

# The Genera *Craterellus*, *Cymatoderma* (*Cladoderris*) and *Thelephora* in South Africa.

By

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## CRATERELLUS Persoon.

1. *Craterellus cornucopioides* (Linn. ex Fr.) Pers., Myc. Eur. 2 (1825) 5; Doidge in *Bothalia* 5 (1950) 483.

*Peziza cornucopioides* Linn., Sp. Plant. (1753) 1181.

*Cantharellus cornucopioides* Linn. ex Fr., Syst. Myc. 1 (1821) 321.

### FIG. 1.

Fructifications single or caespitose, about 4·5 cm high and 2·5 cm diam. at the apex, thin, membranous, drying brittle, trumpet-shaped, tapered to the base, hollow to the base of the stipe. Hymenium on the outer side, cinereous when moist, drying brownish to yellow-brown and black at the base, smooth, becoming longitudinally wrinkled, subgelatinous, drying corneous. Abhymenial surface deep smoky brown, becoming almost black, squamulose. Margin often darker than the rest, usually curved downwards, sometimes erect, lobed. Stipe hollow, black, smooth, glabrous, up to 5 mm diam.

Basidia: long clavate or subcylindrical,  $6-9 \times 50-70 \mu$ , with 2-4 sterigmata.

Spores: hyaline, smooth, elliptic-oblong, with a small lateral apiculus,  $6.5-8-(9.6) \times 12-14-(16.5) \mu$ .

Specimens examined: 10456 (J. M. Wood, 4108), *J. Blake*, Harrison, Natal.

This is the only species of the genus to have been recorded in South Africa, and the above specimen is the only one yet found. The basidia and spores were clearly seen and were quite typical of this species. Other microscopic characters were indistinct.

The systematic position of *Craterellus* is likely to remain speculative until the Aphyllophorales have been more critically examined by hyphal analysis and by comparison of other microscopic features. A recent view of *Craterellus* is to place it in the Cantharellaceae (Singer in *Lilloa* 22, 1949, 730), a family supposedly related rather to the Clavariaceae than to the Agaricaceae or Thelephoraceae where it has formerly been classed.

I have here considered *Craterellus* with the Thelephoraceae because it has been so recorded in previous South African literature and because my present object is to examine the validity of these specific and generic records.

## CYMATODERMA Jungh.

The name *Cladoderris* Pers. ex Berk., a later synonym of *Cymatoderma* Jungh., has almost exclusively been used for this genus in the past, and was proposed for conservation against *Cymatoderma* (Donk in Bull. Bot. Gard. Buitenzorg ser. iii, 18, 1941, pp. 156 and 163). This proposal was defeated at Congress (Taxon 2, 1953, 31). The type species of the genus is *Cymatoderma elegans* Jungh.

The little that is known of the genus is mainly summarised in Fries' "Fungi Natalenses" (1848) and in Lloyd's "Synopsis of the Genus *Cladoderris*" (Lloyd Myc. Writ. 4, 1913).

*Cymatoderma* is evidently closely related to *Stereum*, especially through such species as *Stereum involutum* (Klotzsch) Fr., but differs from *Stereum* in the possession of a radially ribbed and usually papillate hymenium. With the exception of *Cladoderris funalis*, the species of *Cladoderris* or *Cymatoderma* are rather uniform in microscopic characters, having a dimittic hyphal system, hyaline spores, and usually cystidia and/or gloeocystidia showing respectively little variation from species to species. But macroscopically the species are bewilderingly variable. The specific distinctions have always been based almost entirely on the external appearance without adequate investigation of the microscopic features and without sufficient regard for the natural variations and intergradations that are possible in such characters as hairyness, colour and habit. Owing to variation these characters are undoubtedly of minor importance and the emphasis laid on them originally resulted in an unnecessary number of species being proposed. Recognising this fact to some extent, Lloyd was able to accept only five 'good' species out of some twenty-five that had already been described. Lloyd noted that the mode of insertion of the stipe was of no specific value, and stated that the characters of value were: (1) the nature of the hymenial folds, whether broad and obtuse or narrow and sharp, (2) the presence or absence of papillae (but then admitted that these were not a constant feature), and (3) the tomentose upper surface, whether densely or scantily clothed with hairs.

It is instructive to quote fairly extensively from Lloyd's comments on some of the species which he differentiated, which show clearly that the above characters are actually of little taxonomic value owing to variation and intergradation, and secondly that any attempt to key out species entirely on such characters is likely to fail:—

\**Cladoderris dendritica*: "Papillae usually none, but many specimens occur with a few." . . . "I believe that . . . *C. elegans* is in reality only an excessively warty form (of *C. dendritica*) for while the type forms are so different (apparently) there are many connecting specimens in the museums."

\**Cladoderris elegans*: "As to colour, variation as to form and stipe characters, and very often as to the even, thick tomentum pad on the pileus, *elegans* is similar to *dendritica*, but *elegans* has the narrow folds of the hymenium densely covered with papillae" . . . "And the hymenium folds, while narrow, are more the nature of those of *Cladoderris spongiosa*, and specimens occur connecting it with *spongiosa*, rather than with *dendritica*."

\**Cladoderris spongiosa*: "Nor is the distinction between it and *Cladoderris elegans* strongly marked, for the nature of the (hymenial) folds is not an absolute character, and many specimens occur that appear to be intermediate."

\**Cladoderris infundibuliformis*: "All the preceding species might be broadly considered as forms of the same species, but this is widely different, in having a darker colour, thin, ridged pileus, slight tomentum" . . . "Usually the tomentum is but slightly developed, or almost none, but it is a varying character as shown in specimens at Kew of the same collection."

