of *S. fasciatum*. Bresadola (in Hedwigia 51, 1912, 321) treats the species *S. lobatum*, *S. concolor* and *S. perlatum* as forms of *Stereum ostrea*. The present writer is not in a position to evaluate the soundness of this treatment.

(38) *Stereum percome* Berk. & Br. (!). Recorded by Doidge loc. cit. p. 491; Masee in Journ. Linn. Soc. Bot. 27 (1890) 185.

Masee's record is based on a specimen in Kew Herbarium under *S. percome*, namely "MacOwan, C.B.S. 9/83". The writer has compared this specimen with the type of *S. percome* and found that MacOwan's specimen is *Hymenochaete nigricans* (Lév.) Bres.

(39) *Stereum perlatum* Berk. in Hook. Lond. Journ. 4 (1842) 153; Doidge loc. cit. p. 492.

The specimen on which this record is based is Universiteit van Stellenbosch, Herbarium P. A. van der Byl No. 144, which Lloyd determined in Lloyd Myc. Notes 6 (1920) 952. It is probably only an old and weathered example of *Stereum lobatum*. It is old, somewhat broken up, and in very poor condition, and should certainly not have been made the basis of a new record for the country, especially considering that *S. perlatum* is only critically separable from *S. lobatum*.

(40) *Stereum proximum* Lloyd, Syn. Stip. Stereum in Lloyd Myc. Notes 4 (1913) 40; Doidge loc. cit. p. 488; van der Byl in Trans. Roy. Soc. S. Afr. 10 (1922) 152, Fig. 2; van der Byl in Ann. Univ. Stellenbosch 7 (1929) 38.

= *Stereum involutum* (Klotzsch) Fries, see p. 317.

(41) *Stereum pruinatum* Berk. & Curt. (!).

The MacOwan collection (1227), Somerset East, in Herb. Kew. has been compared with the type of *S. pruinatum* and is not that species. It is entirely resupinate with a more or less chocolate-coloured hymenium, pruinose under the lens and much cracked on drying. The margin is lighter, yellow-brown, appressed and somewhat fibrillose; texture spongy; $520\ \mu$ thick. The structure is corticioid. The microscopic characters are not very distinct, the hyphae are dark brown, about $4\ \mu$ wide, with roughish walls; the walls are thickened but the lumen is quite distinct. The hyphae are branched, without clamps, and of one type only. The basal tissues are more compact and run out into hairs of the same type as the hyphae. It appears to have basidia which are short and dumpy, and gloeocystidia are present. No spores were seen, except some traced to an *Aspergillus* sporophore.

(42) *Thelephora (Stereum) pulverulenta* Léveille (!) in Ann. Sci. Nat. ser. iii, 5 (1846) 149; Doidge loc. cit. p. 491.

The type of this species, namely Drège No. 9442, was kindly lent to the author by Herb. Museum Paris. It proves to be undoubtedly a species of *Hymenochaete*, most probably *Hymenochaete luteobadia* (Fr.) Höhnelt & Litsch.

The citation by Doidge (loc. cit. p. 491) of Drège No. 9441 in this connection is an error. Her citation of *S. pulverulentum* Lév. as a synonym of *S. murrayi* is no doubt also an error, firstly because Léveille's species has priority and secondly because Burt (in Ann. Mo. Bot. Gard. 7, 1920, 131) indicates that *S. pulverulentum* Peck is the synonym of *S. murrayi*.

(43) *Stereum purpureum* (Pers. ex Fr.) Fries; Persoon in Roemer Mag. Bot. 1 (1794) 110, Obs. Myc. 2 (1799) 92; Fries Epicrisis (1838) 548, Hym. Eur. (1874) 639; Doidge in Bothalia 5 (1950) 492.

Thelephora purpurea Persoon, Syn. Fung. (1801) 571, Myc. Eur. 1 (1822) 121; Fries, Syst. Myc. 1 (1821) 440.

Stereum rugosiusculum Berk. & Curt. in Grevillea 1 (1873) 162.

FIG. 17.

Fructifications coriaceous then later tough, lignicolous, resupinate becoming reflexed, or sessile, dimidiate, single or laterally confluent, often closely imbricate, the pileate part 0.4–1.3 cm. radius and 1–5 cm. wide by lateral fusion. Surface light brown or fawn with matted villose hairs forming a soft thick covering, sometimes with a few obscure colour zones and concentric furrows towards the margin. Margin sometimes concolorous, usually paler or greyish, often involute, sometimes narrowly lobed by fusion of the pilei. Hymenium ceraceous or subgelatinous when fresh, becoming horny on drying, smooth, purplish or violaceous, becoming fawn or brown with a livid tinge when dry.

Basidia: $25\text{--}40 \times 3\text{--}5\ \mu$, cylindric to subclavate, with 4 sterigmata, forming a dense palisade.

Spores: usually abundant, hyaline, smooth, elliptical with one side depressed and a small lateral apiculus, or oblong-cylindrical, $2.5\text{--}3 \times 5.5\text{--}6.5\ \mu$.

Cystidioles: not always present, $42\text{--}60 \times 5\text{--}7\ \mu$, hyaline, not encrusted, smooth, subulate to subcylindrical with a pointed or rounded apex, formed in the hymenium and usually projecting above it.

Vesicles: (11)– $17.5\ \mu$ diam. or the same width and up to $20\text{--}30\ \mu$ long, globular, ovate or pyriform, sometimes elongated especially when near the hymenium, smooth, thin-walled, terminal, with homogeneous contents, formed in a rather loosely-woven tissue below the hymenium, evidently a form of gloeocystidium.

Hyphae: all hyaline, $3\text{--}4\ \mu$ diam., some thick-walled, unbranched, non-septate; others with thin walls, branched, septate and with rare clamp connections.

Tissue differentiation: hyphae of the lower part of the trama densely intertexted, upper tissue bearing vesicles more loosely intertexted; there is a narrow pale brown seam of hyphae subtending the abhymenial hairs.

Abhymenial hairs: thin- or thick-walled, free or fasciculate, 3–4 μ diam., like the hyphae.

Specimens examined: 15523, 36729; A. E. Eaton, Cape, as *S. vorticosum* in Herb. Kew.

Cystidioles are not always present, and may be difficult to see when they are present. The form with cystidioles was once distinguished as *S. rugosiusculum*, but it appears that production of cystidioles is probably dependent on weather conditions. The presence of vesicles is a very helpful diagnostic character for the species. Fructifications of *S. purpureum* are apparently rare in South Africa though the pathological effect of this fungus in producing "silverleaf" disease of fruit trees is quite well known.

Judging from specimens in the National Herbarium, there has been a tendency to confuse *S. purpureum* with the conidial state of *Punctularia affinis* (B. & C.) Talbot. This must have been due to the similarity in their colour alone.

(44) *Stereum pusillum* Berk.; Saccardo Syll. Fung. 6 (1888) 559; Doidge loc. cit. p. 492.

The specimens cited by Doidge have all been examined. Two of them are referred to *S. thozetii*. The other, 31858 (Universiteit van Stellenbosch, Herbarium P. A. van der Byl No. 662) is in rather poor condition, but appears to be *Stereum diaphanum*. *S. pusillum* should be omitted from South African lists.

(45) *Stereum radicans* (Berk.) Burt in Ann. Mo. Bot. Gard. 7 (1920) 108; van der Byl in Ann. Univ. Stellenbosch 7 (1929) 37, Pl. 2, 13; Doidge loc. cit. p. 492.

Thelephora radicans Berk. in Hooker's Lond. Journ. Bot. 3 (1844) 190.

FIG. 23.

The material on which this record is based was studied in Universiteit van Stellenbosch, Herbarium P. A. van der Byl No. 2384, and another part of it was kindly lent to the writer by Dr. J. C. F. Hopkins from Mycol. Herb. Dept. Agric. S. Rhodesia No. 3878 (Eyles, 4153). A description of this material is appended.

