Thelephoraceae of New Zealand.
XIV—The Genus *Hymenochaete*

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Abstract

Hymenochaete is represented in New Zealand by 33 species, of which 16 are described as new. A diagnostic key is given together with detailed descriptions of all species, each accompanied by notes on distribution, host range, and comparative features. All are illustrated with original line drawings of transverse sections and spores, and with 10 photographs of representative species.

Those previously named are *H. arida* (Karst) Sacc., *H. attenuata* Lev., *H. cinnamomea* (Pers) Bres , *H. corrugata* (Fr.) Lev., *H. corticolor* Berk. & Rav., *H. dura* Berk. & Curt , *H. floridea* Berk. & Br., *H. fusca* (Karst.) Sacc , *H. lictor* Petch, *H. mougeotii* (Fr) Cke , *H. rhabarbarina* (Berk) Cke., *H. rubiginosa* (Dicks.) Lev., *H. semistupposa* Petch, *H. tabacina* (Sow.) Lev., *H. tasmanica* Mass., *H. unicolor* Berk. & Curt. and *H. villosa* Bres.

Of these, *H. cinnamomea, H. corrugata, H. rubiginosa* and *H. tabacina* occur in temperate regions of Europe, Great Britain and North America; *H. arida* and *H. fusca* are distributed in Europe and North America, *H. mougeotii* in Europe, Great Britain, Australia and Tasmania; *H. corticolor* in North America and West Indies; *H. unicolor* in South America and West Indies; *H. dura* in Cuba; *H. villosa* in Java, Malaya, Ceylon, India and Australia; *H. attenuata* in Malaya, Japan, Ceylon and Australia; *H semistupposa* in Ceylon and South Africa; *H. floridea* in Ceylon and Australia; *H. lictor* in Ceylon; *H tasmanica* in Australia and Tasmania; and *H. rhabarbarina* in Australia.

INTRODUCTION

Hymenochaete contains about 100 species, mainly of tropical and subtropical origin. It is placed herein under the tribe Hymenochaetae. The genus may be recognized readily by the coloured hyphae and presence of coloured setae which arise from tissues of the hymenium and subhymenium. Setae are subulate or aculeate and usually project above the hymenial surface where they may be seen under a hand lens. They possess thick walls, acuminate apices, and may be naked, clothed with fine crystals, granules of coloured mucilage, or enmeshed in hyphal sheaths. Features of diagnostic value are discussed below.

HYMENOPHORE. Plants may be stipitate, pileate, umbonate-sessile, or resupinate.

Stipitate species, of which two, or possibly three, have been described, bear one or several pilei upon a central stem. In the tropical *H. damaecornis* (Link) Lev. several flabelliform pilei are attached by short branches to a central stem which may attain a length of 15 cm and diameter of 2–3 mm.

Pileate species are applanate or flabelliform, when attached by a narrow or broad lateral base (*H villosa*) ; or more often effused-reflexed with a broad median part and margins free and reflexed (*H. tabacina*).

Umbonate-sessile species appear as flattened orbicular or patelliform fructifications attached by a narrow or broad base, or umbo, with margins free but plane or scarcely upturned (*H. patelliformis*). The abhymenial surface is clothed with hairs arising from a coloured cortex as in most pileate species.

Resupinate species are adnate upon the substratum and may be loosely or firmly attached They may bear hairs upon the abhymenial surface, arising from a cortex (*H tasmanica*), or be without these when the cortex is wanting (*H. unicolor*).

Species may be divided into three major sections:

I. Species with a coloured cortex bordering the abhymenial surface. This structure is readily seen in sections, being more deeply coloured than the associated intermediate tissue, and composed either of cemented intertwined hyphae or compacted parallel hyphae. It is almost always associated with abhymenial hairs (*H. tabacina*).

II. Species without a coloured cortex but possessing a well-developed intermediate tissue formed from hyphae either arranged parallel with the hymenial layer, or intertwined. Abhymenial hairs are present in pileate species (*H. attenuata*), absent from those which are resupinate (*H. rhabarbarina*).