TABLE 1.

Microscopic organs of various species of *Cymatoderma* (*Cladoderis*): Measurements in  $\mu$ .

Species.	Cystidia.	Gloeocystidia.	Spores.	Hairs.	Hyphae.
<i>C. elegans</i> .....	14-17 $\times$ 35-45	6-11 $\times$ 35-55	3.2-3.7 $\times$ 6.5-8.3	3-5	3-5; dimitic.
<i>C. spongiosa</i> ....	9-14 $\times$ 20-50	9-13 $\times$ 28-55	3.2-4.8 $\times$ 6.4-9.5	4-6	3-6; dimitic.
<i>C. australica</i> ....	6.6-13 $\times$ 20-40	9-12 $\times$ 25-60	3.2-5.0 $\times$ 6.4-9.6	4-6	2.5-5; dimitic.
<i>C. infundibuliformis</i> .....	9-15 $\times$ 25-40	8-15 $\times$ 30-45	3.3-4.0 $\times$ 6.7-8.6	4-5	3-5; dimitic.
<i>C. dendritica</i> ...	Nil.	8-13 $\times$ 30-75	3 $\times$ 4 or 3-4 diam.	5-6	3-7; dimitic.
<i>C. funalis</i> .....	Nil.	Nil.	4.8-6.4 $\times$ 6.4-8.0	3-5	3-9; monomitic.

The taxonomy of this genus must undoubtedly be based primarily on microscopy (see Table 1; cfr. Figs. 2-7). If this is done, *C. dendritica* may be separated from the other species mentioned above by its distinctively smaller and rounder spores and by its lack of cystidia, features mentioned also by Burt (in Ann. Mo. Bot. Gard. 11, 1924, 3). All the other species quoted above have spores, cystidia and gloeocystidia of essentially the same size and shape respectively, and cannot be separated microscopically. The precise configuration of the hymenium, as Lloyd showed, is variable and intergrades, and in any case this character has frequently been demonstrated as unreliable in taxonomy. The development of the surface hairs varies considerably in specimens of a single collection, and hairs may easily rub off with age or be destroyed by insects. The thinner pileus and darker colour of *C. infundibuliformis* is mainly due to the fact that the hairs are scanty. If the hairs be removed from a specimen of *C. spongiosa*, the surface is seen to be dark in colour and composed of radiating, acute ridges not essentially different from *C. infundibuliformis*. To the writer only one macroscopic character so far appears to be of definite specific value, namely whether as in *C. funalis* P. Henn. the pileus is deeply dissected into narrow radiating segments. But as will be seen later, this species is probably better referred to the Clavariaceae under *Clavulina* or *Aphelaria*.

The species that have been studied may be grouped as follows:—

- (A) Pileus deeply dissected into narrow radiating segments. Hyphae monomitic. Cystidia and gloeocystidia absent. Basidia bisporous to quadrisporous. Spores 4.8-6.4  $\times$  6.4-8  $\mu$ . *C. funalis*.  
Pileus entire to shortly incised or lacinate at the margin. Hyphae dimitic. Cystidia and/or gloeocystidia present (B).
- (B) Gloeocystidia present, cystidia absent. Spores  $\pm$  subglobose, 3  $\times$  4  $\mu$  or 3-4  $\mu$  diam. *C. dendritica*.  
Both gloeocystidia and cystidia present. Spores ellipsoid, 3-5  $\times$  6-10  $\mu$ .  
The *C. elegans* Complex (C).
- (C) Pileus surface densely covered by a thick, whitish, pad-like tomentum.  
(a) Hymenial ribs narrow *C. elegans*.  
(b) Hymenial ribs broad, obtuse *C. spongiosa*.  
Pileus surface scantily tomentose, light red-brown or yellow-brown. *C. infundibuliformis*.  
Pileus surface almost devoid of hairs when mature, and dark red-brown to fuscous in colour. *C. australica*.

This last group of four names (the *C. elegans* Complex) has been subdivided above in accordance with the old concept of the species concerned, where extremes in macroscopic form were recognised. But there is little doubt that all these species are variations of a single species, whose earliest epithet is *elegans*, and that the variations intergrade so much that it would not be practicable to recognise varieties of *C. elegans* based on those macroscopic features. I propose therefore that *C. spongiosa*, *C. infundibuliformis*, and *C. australica* should be regarded as synonyms of *C. elegans* Jungh.

#### Notes on South African Records of *Cymatoderma* (*Cladoderris*)\*

The species of *Cymatoderma* and *Cladoderris* that have been recorded for South Africa will now be reviewed. Accepted species are printed in bold type, synonyms or dubious records in italics. I am much indebted to the Director of the Royal Botanic Gardens, Kew, and to the Director of the South African Museum, Cape Town, for the loan of some specimens. I wish also to record my thanks to Mr. D. A. Reid of Kew Herbarium for helpful discussion of some of the problems involved.

##### 1. *Cladoderris australis* Kalchbr. f. *minima* Bres.

There is a specimen in Kew labelled "*Cladoderris australis* Kalchbr. f. *minima*. Specimen authenticum", in Kalchbrenner's writing. The word "Cape" and Bresadola's signature also appear on the label. Although I have not been able to trace whether Bresadola ever published his f. *minima*, and it is probably only a herbarium name, yet this specimen requires comment in view of the similarity of the epithets of *C. australis* and *C. australica* and another species *Cladoderris minima* C. & Br.

The specimen is not a *Cymatoderma* but instead a good match with *Stereum thozetii* Berk. According to Lloyd (Syn. Stip. Stereum 1913, 28) a specimen which he assumes to be the original of *C. australis* Kalchbr. is *Stereum elegans* Mey.