Fructifications terrestrial, thick, distorted, somewhat spatulate or flabellate but rather indefinite in shape. There is no proper stipe but the pileus narrows towards the base and might be considered laterally stipitate. Both surfaces are rugose and radially furrowed. The upper surface has a hint of fine radial striae near the margin. Margin entire, thick. Upper surface coloured chocolate; hymenium almost concolorous but with darker blackish patches suggesting a "bleeding" species. Spores not seen. Hyphae all hyaline, some wide with thick walls; others narrow. Long, deep-staining elements which are a form of conducting vessel are present; they are up to 560 μ or more in length, unbranched, non-septate, thin-walled (4.8)–6.5–11 μ wide, very abundant. Other microscopic characters are rather indistinct. The pileus colour suggests a species of *Thelephora*, but the texture is that of a *Stereum*. The context is light-brown in colour.

Burt's description of *S. radicans* states that no cystidia or gloecystidia are present, and this statement is repeated by Martin (in *Lloydia* 7, 1944, 77). The conducting vessels in Eyles' specimen are so conspicuous that it would seem that it must be unrelated to *S. radicans*, for such a feature could not have been missed if it were present in *S. radicans*. Burt also emphasises the longitudinal striae on the upper surface of the pileus; there is a hint of these in the present specimen, but no more. Martin (loc. cit.) infers that a radicating base is not a constant feature of this species; certainly

it is not shown in Eyles' specimen. Martin further states that his collections approach *Cladoderris*, another feature which casts doubt on the determination of Eyles' specimen as *S. radicans*.

Although there may be similarities in external form with *S. radicans*, the absence of spores and the presence of conductors in Eyles' specimen make a confident identification impossible.

(46) *Stereum ravenelii* Berk. & Curt. in Grevillea 1 (1873) 162; Doidge loc. cit. p. 492.

FIG. 1.

Fructifications coriaceous, terrestrial, centrally stipitate, infundibuliform, 7 mm. radius from attachment, 1.5 cm. diam. Stipe 6 mm. long, 1 mm. wide. Surface glabrous, concentrically furrowed, with red-brown, bay or yellow-brown zones. Hymenium yellow-brown to brownish when dry. Margin thin, entire.

Basidia: compact, $4.8 \times 26-36 \mu$.

Spores: abundant, hyaline, smooth, small, ovate or elliptical, $3.2 \times 4.8 \mu$.

Gloeocystidia: thin-walled, with homogeneous contents, up to $12.8 \times 144 \mu$, with a ventricose base or sometimes widest near the apex, abundant, embedded.

Hyphae: generative hyphae about 2μ wide, hyaline, thin-walled with wide lumen, septate, with clamp connections; skeletal hyphae hyaline, about 5μ wide, with thicker walls but with a wide lumen.

Specimens examined: Welwitsch (427, 425) ex British Museum Nat. Hist.

Lorrain Smith's determination of these specimens as *S. ravenelii* has been accepted here, as the specimens accord fairly well with Burt's description (in Ann. Mo. Bot. Gard. 7, 1920, 90) and no other material of this species has been available for study. Welwitsch 425 is old material in which the details are obscure. The infundibuliform, bay-coloured pileus, gloeocystidia and small spores appear to be the chief characteristics. In these features, however, the present specimens correspond very closely with *S. nitidulum* (see p. 321) and are only separable by the size of their gloeocystidia and by hyphal characters. It is possible that the specimens treated here as *S. nitidulum* and *S. ravenelii* represent only a single species. If so, that species is more likely to be *S. nitidulum* than *S. ravenelii*.

(47) *Stereum retirugum* Cooke (!) in Proc. Roy. Soc. Edinb. (1882) 456; Doidge loc. cit. p. 492.

Doidge's record of this species refers to Mocambique; there is no material under this name in the National Herbarium, Pretoria. Cooke's type at Kew is synonymous with *Stereum schomburgkii* Berk (!), which is now referred to *Stereum fulvum* (Lév.) Sacc. (!).

(48) *Stereum rimosum* Berk. (!); Recorded by Lloyd in Lloyd Myc. Notes 4 (1913) L. 46, 4; Doidge loc. cit. p. 492.

The writer is of the opinion that this species is not typically represented in South Africa, and the specimens cited by Doidge are all referred to *S. rimosum* Berk. var *africanum* Talbot (see following description).

(49) *Stereum rimosum* Berk. var *africanum* Talbot in Bothalia 4 (1948) 495, Fig. 5; ibid. 6 (1951) 38; Doidge in loc. cit. p. 492.

Stereum adnatum Lloyd (!) in Lloyd Myc. Notes 7 (1925) 1336, Fig. 3093; Stevenson & Cash in Bull. Lloyd Library 35 (1936) 49; Doidge loc. cit. p. 487.

FIG 14.

Fructifications effused, resupinate-reflexed, often sessile and attached by a broad umbo, or sometimes only narrowly attached and then composed of several connate, subdimidiate pilei, coriaceous, becoming thickened, lignicolous. Surface cinnamon

buff colour, concentrically furrowed, covered with a thick, felty, pad-like tomentum. Margin even or lobate. Hymenium closely and conspicuously rimose and rugose, sometimes appearing blistered, cracking to show a pallid silky context, often concentrically furrowed, warm buff or pinkish buff in herbarium, yellow when fresh, bleeding when bruised and often drying adustus to cinereous colour especially where bruised. Width in section excluding the tomentum, 700–1000 μ .

Basidia: closely aggregated, 4–4.5 μ wide at apex.

Spores: hyaline, smooth, elliptic-ovate, with one side frequently depressed, with a small attenuated apiculus, 2–3 \times 3.5–5.5 μ .

Conducting vessels: yellow, 5.5–8.5 μ wide, with rigid walls, in a layer about 200 μ thick, distributed in the subhymenium and curving upwards into the hymenium, not emergent.

Hyphae: thin-walled, hyaline, frequently septate, 3.5 μ wide.

Tissue differentiation: there is a narrow orange coloured, dense zone subtending the abhymenial surface.

Abhymenial hairs: thick-walled, much intertwined, almost hyaline to pale yellowish, 4.2 μ diam.

Specimens examined: Type, 30233; 30268, 30777, 28285, 27755, 28296, 28303, 40211, 40217, 27565, 34375, 27772, 34365, 28295, 36891; 1708 (Type of *Stereum adnatum* Lloyd); Universiteit van Stellenbosch, Herbarium P. A. van der Byl No. 1646 (as *Stereum transvaalium* van der Byl); Uganda, Maitland (460, 19 A).

Reasons for reducing *S. adnatum* Lloyd to synonymy with *S. rimosum* var *africanum* are given in *Bothalia* 6 (1951) 39.

The variety *africanum* was described as “not differing from the type in microscopic appearance, with a resupinate-reflexed habit (neither pileate nor sessile-umbonate), with a thicker tomentum, with a rougher, paler and more zonate hymenium” (Talbot in *Bothalia* 4, 1948, 945). With further specimens to hand, some are now included which are only narrowly resupinate, and in others the hymenial colour is predominantly cinereous with only patches of yellowish colour remaining. The change to cinereous colour is definitely associated with the ability of this fungus to “bleed” when bruised. Thick specimens showing a perennating tendency have been collected.

(50) *Stereum rubiginosum* Fries. Recorded under this name by Montagne in *Ann. Sci. Nat.* ser iii, 7 (1847) 174.

A specimen has not been seen by the writer, but “*Stereum rubiginosum* Fr.” is a synonym of *Hymenochaete rubiginosa* Dicks. ex Lev. This is noted by Doidge loc. cit. p. 485.

(51) *Stereum rugosum* (Pers.) Fr. Doidge loc. cit. p. 492 records two specimens under this name.

W. Nelson, Hout-Bosch Berg, 1880, in Kew Herbarium has been seen by the writer and is referred to *S. rimosum* var *africanum*. No. 34394 is a young species of *Stereum*, but not *S. rugosum*. It lacks conductors and also differs in habit and colour. There is a third specimen in Pretoria as *S. rugosum*, No. 35559, which proves to be *S. durbanense* van der Byl.

(52) *Stereum sanguinolentum* (Alb. & Schwein. ex Fr.) Fr., *Epicrisis* (1838) 549, *Hym. Eur.* (1874) 540; Saccardo *Syll. Fung.* 6 (1888) 564; Doidge in loc. cit. p. 493; Talbot in *Bothalia* 6 (1951) 37.

Thelephora sanguinolenta Alb. & Schwein., *Consp. Fung.* (1805) 274; Fries *Syst. Myc.* 1 (1821) 440, *Elenchus Fung.* 1 (1828) 178.

FIG. 15.