III. Species without a cortex or well developed intermediate tissue. Setae arise directly from a compact layer of intertwined hyphae seated upon the substratum. Species are resupinate, usually firmly attached to the substratum (*H. corrugata*) and without abhymenial hairs.

Transverse sections through pileate species of Section I show several well defined tissues: (1) a layer of abhymenial hairs, sometimes in thickness exceeding that of the context, arising from (2) a deeply coloured usually cemented cortex, (3) a broad intermediate tissue of hyphae either arranged parallel with the hymenium, or intertwined and upright; (4) the setal layer, and (5) hymenium and subhymenium.

(1) *Abhymenial Hairs.* In pileate species these appear upon the pileus surface and may form a tomentum, be imbricate when the surface appears silky, be grouped into strigose tufts, or appear as raised or depressed bands which are usually radiate and concolorous or of different shades of brown. They may persist, as in most pileate species, or become denuded, as in *H. obesa,* when the dark brown cortex becomes exposed.

In umbonate-sessile and resupinate species which possess a cortex, abhymenial hairs are also present, forming a loose weft lying upon the substratum, so that plants are usually loosely attached.

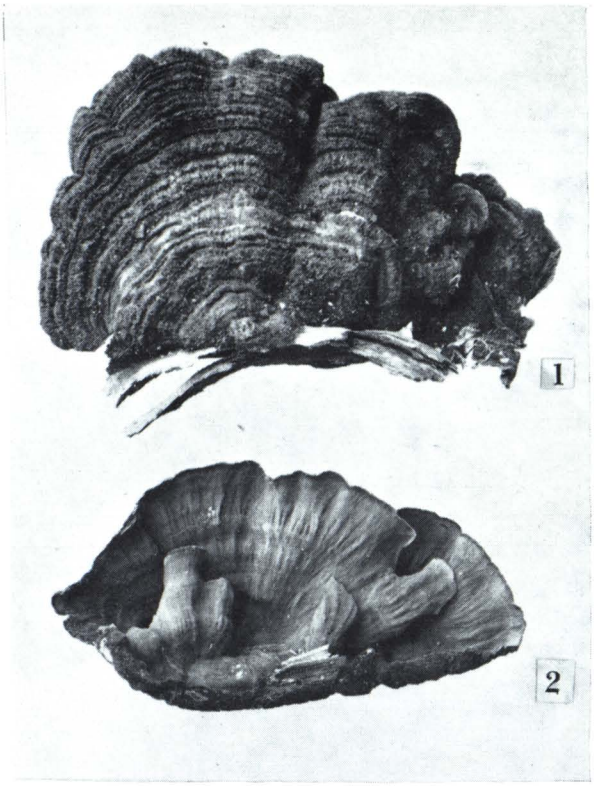
Abhymenial hairs are present in pileate species without a cortex, placed in Section II, but absent from resupinate species of that section, and from all species of Section III. They are formed from skeletal hyphae of species with dimitic hyphal systems, and from generative hyphae of those with monomitic systems.

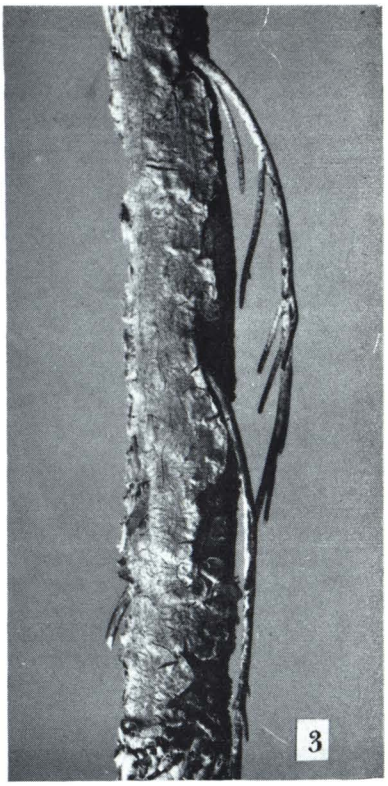
(2) *Cortex.* Present in species placed under Section I, the cortex may be seen readily in transverse sections since hyphae of which it is composed are more deeply coloured than tissues of the intermediate layer, compacted, cemented, and either intertwined (*H. tabacina*) or parallel (*H. villosa*). The cortex is composed mainly of skeletal hyphae in species with a dimitic hyphal system, though generative hyphae may be intertwined with them, and of generative hyphae in species which possess a monomitic system. The cortex is absent from species placed under Sections II and III.