##### 2. ***Cymatoderma elegans*** Jungh. in Tijdschr. Nat. Gesch. Phys. ed v. d. Hoeven & De Vriese 7 (1840) 390; Montagne in Ann. Sci. Nat. 7 (1847) 173.

*Cladoderris elegans* (Jungh.) Fries, Fungi Natalenses (1848) 22; Doidge in Bothalia 5 (1950) 480.

*Cladoderris spongiosa* Fries (!), Fungi Natalenses (1848) 20; Saccardo, Syll. Fung. 6 (1888) 548; Lloyd, Syn. Gen. Cladoderris (1913) 5, f. 526; van der Byl in Ann. Univ. Stellenbosch 7 (1929) 51, f. 17; Doidge in Bothalia 5 (1950) 480.

*Cladoderris spongiosa* Fr. var. *subsessilis* Fr., Fungi Natalenses (1848) 21; Doidge in Bothalia 5 (1950) 480.

*Actinostroma infundibuliforme* Klotzsch, Fungi in Meyen, Beiträge zur Botanik, gesammelt auf einer Reise um die Erde (1843) 237.

*Cladoderris infundibuliformis* (Kl.) Fries, Fungi Natalenses (1848) 21; Doidge in Bothalia 5 (1950) 480.

*Cladoderris australica* Berk. ex Saccardo, Syll. Fung. 6 (1888) 548; Cooke, Handbk. of Australian Fungi (1892) 181, f. 76; As *C. australica* Berk. in Herb., Cooke in Grevillea 8 (1879) 70, *nom. nud.*; *ibid.* 9 (1880) 14, *nom. nud.*; *ibid.* 11 (1882) 28, *nom. nud.*

FIGS. 2, 4-6.

\* Deur die goedgunstigheid van die Universiteit van Stellenbosch is ek toegelaat om sekere eksemplare in die Herbarium P. A. van der Byl te ondersoek. Verwysing na verskillende soorte in die Van der Byl-Herbarium word hieronder gemaak.

Pileus flabellate to infundibuliform, substipitate or attached by a short central, excentric or lateral stipe. Surface radially ridged, the ridges sharp, sublamellate, varying from nearly glabrous and somewhat zonate to thickly covered with a dense whitish, later discoloured, pad-like tomentum and azonate; the ridges yellow-brown to light reddish-brown to dark red-brown (near Carob brown or Chestnut of Ridgway). Margin entire or slightly incised. Hymenium creamy to light buff, radially costate, the ribs varying from narrow and sharp to broad and obtuse, almost smooth or strongly papillate or tuberculate.

Basidia: Clavate,  $25-45 \times 6 \mu$ .

Spores:  $3.2-5 \times 6.4-9.6 \mu$ , hyaline, smooth, elliptical, sometimes unilaterally depressed.

Cystidia: smooth, rarely with a minutely encrusted apical portion, hyaline, very thick-walled, fusiform, mammiform or pyriform, often with a small apical protuberance,  $(6.6)-8-17 \times 20-50 \mu$ , terminal in position.

Gloeocystidia: smooth, hyaline, with homogeneous deeply-staining contents, fusoid, pyriform or mammiform, or sometimes elongated and irregularly subcylindrical,  $(6)-8-12-(15) \times 25-60 \mu$ .

Hyphae: dimitic, hyaline. Skeletal hyphae thick-walled, smooth,  $2.5-6 \mu$  diam.

Surface hairs: scanty to abundant, thick-walled, smooth, hyaline, with clamp connections, part of the generative hyphal system.

Specimens examined: As *C. elegans*: Herb. Hort. Bot. Bog. Java 2361 in Herb. Kew.; *P. W. Richards* 2258, Sarawak, in Herb. Kew. (Java is the *locus typicus* of this species). As *C. spongiosa*: Part of Type in Herb. Kew. marked by Fries "*Cladoderris spongiosa* Fung. Nat. fragmentum Cap. Nat."; *Farquharson* 47, S. Nigeria, in Herb. Kew.; Universiteit van Stellenbosch, Herbarium P. A. van der Byl nr. 319, 2085; National Herbarium, Pretoria Nos. 36864, 33142, 15554, 31344, 9149, 39079. As *C. infundibuliformis*: *Dümmer* 2108 and 3125, Uganda, in Herb. Kew.; Ex Papua, det E. M. Wakefield, in Herb. Kew.; *W. Small*, 471, Uganda; *Maitland* 1, 30 A, Uganda; *Holst* 2542, Usambara; National Herb., Pretoria No. 18045 and 13032 (*Dümmer* 2108), Uganda; Universiteit van Stellenbosch, Herbarium P. A. van der Byl nr. 522. As *C. australica*: *J. M. Wood* 239, Natal (In Herb. Kew. and in Herb. S.A. Museum No. 34303) neotype. As *Thelephora dendritica*: ex Gripps Land, Herb. Berkeley.

Under *Cladoderris elegans*, Doidge lists two collections by Drège from South Africa. It has been ascertained that neither of these is represented in Montagne's Herbarium in the Paris Natural History Museum.

*Cladoderris spongiosa* Fr. var *subsessilis* Fr. was described as having an excentric stipe, but, as Lloyd has shown, the characters of stipe insertion are not of taxonomic value in this genus.

There is a specimen in Herb. Kew. labelled "*Thelephora calix* Kze." in an unknown handwriting, and "*Thelephora dendritica* Fr. Africa austr. leg. Ecklon & Zeyher" by Berkeley. It corresponds with *Cladoderris spongiosa* microscopically, and macroscopically except that its hymenium is obviously discoloured.