Fructifications coriaceous, lignicolous, thin, resupinate or effused becoming narrowly reflexed, orbicular-confluent. Margin acute, pallid. Surface villous-strigose, with short, adpressed, silky hairs, zonate and striate, whitish to some tint of buff.

Hymenium more or less cinereous when fresh, becoming light brown, smooth or cracking rimosely to show a silky subiculum, often zonate. Flesh exuding a reddish juice when wounded in fresh state. In section 400–500 μ thick.

Basidia: clavate, 26–40 \times 4.5–6.5 μ .

Spores: hyaline, smooth, cylindrical, unilaterally depressed (6.4)–8–(9) \times 3–3.5 μ .

Conducting vessels: conspicuous, reddish-brown, numerous, in the intermediate tissues and curving upwards into the hymenium, 3–4(9) μ wide, very occasionally forked, walls hyaline, smooth, occasionally thickened.

Hyphae: hyaline, 2.5–5 μ diam., with thin, firm walls and a wide lumen, without clamps, septate, sometimes branched, densely interwoven in a more or less horizontal direction.

Tissue differentiation: There is a narrow, dense, yellowish-brown zone subtending the abhymenial surface.

Abhymenial hairs: simple, thick-walled, agglutinated, short, adpressed, 4–5 μ diam.

Specimens examined: 28933, 33248, 40462, 40494.

— *Stereum sanguinolentum* is usually considered a North Temperate species, and was possibly introduced to South Africa on imported conifers. Its thin, almost papery texture and its occurrence on conifers is at once a difference from all other South African species of *Stereum* possessing conducting vessels. *S. sanguinolentum* is suspected of causing a serious disease of *Pinus taeda* in Northern Natal.

(53) *Stereum schomburgkii* Berk. (!) in Journ. Linn. Soc. Bot. 13 (1873) 168; Saccardo Syll. Fung. 6 (1888) 568; Talbot in Bothalia 6 (1951) 43; Doidge loc. cit. p. 493.

= *Stereum fulvum* (Lév.) Sacc. (!). See p. 315.

(54) *Stereum spadiceum* Fr.; Recorded by Lloyd in Lloyd Myc. Notes 4 (1913) L. 46, 8; Brown in S.A. Journ. Sci. 33 (1936) 388; Doidge in loc. cit. p. 493.

All the specimens cited by Doidge have been seen. Mrs. Brown's material is *Stereum australe* Lloyd. The other specimens all lack conductors and are characteristic *Stereum hirsutum*.

(55) *Stereum subpileatum* Berk.; Recorded by Lloyd in Lloyd Myc. Notes 5 (1917) L. 66, 15, Note 634; Doidge in loc. cit. p. 489.

The material cited by Lloyd was made the type of *Stereum durbanense* van der Byl (see p. 312). *Stereum subpileatum* does not occur in South Africa.

(56) *Stereum tabacinum* Sow. ex Fr. var. *australis* Mont.; Recorded by Kalchbrenner in Grev. 10 (1881) 58; Doidge loc. cit. p. 485.

The writer has not seen MacOwan's material on which this record is based. *Stereum tabacinum* var. *australis* is a synonym of *Hymenochaete tabacina* (Sow. ex Fr.) Lev.

(57) *Stereum tenebrosum* Lloyd (!), *nomen nudum*, in Lloyd Myc. Notes 5 (1918) L. 67, p. 16; Doidge loc. cit. p. 493.

This species is sunk under *Stereum australe* Lloyd, for reasons given on p. 307.

(58) *Stereum thozetii* Berk. Austral. Fung. No. 268; Saccardo Syll. Fung. 6 (1888) 557; Doidge loc. cit. p. 493.

FIG. 3.

Fructifications soft-coriaceous, terrestrial among grass, perhaps on grass roots, solitary or sometimes gregarious and then 2–3 pilei from separate stems may fuse above into a single connate pileus; centrally stipitate, infundibuliform becoming

somewhat flattened and discoid later. Pileus 0.4–2 cm. radius from the attachment, the disc 0.7–3 cm. diam., larger sizes often resulting from fusion of up to 3 pilei. Stipe 4 mm. long, 1 mm. wide, smooth or pruinose, creamy to light-brown colour. Surface of pileus glabrous to pruinose, not tomentose or velutinate, concentrically zoned in shades of pale yellow-brown to red-brown or brown. Hymenium smooth, creamy or whitish in colour. Margin thin, entire, undulate, concolorous. Thickness in section 400–1100 μ .

Basidia: cylindric-clavate, $26\text{--}35 \times 4\text{--}6.6 \mu$, with 4 sterigmata.

Spores: $4.8\text{--}6.4 \times (6.4)\text{--}7.2\text{--}9.6 \mu$, hyaline, smooth, frequently uniguttulate, broad ovate to broad elliptical, sometimes showing a small apiculus, thin-walled.

Gloeocystidia: usually abundant and long, $3.2\text{--}9.6 \mu$ wide \times $66\text{--}186 \mu$ (or more) long, hyaline, arising from generative hyphae, sometimes showing a basal clamp, subcylindrical, sometimes somewhat ventricose at the base, at other times not at all swollen and completely hyphoid, thin-walled, smooth, with homogeneous deep-staining contents.

Hyphae: skeletal hyphae hyaline, not staining, usually thick-walled, occasionally branched, not septate, $2.4\text{--}3.2 \mu$ diam.; generative hyphae hyaline, thin-walled, staining deeply, $1.5\text{--}3.2 \mu$ diam., smooth, with occasional clamp connections, branched, septate.

Tissue differentiation: There are no abhymenial hairs, nor is a dense zone differentiated below the abhymenial surface.

Specimens examined: 8933, 31456, 13009, 8807, 28895; Herb. S. Afr. Museum No. 45947; Herb. S. Afr. Museum No. 34266 (MacOwan 1232).

The identification of this species was checked at Kew by Dr. Dennis. In the National Herbarium this species was formerly confused with *S. pusillum* and *S. nitidulum*, while MacOwan's collection cited above was originally determined as *S. elegans*. As far as can be ascertained neither *S. elegans* nor *S. pusillum* occur in South Africa, and *S. nitidulum* may be distinguished from *S. thozetii* by the bay-zonate pileus of the former and its smaller spores.

(59) *Stereum tomentosum* van der Byl (!) in Trans. Roy. Soc. S. Afr. 10 (1922) 156 Fig. 9, in Ann. Univ. Stellenbosch 7 (1929) 45; Doidge loc. cit. p. 493.

= *Stereum durbanense* van der Byl (!). See p. 312.

(60) *Stereum transvaalium* van der Byl (!) in Ann. Univ. Stellenbosch 7 (1929) 40; Doidge loc. cit. p. 494.

Two specimens are preserved under this name in the Universiteit van Stellenbosch, Herbarium P. A. van der Byl Nos. 1472 and 1646. No. 1472 is taken to be the Type, since it is the only specimen cited in van der Byl's latin description of the species. Most of his description, however, appears to be taken from No. 1646, or at least it is compounded from both specimens, which are both cited in the Afrikaans text.

In the writer's opinion, No. 1472 cannot be differentiated from *Stereum australe*, while No. 1646 is referred to *Stereum rimosum* var. *africanum*. The fact that the description was partly based on this specimen of *S. rimosum* var. *africanum* may be the reason why van der Byl stated that the general appearance of the fruit-bodies differentiated them easily from *S. australe*.

Stereum transvaalium must be taken either as a synonym of *Stereum australe*, or as a *nomen confusum*.

(61) *Stereum turgidum* Lloyd (!) in Lloyd Myc. Notes 5 (1916) L. 63, 15, Note 502; Doidge loc. cit. p. 494.

Lloyd (in Lloyd Myc. Notes 4, 1916, 549, Fig. 751) first described this species under the name *Stereum caperatum* Lloyd, but as this was a later homonym of *S. caperatum* (Berk. & Mont.) Masee, he later changed its name to *S. turgidum*. For

reasons given in *Bothalia* 6 (1954), p. 339, this species is regarded as synonymous with *Stereum cinerascens* (Schw.) Masee (!).

(62) *Stereum umbrinum* Berk. & Curt. (!) in *Grevillea* 1 (1873) 164; Doidge loc. cit. p. 494; Talbot in *Bothalia* 6 (1951) 41.

Hymenochaete vinosa (Berk.) Cooke (!) in *Grev.* 8 (1880) 149; Saccardo *Syll. Fung.* 6 (1888) 600.