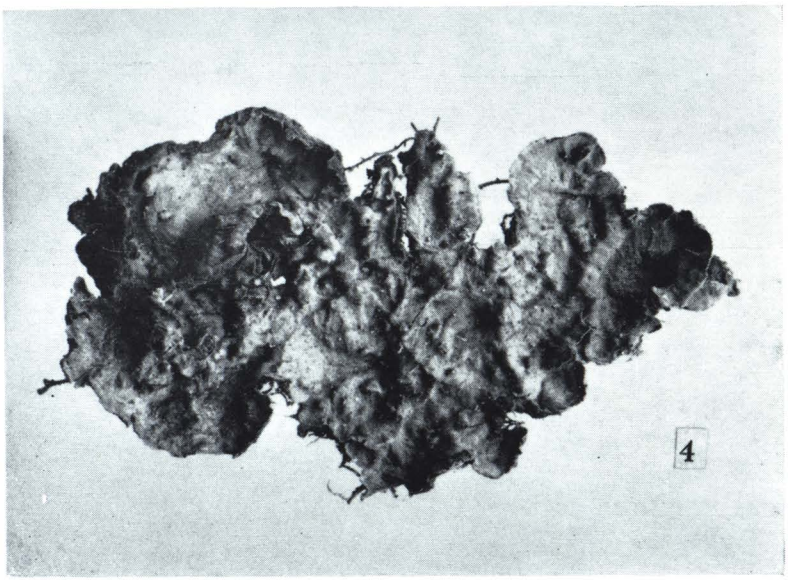
A second colour zone may be seen beneath the subhymenium of most species of Section I. It is irregular in position and formation, and for the most part composed of more densely arranged intertwined hyphae which are seldom cemented.

(3) *Intermediate Tissue.* The bulk of the context in species placed under Sections I and II is formed from the intermediate tissue In pileate species it is composed of hyphae radiately arranged parallel with the hymenium; in apileate species hyphae may be parallel (*H. mougeotii*), or loosely intertwined and mainly upright (*H. cinnamomea*). Sometimes the setal layer is so copiously developed that the intermediate tissue is reduced to a narrow zone (*H. plurimaesetae*); its presence then may be indicated by the presence of abhymenial hairs. In species placed under Section III, the intermediate tissue is wanting, though sometimes basal hyphae if well developed in small areas may simulate it. Absence of abhymenial hairs indicates that such specimens belong to Section III.

(4) *Setal Layer.* Setae may be confined to a single row arising from the subhymenium (*H. gladiola*); or, more commonly, arranged in 2–5 rows which overlap