*Cladoderris australica* Berk. ex Sacc. is a species with a curious and complicated history. Cooke first published this name in 1879, 1880, and 1882 as a *nomen nudum*, attributing the epithet to "Berk. in Herb." In 1888 Saccardo validated the name with a full description, citing it as "*Cladoderris australica* Berk. in Herb. et in Cooke Fungi Austral." The formal citation of this species should therefore be *Cladoderris australica* Berk. ex Sacc. Then in 1892 Cooke published a close translation of Saccardo's description and added a coloured figure. He cited the species as "*Cladoderris australica* Berk. in Herb.", and referred to Saccardo's description. There is no concrete evidence that Berkeley ever used *C. australica* as a herbarium name, but both Saccardo and

Cooke referred to a Berkeley specimen from New South Wales which, if it existed, would be the holotype. The only Berkeley specimen in the type folder of *C. australica* at Kew was labelled "*Thelephora dendritica*" by Berkeley, and came from Gipps Land. Gipps Land is now part of Victoria, but I am informed by Mr. D. A. Reid that prior to 1851 it formed part of New South Wales. The old boundaries would be difficult to define and no exact locality was given for this specimen, so one could perhaps accept this specimen as being the one from N.S.W. referred to by Saccardo and by Cooke. Berkeley, on the other hand, did not use the name *C. australica* for this specimen, and so one must assume that he used it for a specimen that is now lost; consequently a lectotype or neotype should be chosen. As there is no material in existence seen and classified by Berkeley as *C. australica* a lectotype is out of the question and a neotype should be nominated. Cooke's earlier mention of the species was in connection with the Natal collection of *J. M. Wood* No. 239, and there is little doubt that both Saccardo's and Cooke's descriptions, and the coloured figure, fit the Natal specimens rather than Berkeley's specimen from Gipps Land. Lloyd (Syn. Gen. *Cladoderris* 1913, 10) considered that the latter specimen matched *C. spongiosa* Fr., and I support that opinion. Consequently I consider that if another Berkeley specimen, now lost, had existed, it must have had the appearance of *J. M. Wood* 239, and I nominate the latter as the **neotype** of *Cladoderris australica* Berk. ex Sacc. I regard both *C. spongiosa* and *C. australica* as synonyms of *Cymatoderma elegans* Jungh. That a neotype for *C. australica* should be nominated, really only becomes a practical necessity if this synonymy should later be disputed.

It may be mentioned that the specimen of *J. M. Wood* No. 239 in the National Herbarium, labelled *Cladoderris thwaitesii*, is instead a species of *Favolus*, but that the part of this collection in Herb. S.A. Museum 34303 matches *Cladoderris australica* and the neotype in Kew.

3. *Cladoderris funalis* P. Henn. in Engler Jahrb. 38 (1905) 120; Saccardo Syll. Fung. 21 (1912) 385; van der Byl in Ann. Univ. Stellenbosch 7 (1929) 52, f. 18; Doidge in Bothalia 5 (1950) 480.

FIG. 7.

Fructifications laterally stipitate, anastomosed and with somewhat fused stipes, more or less flabellate, 3 cm diam. and 1.5 cm high. Stipe 1.5–2 cm × 2 mm, compressed, rugulose striate. Upper surface sterile, yellow-brown to pale reddish-brown, covered with tangled, thick, concolorous fibrils composed of fascicles of hyphae. Margin fimbriate to deeply dissected. Hymenium yellowish to brownish, covering broad, obtuse, radiating, branched ribs, not papillate, decurrent on the stipes.

Basidia: cylindric-clavate, 35–50 × 6–8  $\mu$ , with two to four sterigmata up to 4  $\mu$  long. Spores: hyaline, smooth, ovate to ellipsoid, finely apiculate, 4.8–6.4 × 6.4–8  $\mu$ .

Hyphae: thin-walled, hyaline, without clamps, septate, readily collapsing, in parts inflated, 3–9  $\mu$  wide. Hyphae composing the surface fibrils are similar, usually uninflated, 3–5  $\mu$  wide, adherent in fascicles.

Specimens examined: Universiteit van Stellenbosch, Herbarium P. A. van der Byl nr. 2465 (*Eyles* 5026), Salisbury, S. Rhod.

This collection agrees very well with Hennings' description and Lloyd's photograph (Syn. Gen. *Clad.*, 1913, p. 10, Fig. 530) of the type, and appears to be correctly named as to species.

The dissection of the pileus at the margin is partly due to the running out of the hymenial ribs, and partly to their being continued into some of the surface fibrils. The fibrils are thick, sterile, and resemble hydroid spines. The hymenial ribs are broad, obtuse and not papillate. The spores are very abundant. No cystidia or other accessory organs are present. There is a monomitic hyphal system.

Writing of *Cladoderris funalis*, Lloyd said, "It is so different from all other species that it is a question if Hennings was correct in referring it to *Cladoderris*." Lloyd suggested an affinity with *Lachnocladium*, but that can be ruled out since *C. funalis* has no dichophytic hyphae.