Hymenochaete scabriseta Cooke (!) in *Ravenel, Fung. Amer.* (1882) 717.

Hymenochaete purpurea Cooke & Morgan (!) apud Cooke in *Grev.* 11 (1883) 106.

Hymenochaete kalchbrenneri Masee (!) in *Journ. Linn. Soc. Bot.* 27 (1890) 116; Saccardo *Syll. Fung.* 9 (1891) 230.

FIG. 19.

Resupinate, effused, sometimes narrowly reflexed, never pileate. Margin shortly villose. Context soft, spongy. Hymenium velutinous, cracking but little in drying, sometimes pitted, umber, vinaceous purple, purple-brown, light sandy brown or snuff brown in colour.

Basidia: hyaline or very faintly coloured, about $6 \times 30 \mu$.

Spores: cylindrical or ellipsoid, hyaline, smooth, $6-8 \times 3-4 \mu$.

Cystidia: originating in the basal or middle part of the trama, curving up into the hymenium and frequently projecting $10-20 \mu$ beyond; dark yellow-brown, lighter colour when young or when emergent, not very thick-walled, encrusted or rugose especially near the apex, rarely quite smooth, $100-250 \times 7-9 \mu$, cylindrical-clavate or fusoid, arising as apical modifications of the skeletal hyphae.

Hyphae: skeletal hyphae $6.4-9.6 \mu$ diam., yellow-brown, unbranched, without septa; generative hyphae lightly coloured, $3-4.5-(6) \mu$ diam., thin-walled, branched, septate, without clamps.

Tissue differentiation: the tissues are formed of loosely interwoven hyphae without any denser abhymenial zone.

Specimens examined: 20974, 22044, 30220, 27626, 28294, 28702, 28276, 28277, 27767, 33392, 33400, 34357, 34393, 35419, 34381, 36839, 36710; van der Byl (2737) in *Herb. Kew.*; MacOwan (1055) sub *Hymenochaete pellicula* in *Herb. S. Afr. Museum* No. 34315; MacOwan (1054) sub *Peniophora cinerea* in *National Herbarium*.

The cystidia of this species are apically modified skeletal hyphae. They do not darken in alkali and in some specimens lack conspicuous incrustation or roughness, but they are quite different from setae. The lack of a distinctive horizontal layer of densely interwoven hyphae as an intermediate or basal tissue is characteristic of relatively few species of *Stereum*. Its closest affinity is with *S. papyrinum* Mont. (!) (= *S. membranaceum* Fr.), which is frequently pileate and always possesses wider, more encrusted, more peniophoroid cystidia with thicker walls. Most South African specimens of *S. umbrinum* have a purplish tinge rather than the typical umber colour.

(63) *Stereum vellereum* Berk.; Doidge loc. cit. p. 494; van der Byl in *Trans. Roy. Soc. S. Afr.* 10 (1922) 156, in *Ann. Univ. Stellenbosch* 7 (1929) 47; Lloyd in *Lloyd Myc. Notes* 5 (1917) L. 66, Note 584.

Lloyd's conception of this species, which has been followed in South Africa is that it is a fungus very like *Stereum hirsutum* but differing in being somewhat thinner and having very pale or colourless surface hairs instead of the more yellow-brown hairs of *S. hirsutum*. Microscopically there is no difference. The writer is doubtful whether these distinctions are sufficiently marked to merit a different specific name.

The following specimens examined show the pale to colourless surface hairs and might be considered as *S. vellereum*: Universiteit van Stellenbosch, Herbarium P. A. van der Byl Nos. 1717 (Eyles 3892), 2229, 143, 191, 147; National Herbarium, Pretoria Nos. 15610, 30879.

(64) *Stereum versicolor* (Swartz ex Fr.) Fr.; Doidge loc. cit. p. 494.

The writer has not seen all the specimens cited by Doidge, but those seen are not referable to *S. versicolor*. MacOwan (1276, 1163, as *Stereum versicolor*, Herb. S.A. Museum 34265) is referred to *Stereum lobatum*.

(65) *Stereum (Hymenochaete) villosum* Lév.; Recorded by Lloyd in Lloyd Myc. Notes 5 (1916) L. 63, 2.

The specimen referred to (No. 15558) is *Hymenochaete luteobadia* (Fr.) Höhnelt & Litsch. Doidge loc. cit. p. 485 cites *Stereum villosum* Lév. as a synonym of *Hymenochaete nigricans* (Lév.) Bres. This synonymy is also given by Bresadola (in Ann. Myc. 14, 1916, 232). The present specimen is however not *H. nigricans*.

(66) *Stereum vitile* Fries, Fungi Natalenses (1848) 23; Doidge loc. cit. p. 494.

Doidge notes that "fide Wakefield this fungus has not been recognised since the original collection and it is doubtful whether a specimen exists".

A fungus not unlike *Stereum umbrinum* is called for from Fries' description, and affinity with this species is suggested by Saccardo in Sacc. Syll. Fung. 6 (1888) 569, and repeated by Massee in Journ. Linn. Soc. Bot. 27 (1890) 193.

(67) *Stereum vorticosum* Fr.; Recorded by Berkeley in Journ. Bot. London 14, n.s. V (1876) 175; Doidge loc. cit. p. 492.

Berkeley's material was borrowed from Kew Herbarium. It was labelled "*Stereum vorticosum* Fr. Pale form. Cape. A. E. Eaton", and proved on examination to be in no way different from *Stereum purpureum*.

Key to accepted species of *Stereum*:—

- | | |
|---|---------------------------|
| 1. Pilei infundibuliform and centrally stipitate. | 2. |
| Pilei not infundibuliform nor centrally stipitate. | 7. |
| 2. With gloecystidia (some may be interpreted as smooth cystidia). | 3. |
| Without gloecystidia. Here may be located some rare forms of <i>Stereum lobatum</i> (29) which are infundibuliform by fusion and thus often partially split down one side. | |
| 3. Without surface hairs. Sections do not show any well-marked denser coloured zone immediately beneath the abhymenial surface. | 4. |
| With (scanty) surface hairs. Sections show a well-marked denser coloured zone beneath the abhymenial surface. Here are located unusual forms of <i>S. affine</i> (2) which are usually only infundibuliform by fusion and thus are often partially split down one side. | |
| 4. Spores, small, ovate, broad-elliptic or subglobose, not larger than 3-4 × 4-5 μ. | 5. |
| Spores, larger, in the range of 3-6 × 6.5-9 μ. | 6. |
| 5. Gloecystidia up to 12.8 × 144 μ in size. | <i>S. ravenelii</i> (46). |
| Gloecystidia smaller, up to 10.5 × 80 μ. | <i>S. nitidulum</i> (34). |
| 6. Gloecystidia usually rather narrow (3.2-9.6 μ wide) and often hyphoid. Hyphae of two types, some with clamp connections. | <i>S. thozetii</i> (58). |
| Gloecystidia usually wider (8-9.6-16 μ wide) and clavate. Hyphae of one type only and without clamps. | <i>S. diaphanum</i> (15). |
| 7. Pilei laterally stipitate, or flabellate or spatulate, or sessile and cuneate attached by a markedly reduced base. | 8. |
| Pilei dimidiate or effuso-reflexed or resupinate. | 13. |
| 8. Fresh pilei bleeding red when bruised. Conducting vessels present microscopically in fresh or dried plants. | <i>S. australe</i> (6). |
| Fresh plants not bleeding. Conducting vessels absent. | 9. |
| 9. Without gloecystidia or cystidia. | 10. |
| With gloecystidia or cystidia, or both together. | 11. |