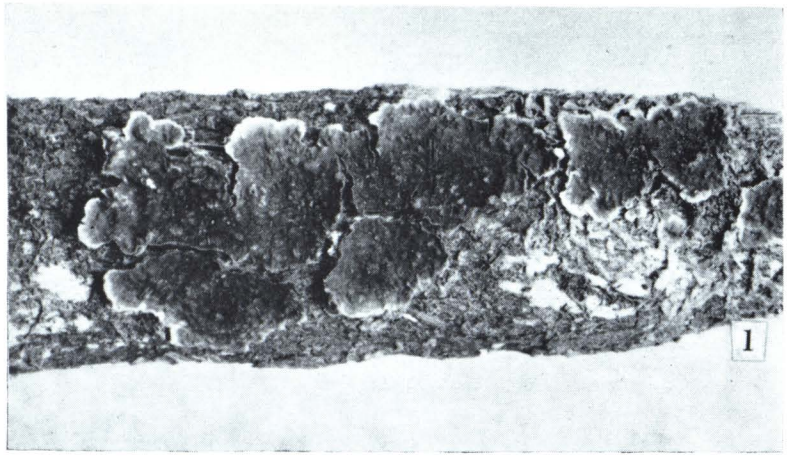


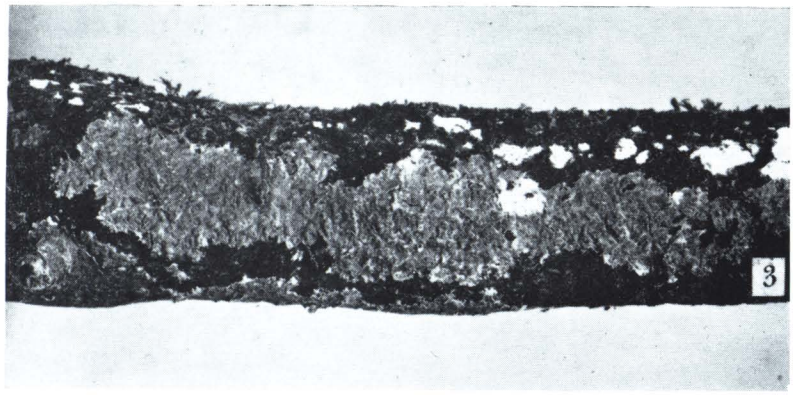




Photographs by S. A. Rumsey.

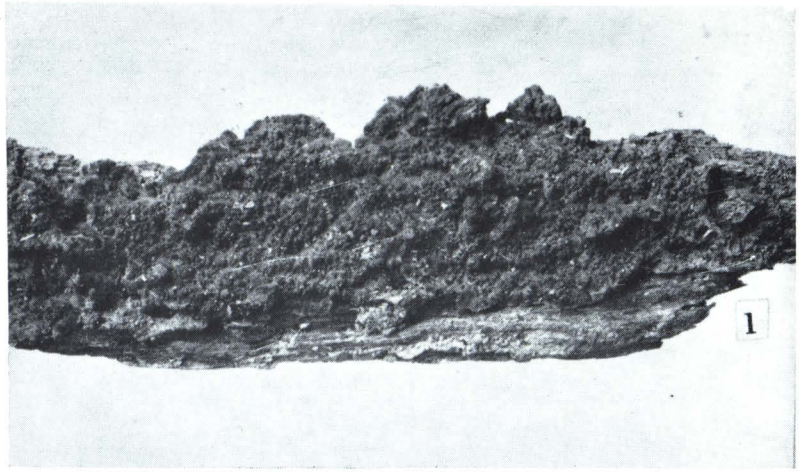
FIG. 1.—*Hymenochaete villosa* (Lev.) Bres. × 1. Showing concentric zones of tomentum on the surface of the applanate pileus. FIG. 2.—*Hymenochaete villosa* (Lev.) Bres. × 1. Hymenial surface showing plicate and concentric zoning. FIG. 3.—*Hymenochaete obesa* G. H. Cunn. × 1. Showing effused-reflexed pilei with radiate series of crevices in the hymenial surface. FIG. 4.—*Hymenochaete gladiota* G. H. Cunn. × 1. Umbonate-sessile pilei with incurved margins.