Certainly *C. funalis* is far removed from other *Cladoderris* species by its monomitic hyphae which become inflated, by its bisporous to quadrisporous basidia, and by the lack of cystidia and gloeocystidia. It seems certain that the ribbed hymenium is composed basically of flattened clavarioid branches which have fused into an unusual dorsiventral form. Except that the basidia are not all bisporous they and the other microscopic characters agree well with those of *Clavulina* as delimited by Corner (Monogr. of Clavaria and Allied Genera, 1950), and there are species in this genus which show flattened branching. Flattened branching is however more characteristic of the genus *Aphelaria* Corner in which the basidia are bisporous to quadrisporous; but the hyphae in *Aphelaria* are uninflated and tend to have thickened walls, which is not the case in *Cladoderris funalis*. Mr. D. A. Reid informs me that the type of *C. funalis* has basidia with four spores. *Cladoderris funalis* appears to have characters somewhat intermediate between those of *Clavulina* and *Aphelaria* but I am not in a position to decide to which of these genera it should be transferred.

4. *Cladoderris thwaitesii* Berk. & Broome; recorded by Kalchbrenner in Grevillea 10 (1881) 58; Saccardo Syll. Fung. 6 (1888) 550; Doidge in Bothalia 5 (1950) 480.

The collection which Kalchbrenner assigned to this species is J. M. Wood No. 239. This collection has been nominated above as the neotype of *Cladoderris australica* Berk. ex Sacc., which has here been reduced to synonymy under *Cymatoderma elegans* Jungh.

According to Petch (Ann. Roy. Bot. Gard. Perad. 9, 1924, 134) the true *C. thwaitesii* is a bleeding species of *Stereum*.

#### THELEPHORA Ehrhart ex Fries.

Many of the Thelephoraceae were originally described as species of *Thelephora* and have since been combined under other genera. The object of this section is to annotate all those species which have at some time been recorded for South Africa under the genus *Thelephora*.

1. *Thelephora (leijostroma) acerina* (Pers.) Pers. ex Fr., Syst. Myc. 1 (1821) 453; Persoon, Syn. Fung. (1801) 581, Myc. Eur. 1 (1822) 152; Léveille in Ann. Sci. Nat. ser iii, 5 (1846) 150.

*Stereum acerinum* (Pers. ex Fr.) Fr., Epicrisis (1838) 554; Saccardo Syll. Fung. 6 (1888) 587.

As no material supporting Léveille's and Saccardo's records is available, it is not known whether this species is represented in South Africa. The species is referable to the genus *Aleurodiscus*, and a description and comment on it as a South African record is given by the writer (Bothalia 6, 1956, 466).

2. *Thelephora biennis* Fries, Syst. Myc. 1 (1821) 449; recorded by Kalchbrenner in Grevillea 10 (1881) 58.

This record is based on Kalchbrenner's determination of *MacOwan* (1244), collections of which have been examined at Kew Herbarium and in Herb. S.A. Museum (sub. *Stereum fuscum*, No. 34292). These specimens are *Stereum bicolor* (Pers. ex Fr.) Fr. Cfr. Bothalia 6 (1954) 308, f. 21.

3. *Thelephora (Stereum) fulva* L veille (!) in Ann. Sci. Nat. ser. iii, 5 (1846) 149.

The type of this species, Dr ge (9441), Cap-de-Bonne-Esp rance in Herb. Mus. Paris, was examined and is annotated under *Stereum fulvum* (Lev.) Sacc: See Bothalia 6 (1954) 315, f. 20.

4. *Thelephora fuscoviolascens* Mont. in Ann. Sci. Nat. ser. iii, 7 (1847) 174.

Collected by Dr ge (9429) at Port Natal, and referable to *Hymenochaete fuscoviolascens* (Mont.) Sacc., according to van der Byl (in Ann. Univ. Stellenbosch 7, 1929, 14). Saccardo (Syll. Fung. 6, 1888, 546) however, left the species under *Thelephora*, only suggesting in a footnote that it might be a *Hymenochaete*. The correct citation is thus *Hymenochaete fuscoviolascens* (Mont.) v. d. Byl as indicated by Doidge, loc. cit. p. 484. Dr ge's specimen has not been available for personal study.

5. *Thelephora hirsuta* (Willd.) Pers. ex Fr.; Recorded for South Africa by Berkeley in Hooker Lond. Journ. Bot. 11 (1843) 516.

= *Stereum hirsutum* (Willd.) Pers. ex S. F. Gray; annotated in Bothalia 6 (1954) 316, f. 11.

6. *Thelephora intybacea* Pers. ex Fr.; Recorded by van der Byl in Trans. Roy. Soc. S. Afr. 10 (1922) 285 and in Ann. Univ. Stellenbosch 7 (1929) 32; Doidge in Bothalia 5 (1950) 495.

The writer has examined van der Byl's specimens determined as this species in Universiteit van Stellenbosch, Herbarium P. A. van der Byl Nos. 214, 922, 1261, 1263. These are apparently indistinguishable from numerous South African collections named *Thelephora terrestris* in the National Herbarium, and from Herb. S.A. Mus. No. 34298, originally named *Thelephora laciniata* but annotated by v. d. Byl as *T. intybacea*.

The literature on *T. intybacea* does not clearly indicate how it differs from *T. terrestris* and moreover there is the complication that *T. intybacea* Pers. ex Fr. and *T. intybacea* Fr. are apparently not the same species. This confusion can obviously not be resolved outside Europe, but the probability is strong that *T. intybacea* does not occur in South Africa and that specimens recorded as such are actually the far commoner species *T. terrestris*. That opinion is adhered to here, and van der Byl's specimens are taken to be *T. terrestris*.

7. *Thelephora laciniata* Pers. ex Fr.; Recorded for South Africa by MacOwan in Cape Agric. Journ. 8 (1895) 331; Davidson in Natal Agric. Journ. 12 (1909) 617; Doidge loc. cit. p. 495.