10. Pilei small (up to 1 cm. in any direction), soft, whitish, without colour zones on the surface. Spores pip-shaped or later distorted and angled. Hyphae monomitic. *S. cyphelloides* (14).
Pilei large, coriaceous or tough, surface coloured with zones of grey, brown, chestnut. Spores cylindrical-depressed. Hyphae dimitic. *S. lobatum* (29).
11. With gloeocystidia but no cystidia. Pilei with a definite stipe, flabellate, spatulate or infundibuliform. *S. affine* (2).
With both gloeocystidia and cystidia. 12.
12. Pilei usually merismatoid, i.e. a compound fructification consisting of a number of smaller pilei growing together in a bush. Gloeocystidia $7-10 \times 40-66 \mu$. *S. involutum* [26]
Pilei not merismatoid, but single or sometimes dimidiate or fused laterally. Gloeocystidia smaller $7-12 \times (15)-25-(40) \mu$. Here is located the species represented by *S. bellum* (7) and *S. friesii* (20) in the sense used by van der Byl.
13. Without cystidia, cystidioles, gloeocystidia, vesicles or conducting vessels (distinguish carefully between skeletal hyphae which intrude into the hymenium and conductors or cystidia). 14.
With any of the following organs: cystidia, cystidioles, gloeocystidia, vesicles, conducting vessels (Avoid locating here species which have intrusive skeletal hyphae unless these are much swollen like cystidia at the apex). 18.
14. Mature pilei small (1 cm. or less) soft, whitish, azonate. Spores pip-shaped becoming angularly distorted. Hyphae monomitic. *S. cyphelloides* (14).
Mature pilei larger, or if immature then either not whitish or possessing more than one type of hypha. 15.
15. Skeletal hyphae in context brown. The skeletal hyphae which curve up into the hymenium are brown, rugose or encrusted. Hymenium usually dark-coloured, only rarely yellowish or light-coloured. [Compare also *S. umbrinum* (62) where the skeletal hyphae are much expanded and resemble cystidia in the hymenium.] *S. fulvum* (21).
Skeletal hyphae in the context not brown, but at the most only pale straw-coloured or hyaline. Hymenium not dark, usually creamy, yellow, orange, fawn or sometimes changing to cinereous. 16.
16. Pileus with multi-coloured zones on the surface, usually flabellate, or if a uniform brown colour then the pilei are relatively large and flabellate. *S. lobatum* (29).
Pileus without multi-coloured zones on the surface, or zoned in shades of brown; usually smaller than *S. lobatum* and effuso-reflexed or dimidiate, not flabellate. 17.
17. Pileus thin, coriaceous, effuso-reflexed or dimidiate with a shortly villose or matted hairy surface. *S. hirsutum* (24).
Pileus thicker (usually more than 1 mm. thick) corky or subligneous, effuso-reflexed, with a thick padlike tomentum of ochraceous to golden hairs. *S. durbanense* (16).
18. Fresh pilei bleeding red when bruised. Fresh or dried specimens possessing conductors in the hymenial layer. 19.
Fresh pilei not bleeding, lacking conductors at all times. 21.
19. Pilei generally dimidiate or cuneate with a reduced base, rarely widely effuso-reflexed. Hyphae dimitic. Hymenium cinereous, smooth. *S. australe* (6).
Pilei mostly resupinate-reflexed, rarely dimidiate. 20.
20. Hymenium rimose, i.e. blistered and cracking into small rough areas, yellow, tan or cinereous. Not on conifers. Hyphae dimitic. Usually more than 700μ thick. *S. rimosum* var *africanum* (49).
Hymenium smooth, not rimose, cinereous to light brown. Occurring on conifers. Hyphae monomitic. Usually less than 600μ thick. *S. sanguinolentum* (52).
21. Species possessing pyriform or subglobose vesicles embedded deep in the trama (some of the vesicles are sometimes elongated and must be distinguished from gloeocystidia). 22.
Species without vesicles. 23.
22. Fructifications more or less resupinate, sometimes narrowly reflexed, stratose with a veined or marbled subligneous context and a glabrous black abhymenial surface showing as a black line in wholly resupinate specimens. Hymenium yellowish. *S. murraii* (33).
Fructifications effuso-reflexed or dimidiate, not stratose or veined, with a hairy brownish surface. Hymenium purple to purple-brown. *S. purpureum* (43).
23. Species with cystidia but lacking gloeocystidia. 24.
Species with gloeocystidia and sometimes cystidia as well. 25.
24. Cystidia large ($12-24 \mu$ wide) conical or fusoid, encrusted, hyaline or only dilutely coloured. Spores averaging $6 \times 11 \mu$. Hymenium light-coloured. *S. cinerascens* (11).

- Cystidia dark yellow-brown, subhyaline where emergent, actually only apically swollen and encrusted or rugose skeletal hyphae (rarely smooth at apex). Spores $3-4 \times 6-8 \mu$. Hymenium usually umber brown or purplish, rarely a light sandy brown. [Compare *S. fulvum* (21) whose skeletal hyphae in the hymenium are less like cystidia, being not much expanded and roughly cylindrical.] *S. umbrinum* (62).
25. Species with gloecystidia but no cystidia. 26.
Species with both gloecystidia and cystidia. 27.
26. Context pale creamy to pale yellow-brown, usually stratose. Spores subglobose, $6-7 \mu$ diam. (Gloecystidia sometimes seen with difficulty.) *S. duriusculum* (17).
Context brown, contrasting with a hyaline hymenial layer. Spores $3-4.5 \times 2-3 \mu$. Gloecystidia abundant, sometimes fragmented and refractile like cystidia. *S. bicolor* (8).
27. Cystidia and gloecystidia clearly differentiated. Context pale-coloured throughout. Hyphae hyaline. Here may be located the species represented by *S. bellum* (7) and *S. friesii* (20) in the sense of van der Byl.
Only gloecystidia present, but older ones are fragmented and highly refractile thus resembling cystidia or mineral aggregations. Context brown, contrasting with a hyaline hymenial layer. Basal hyphae mostly brown. *S. bicolor* (8).

EXPLANATION OF THE ILLUSTRATIONS.

The following lettering has been used throughout the illustrations:—

B = Basidia.

C = Cystidia.

S = Spores.

CY = Cystidioles.

G = Gloecystidia.

V = Vesicles.

SH = Skeletal hyphae.

CV = Conducting vessels.

GH = Generative hyphae.

IH = Intrusive skeletal hyphae in the

H = Surface hairs.

hymenium.

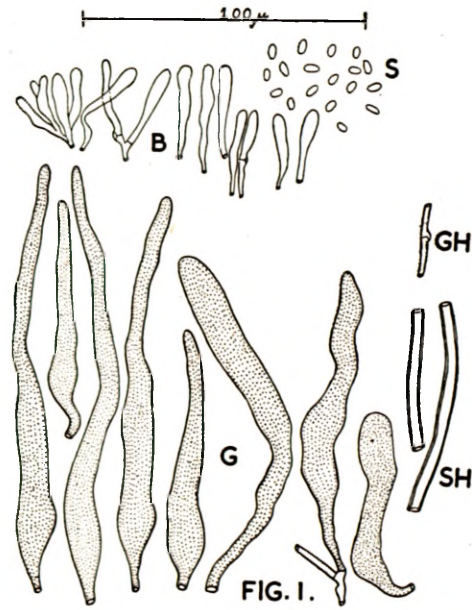


FIG. 1.

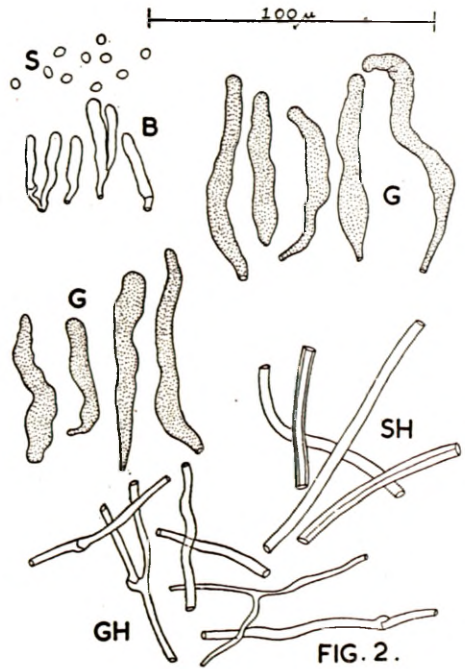


FIG. 2.