*Thelephora laciniata* is generally acknowledged to be a synonym of *T. terrestris* Ehrh. ex Fr. Davidson's specimen does not exist, but I have seen MacOwan's (No. 1445, Herb. S.A. Mus. 34298) which is in no way different from *T. terrestris*.

8. *Thelephora palmata* (Scop.) Fr., Syst. Myc. 1 (1821) 432; Wood in Rept. Natal Bot. Gard. & Colonial Herbarium for 1898, p. 19; van der Byl in Ann. Univ. Stellenbosch 7 (1929) 31; Doidge in Bothalia 5 (1950) 495.

This record is based on a single collection, in Herb. Kew., labelled "J. M. Wood (3497), *Thelephora palmata*, on ground in N.B. Gardens, Febr. 1885." The pilei are terrestrial, erect, flabelliform, and split longitudinally for about half their length into a number of flattened, narrow segments. The undivided base and the microscopic structure show that these segments are merely formed by splits in the fibrous pileus and are not clavarioid branches arising from a stem as is the case in *T. palmata*. Spores and basidia were absent, the only clear microscopic feature being the hyphae, which were pale coloured, lacking clamps, 2.5-3.2  $\mu$  diam., with thin or slightly thickened

walls. Both surfaces of the pilei were heavily covered with conidiophores and conidia of an *Aspergillus*. It is doubtful whether this collection is in good enough condition ever to be determined, but certainly it is not *Thelephora palmata*.

9. *Thelephora pedicellata* Schw.; Recorded by Wood in Rept. Natal Bot. Gard. & Colonial Herbarium for 1898, p. 19; Bottomley in S.A. Journ. Sci. 13 (1917) 440.

J. M. Wood recorded this fungus as "*Thelephora pedicellata* Schuz. (sic), on bark, No. 532." This collection was examined in Herb. Kew. and proved to be a species of *Septobasidium*, but could not definitely be referred to *S. schweinitzii* Burt (in Ann. Mo. Bot. Gard. 3, 1916, 324; Couch, The Genus *Septobasidium*, 1938, 112) with which *Thelephora pedicellata* Schw. is synonymous.

10. *Thelephora penicillata* Lloyd (non Fries) in Myc. Notes 6 (1920) 989, Figs. 1759, 1760; van der Byl in Ann. Univ. Stellenbosch 7 (1929) 32, f. 12; Stevenson & Cash in Bull. Lloyd Library 35 (1936) 60; Doidge in Bothalia 5 (1950) 495.

#### FIG. 8.

Fructifications beginning as resupinate, fertile, membranous, whitish growths encrusting soil and debris, finely pubescent under the lens, smooth, following the conformation of the substratum, later becoming greyish then fuscous-purplish and finally drying fawn or chocolate brown. Flabellate fascicles of subulate radiating branches are emitted usually near the margin; they are oblique or suberect and become fertile with age at the base, white at first, then yellow-brown to fawn or chocolate brown with the apex remaining whitish and infertile. These branches are occasionally entire but are usually dissected into a number of penicillate or ciliate parts, and are up to 0.5–0.7 cm long. When growing on debris the fructification may become subpileate, but it is resupinate on soil. Microscopically the resupinate and pileate parts are the same.

Basidia: (30)–60 × 8.5–11 μ, proliferating by basal clamps, with four sterigmata up to 7.2 × 1.6 μ.

Spores: forming a chocolate coloured spore print, yellow-brown under the microscope, finely warted, irregularly angled, elliptic or subglobose, 4.8–7.2 × 6.4–9.6 μ.

Hyphae: at first hyaline, some later becoming dark brown, branched, closely intertwined, septate, with abundant clamps, 3.5–7 μ diam.

Specimens examined: 31417, *J. D. Krige*, Stellenbosch, June, 1919, (presumed Type collection); 31500, *A. V. Duthie*, Stellenbosch, July, 1923; 40512, *P. H. B. Talbot*, on soil and mosses, Fountains, Pretoria, 1951; 40712, *P. H. B. Talbot*, on soil and pine needles, Union Buildings Grounds, Pretoria, 1954.

This rather rare species inhabits very moist situations, especially favouring debris under pine trees but not confined to this habitat.

Lloyd (l.c.) named the earlier specimens from Stellenbosch *Thelephora penicillata*, about which Stevenson & Cash commented: "Seems to have been intended by Lloyd as a new species though his description and comparison with *T. spiculosa* Fr. might indicate that he had reference to *T. penicillata* Fr., Syst. Myc. 1, 434, 1821. In a note with a specimen of another species Lloyd refers to *T. penicillata* 'which I had named from South Africa.'"

Van der Byl and Doidge both attributed the specific epithet to Lloyd. If this is correct then it is a later homonym of *T. penicillata* Fr., and Lloyd's name has no nomenclatural standing. Lloyd regarded the South African specimens as differing from *T. spiculosa* Fr. in having the hymenium only on the resupinate portion and not on the erect subulate parts. However, further specimens show quite clearly that at least the basal parts of the penicillia become fertile with age.

From the literature alone there is very great difficulty in differentiating between *Thelephora mollissima* Pers. ex Fr., *T. spiculosa* and *T. penicillata*, for these names have been used in different senses by different authors. However, it seems fairly certain that our material is referable to the species described by Burt (Ann. Mo. Bot. Gard. 1, 1914, 225, Pl. 4, f. 2), after reference to an authentic specimen, as *T. spiculosa* Fr., and by Bourdot & Maire (in Bull. Soc. Myc. de Fr. 36, 1920, 29) as *T. spiculosa* Fr. forme *B. mollissima*. Used in this sense, *T. spiculosa* Fr. is regarded by several authors (Bourdot & Galzin, Hym. de Fr. 1928, 467; Bourdot & Maire, loc. cit.; Rea, Brit. Basid., 1922, 654; Lundell & Nannfeldt, Fung. Exsicc. Suecici No. 77, 1934) as synonymous with *Thelephora mollissima* Pers. ex Fr., and this is the name which I think should be adopted for *T. penicillata* Lloyd. Further work is necessary before this can be confirmed.

Dr. John Eriksson of Värnamo, Sweden, has kindly examined these specimens and has concluded that they are *Thelephora mollissima* Pers. ex Fr.

11. *Thelephora (Stereum) pulverulenta* Lév. (!) in Ann. Sci. Nat. ser. iii, 5 (1846) 149; Doidge in Bothalia 5 (1950) 491; Talbot in Bothalia 6 (1954) 323.

*Corticium (Coniophora) pulverulentum* (Lév.) Cooke in Grevillea 8 (1880) 89.

*Coniophora pulverulenta* (Lév.) Masee in Journ. Linn. Soc. Bot. 25 (1889) 129; Saccardo, Syll. Fung. 6 (1888) 649; Doidge in Bothalia 5 (1950) 480.

The type of this species, Drège 9442, as noted previously (Talbot, loc. cit.) is a *Hymenochaete*, probably *H. luteobadia* (Fr.) Höhnelt & Litsch.

12. *Thelephora punicea* Alb. & Schw.; Recorded for South Africa by Wood in Rept. Natal Bot. Gard. & Colonial Herbarium for 1898, p. 19; Kalchbrenner in Grevillea 10 (1881) 58.

J. M. Wood recorded this fungus as "*Thelephora punicea* Alb. & Schw., on bark, No. 190". Van der Byl (in Ann. Univ. Stellenbosch 7, 1929, 19) quotes Wood's record and gives a description, taken from Rea's "British Basidiomycetes", under *Hypochnus puniceus* (A. & S.) Sacc. Bourdot & Galzin (Hym. de Fr., 1928, 769) describe this species from Europe under the genus *Tomentella* as *T. punicea* (A. & S.) Schroet. Wood's collection is no longer in existence and so the record cannot be confirmed.

13. *Thelephora sinuans* Pers.; Recorded by Léveillé in Ann. Sci. Nat. ser. iii, 5 (1846) 146.

The record refers to a collection by Drège (944), Caput Bonae Spei, but no material is available from Herb. Mus. Paris and so the record has not been confirmed. Fide Lentz (U.S.D.A. Agric. Monogr. No. 24, 1955, 35) *T. sinuans* is a synonym of *Stereum frustulatum* (Pers. ex Fr.) Fuckel.

14. *Thelephora terrestris* Ehrh. ex Fr., Syst. Myc. 1 (1821) 431; Ehrhart, Crypt. Exsicc. No. 178 (1785); Doidge in Bothalia 5 (1950) 495.

*Thelephora laciniata* Pers. ex Fr., Syst. Myc. 1 (1821) 431; Persoon, Syn. Fung. (1801) 567.

FIG 9.

Fructifications effuso-reflexed and encrusting, more usually dimidiate and sessile, imbricate or confluent, occasionally shortly stipitate. Surface fawn to chocolate or

dark fuscous colour, usually strigose. Hymenium smooth to finely radiately rugose and papillate, concolorous. Texture coriaceous, soft, thin. Margin whitish then concolorous, entire to shortly lacinate and strigose-fibrous.

Basidia: not seen (fide Bourdot and Galzin:  $40-90 \times 9-12 \mu$ ).

Spores: coloured, fuscous, finely and sparsely verrucose, subglobose to broad ellipsoid and irregularly angled,  $(7)-9-11 \times 7-8 \mu$ .

Hyphae: coloured brownish, thin-walled, some inflating and then collapsing, with occasional clamps, not encrusted,  $3-5.5-8-(11) \mu$  diam.

Specimens examined: As *T. terrestris*: Nos. 27560, 30616, 40206, 40670, 40657, 13020, 19852, 27329, 27330, 1067, 10049.

As *T. intybacea*: No. 25863; Universiteit van Stellenbosch, Herbarium P. A. van der Byl Nos. 1263, 214, 1261, 922.

As *T. laciniata*: Nos. 11107, 34406, 30712; Herb. S.A. Mus. No. 34298 (*MacOwan* 1445), Table Mountain.

#### EXPLANATION OF THE ILLUSTRATIONS.

The following lettering has been used throughout the illustrations:—

B = Basidia.	G = Gloeocystidia.
C = Cystidia.	H = Hyphae.
CO = Conidia	HA = Habit.
CP = Conidiophores.	S = Basidiospores.
CY = Cystidioles.	SE = Setae.
D = Dendrophyses.	SH = Surface hairs.