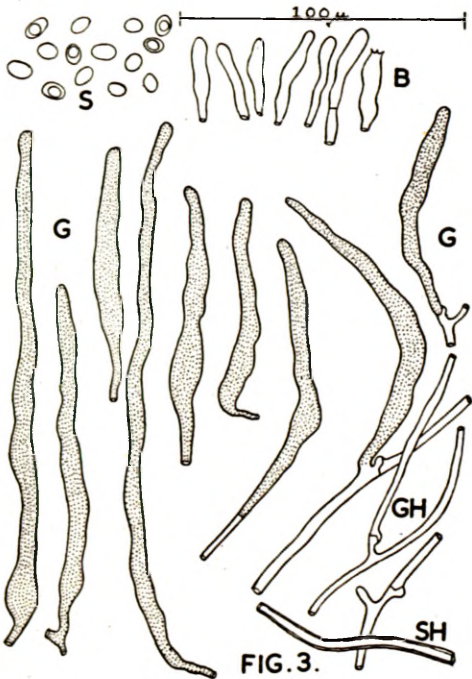


FIG. 3.

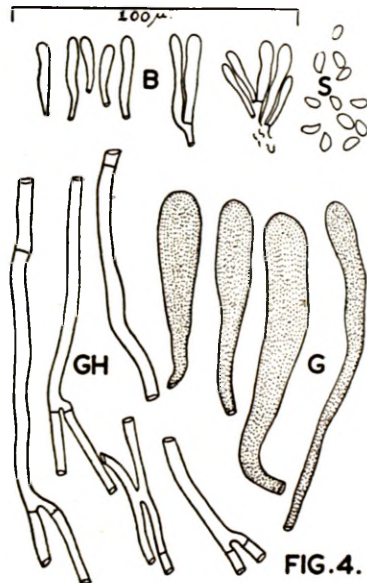


FIG. 4.

FIG. 1.—*S. ravenelii*. FIG. 2.—*S. nitidulum*. FIG. 3.—*S. thozetii*.
 FIG. 4.—*S. diaphanum*.

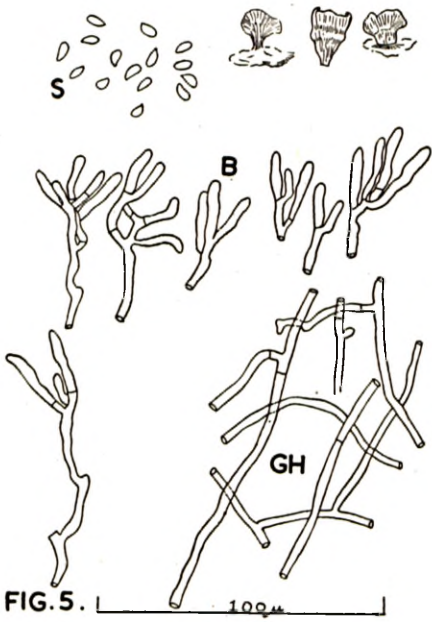


FIG. 5.

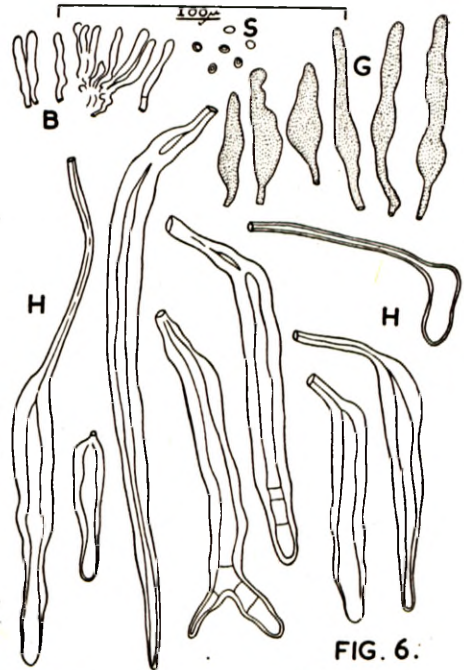


FIG. 6.

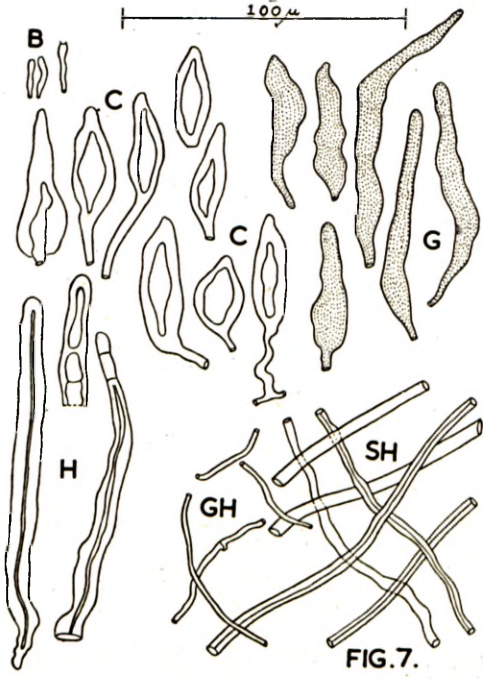


FIG. 7.

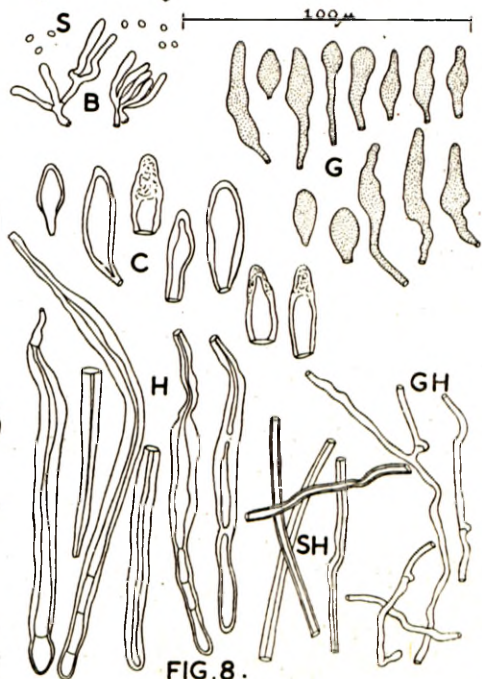


FIG. 8.

FIG. 5.—*S. cyphelloides*. FIG. 6.—*S. affine*. FIG. 7.—*S. involutum*.
 FIG. 8.—van der Byl (645) as *Stereum bellum*.

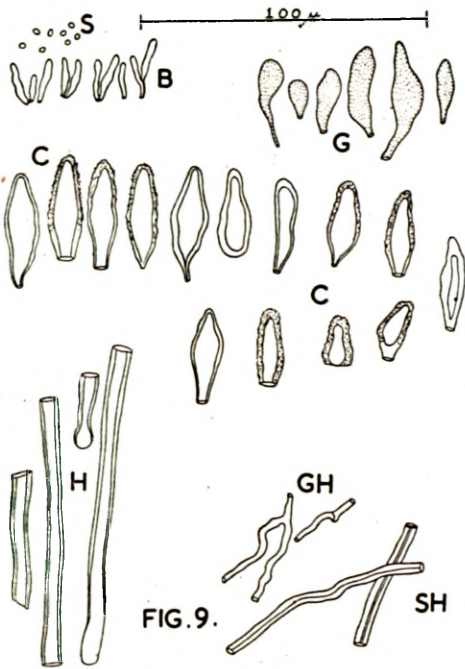


FIG. 9.

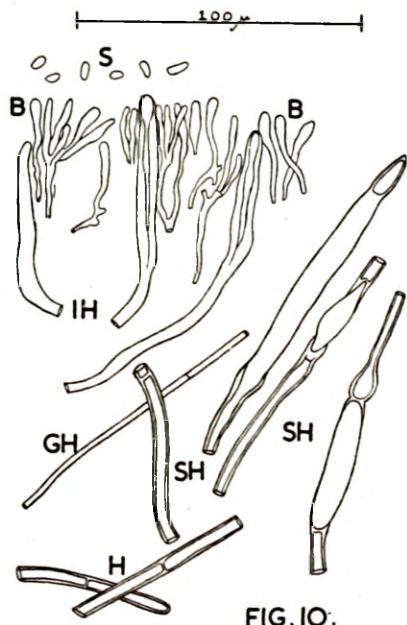


FIG. 10.

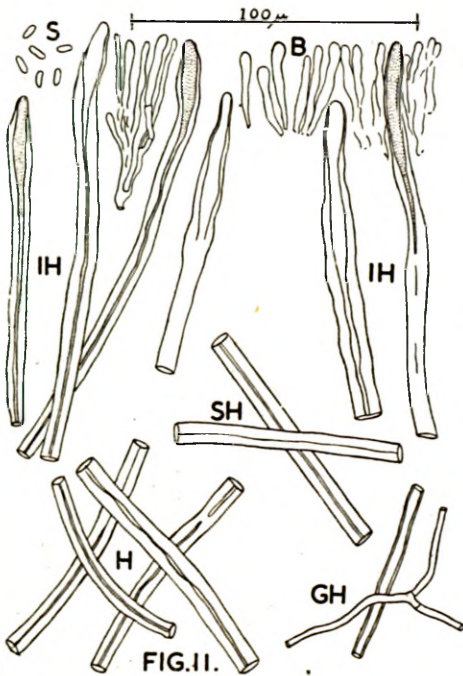


FIG. 11.

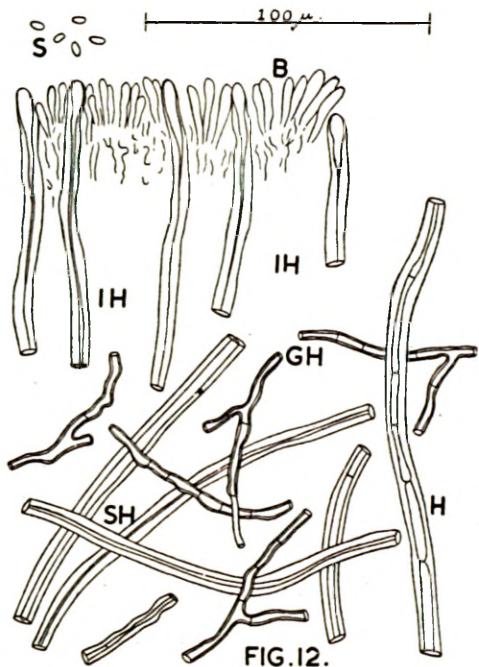


FIG. 12.

FIG. 9.—van der Byl (378) as *Stereum friesii*. FIG. 10.—*S. lobatum*.
FIG. 11.—*S. hirsutum*. FIG. 12.—*S. durbanense*.

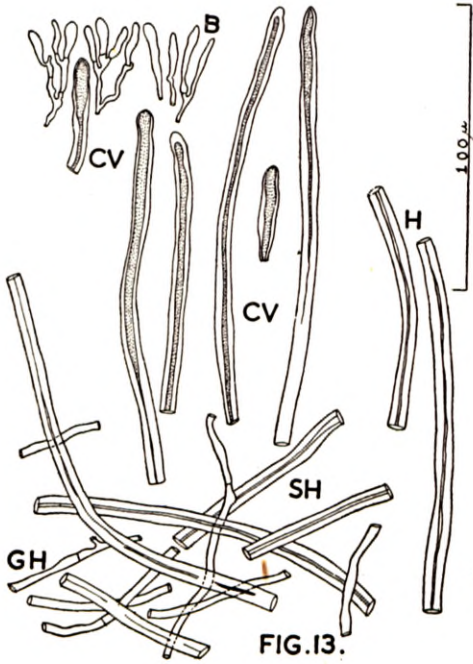


FIG. 13.

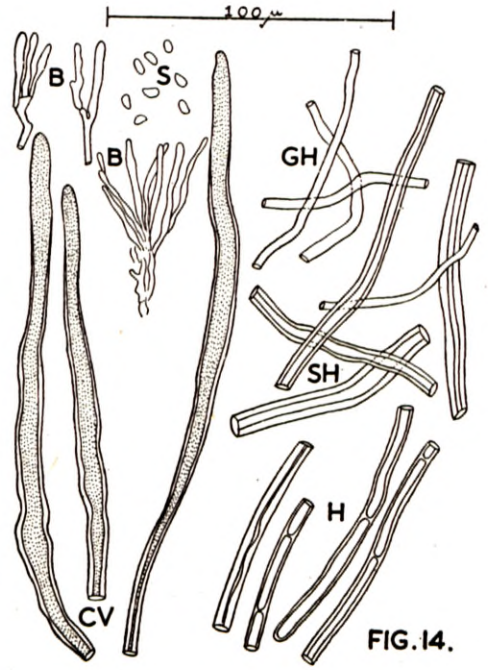


FIG. 14.

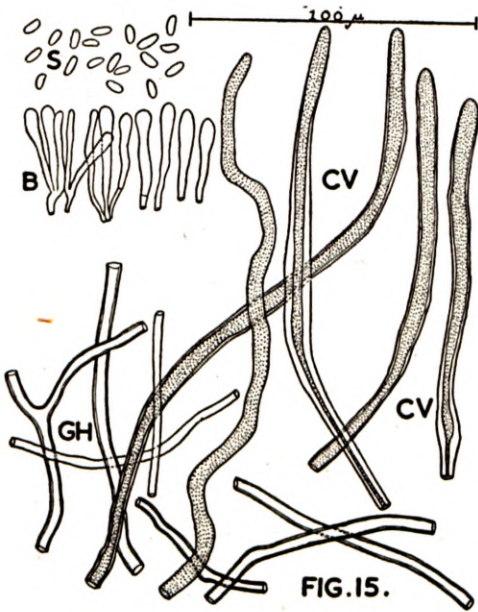


FIG. 15.

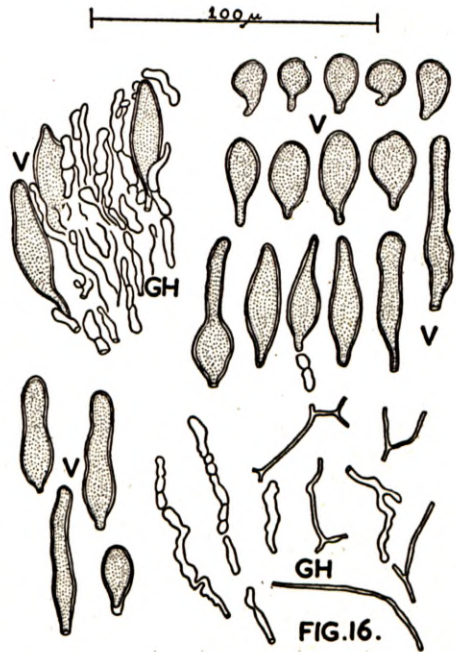


FIG. 16.

FIG. 13.—*S. australe*. FIG. 14.—*S. rimosum* var *africanum*.

FIG. 15.—*S. sanguinolentum*. FIG. 16.—*S. murrayi*.