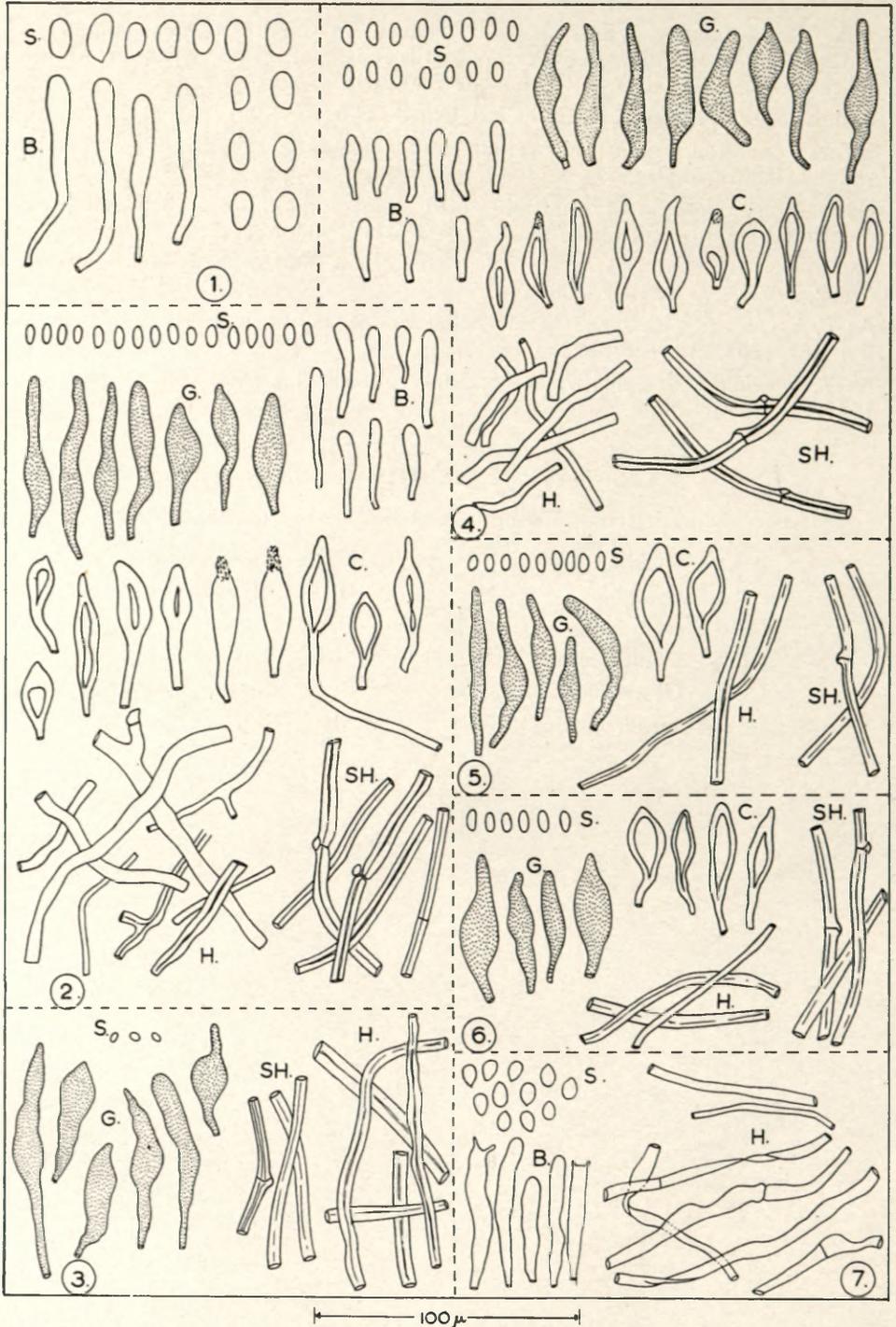


FIG. 1.—*Craterellus cornucopioides* (J. M. Wood No. 4108). FIG. 2.—*Cladodermiss spongiosa*. FIG. 3.—*Cladodermiss dendritica*. FIG. 4.—*Cladodermiss australica* (J. M. Wood No. 239), neotype. FIG. 5.—*Cladodermiss elegans*. FIG. 6.—*Cladodermiss infundibuliformis*. FIG. 7.—*Cladodermiss funalis* (Eyles No. 5026).

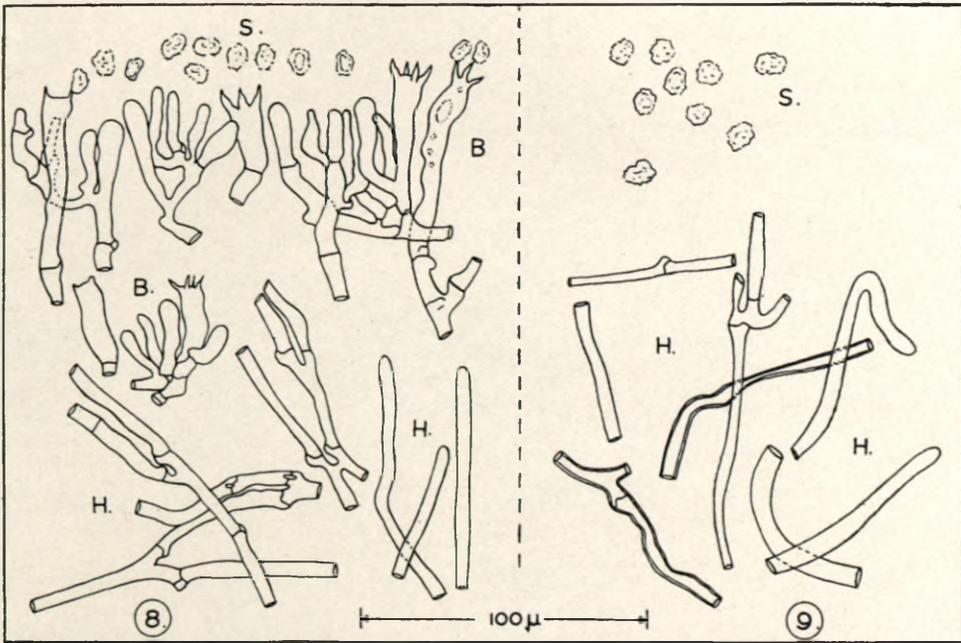


FIG. 8.—*Thelephora penicillata* Lloyd. FIG. 9.—*Thelephora terrestris*.