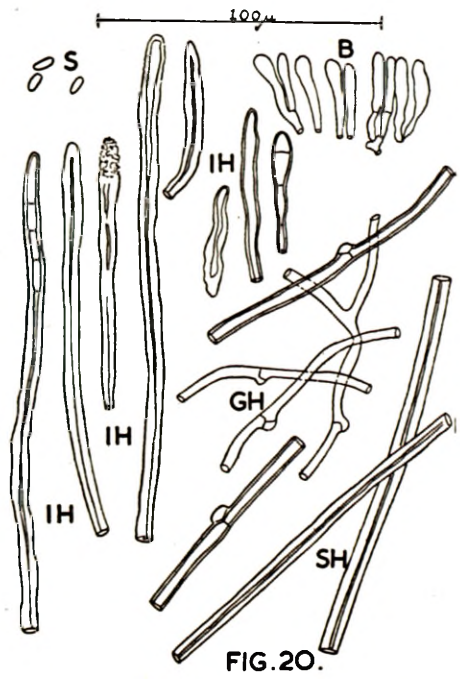
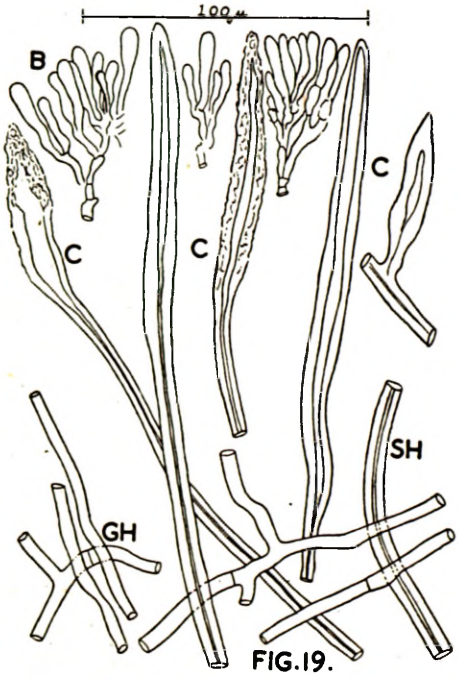
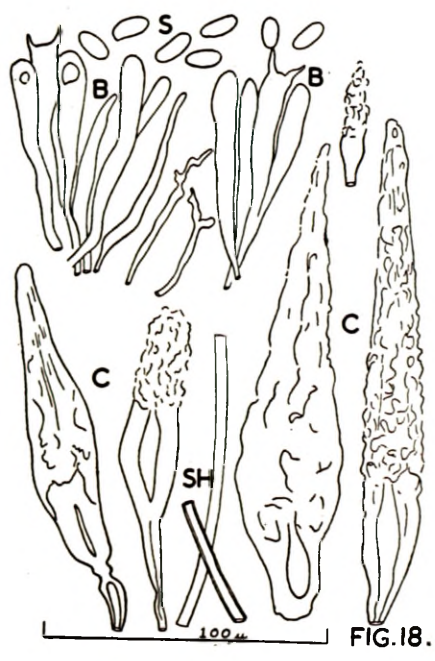
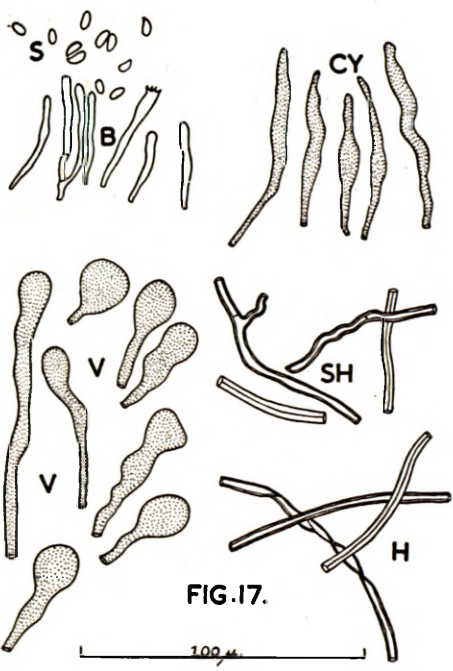


FIG. 17.—*S. purpureum*. FIG. 18.—*S. cinerascens*. FIG. 19.—*S. umbrinum*.
 FIG. 20.—*S. fulvum*.

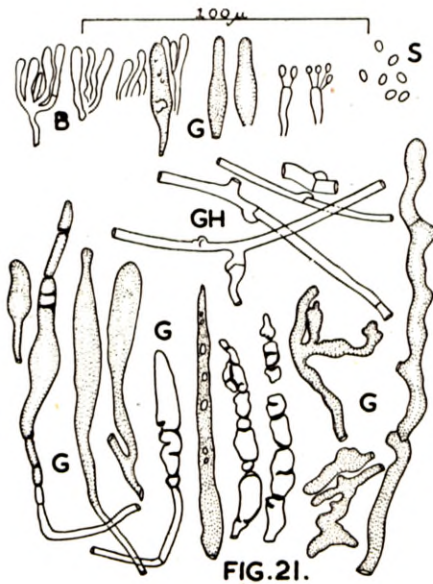


FIG. 21.

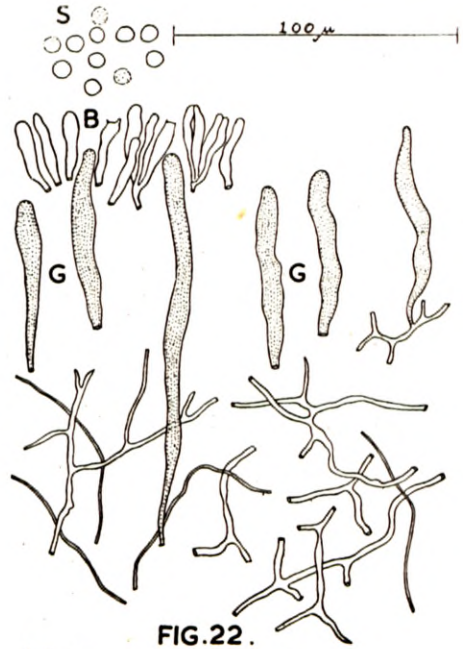


FIG. 22.

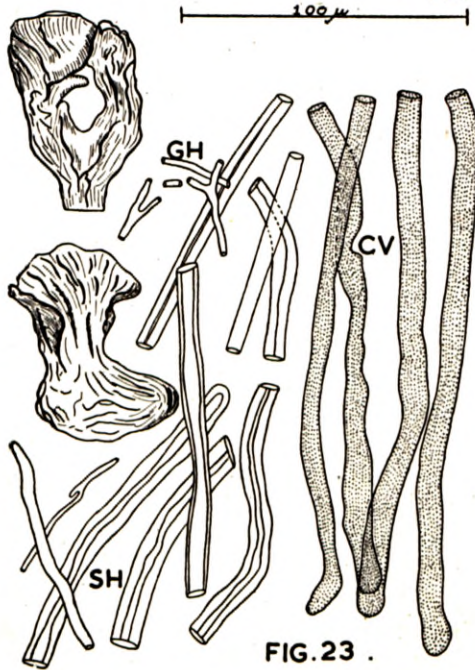


FIG. 23 .

FIG. 21.—*S. bicolor*. FIG. 22.—*S. duriusculum*. FIG. 23.—Eyles (4153) as *S. radicans*.

On the Genus *Lopharia* Kalchbrenner & MacOwan.

By

P. H. B. Talbot.

Summary.

Four species of *Lopharia* have previously been described. Of these, *L. lirellosa* Kalchbr. & MacOwan is regarded as a synonym of *L. mirabilis* (B. & Br.) Pat. It is shown that the external morphology of the hymenium, upon which the genus *Lopharia* is based, is a variable and unreliable character. Over several collections, intergrading states of the hymenium link the species *L. mirabilis*, *Stereum turgidum* Lloyd and *Stereum cinerascens* (Schw.) Masee, and no constant differences can be demonstrated in the internal structure of these three species. *S. turgidum* and *L. mirabilis* are accordingly recognised as synonyms of *Stereum cinerascens*, and the genus *Lopharia* is sunk under the genus *Stereum* Pers. ex S. F. Gray.

Lopharia dregeana (Berk.) Talbot is found to be cospecific with *Irpex vellereus* B. & Br., and the new combination *Irpex dregeanus* is made. It is suggested that *Lopharia javanica* P. Henn. & E. Nym. may be based on a collection of *Lopharia mirabilis* with immature spores. A sporograph supports this supposition, but detailed evidence is lacking as the type of *L. javanica* was not available for study.

The writer examined type or authentic material of most of the species discussed here. Such material is indicated by an exclamation mark (!) after the specific epithets listed in this paper.

History of the genus *Lopharia*.

In 1873, Berkeley & Broome described *Radulum mirabile* from Ceylon, in the following words (in Journ. Linn. Soc. Bot. 14, p. 61):—

558 RADULUM MIRABILE, B. & Br. Primum orbiculare tomentosum, demum confluens; hymenio perfecto hispidulo (No. 328). On dead wood. 5 inches long, 2 broad.

From this description it is certain that the species could not be recognised again, but the type specimen was preserved in Kew Herbarium, where Masee studied it and in 1892 (in Grevillea 21, p. 2, Pl. 182, fig. 8-9) erected a new genus, *Thwaitesiella*, with the single species *T. mirabilis* (B. & Br.) Masee. The description and illustrations were competently executed.

Meanwhile, in 1881, Kalchbrenner and MacOwan had erected the genus *Lopharia* (in Grevillea 10, p. 58) on the single species *L. lirellosa*, with the following diagnosis:—

LOPHARIA, K. et M. On. Hymenium cartilagineo-membranaceum glabrum, contiguum, in rugas interruptas, cristato-incisas elevatum, Phlebiae maxime affine; sed in hac rugae acie integerrima gaudet.

LOPHARIA LIRELLOSA, K. et M. On. Effusa, plana, pallide rufescenti carnea, subpruinosa, ambitu determinato, villosociliatulo, albidiore; plicis interruptis, varie curvatis, subramosis, cristato-incisas. Somerset East (1. MacOwan). Ligno arcte adnata, placas oblongas formans. Plicae ad formam lirellarum Graphidis eurvatae.