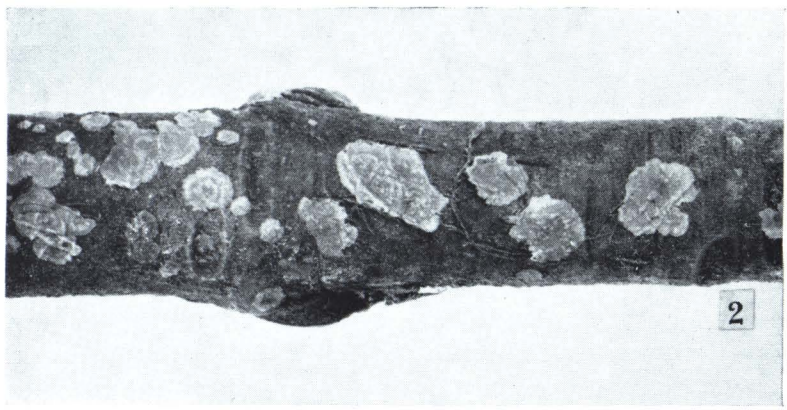


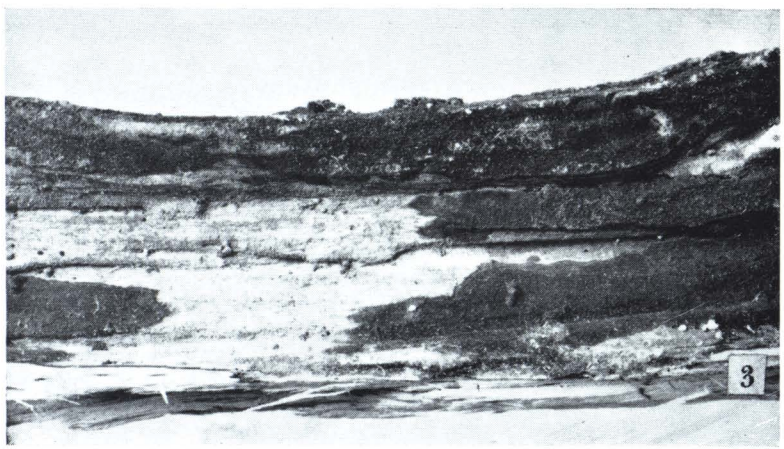


Photographs by S. A. Rumsey.

FIG. 1.—*Hymenochaete patelliformis* G. H. Cunn. × 1. Umbonate-sessile pilei. FIG 2.—*Hymenochaete lignosa* G. H. Cunn. × 2/3. Specimen has been fractured to show depth of the context. FIG. 3.—*Hymenochaete dictator* G. H. Cunn. × 1. Showing colliculose surface deeply areolately creviced. White colonies are of a Corticium.







Photographs by S. A. Rumsey.

FIG. 1.—*Hymenochaete tasmanica* Mass. × 1. Showing tuberculate surface of New Zealand specimens. FIG. 2.—*Hymenochaete plurimaesetae* G. H. Cunn. × 1. Orbicular colonies with free plane margins. FIG. 3.—*Hymenochaete dissimilis* G. H. Cunn. × 1/2. Closely adnate fructifications finely colliculose in the upper portion.

and arise from the subhymenium and upper part of the context (*H. tabacina*). In *H. cinnamomea, H. lignosa, H. tasmanica, H. unicolor, H. vaginata* and *H. vallata* setal layers are arranged in strata, each separated from the others by intervening layers of intertwined or parallel context hyphae sometimes with, in addition, persistent paraphyses forming an irregular palisade (*H. tasmanica*). In two species setae are arranged in fascicles of 2–6 (*H. lictor*) or 3–12 (*H. dictator*).

In species of Section III the setal layer usually occupies the entire thickness of the plant. When this does not exceed 100μ it may be confined to two or three overlapping rows of setae (*H. corrugata*); in plants of greater depth many overlapping rows may be present (*H. dissimilis*), or rows may be arranged in poorly defined strata (*H. unicolor*).

Hyphal Systems

Both monomitic and dimitic systems are present in species of the genus. Of those present in New Zealand 18 possess monomitic and 15 dimitic hyphal systems. Species in which the intermediate tissue is composed of parallel hyphae usually possess a dimitic hyphal system (save *H. bispora* and *H. stratura*), whereas those with intertwined hyphae are monomitic.

Skeletal hyphae are coloured some shade of brown, and the colour deepens when sections are treated with an aqueous solution of potassium hydroxide. In diameter they range from 2·5μ to 6μ, and walls in thickness range from 0·25μ to 2μ. Most are sparingly branched, sparsely septate, and smooth. Skeletal hyphae of most species develop parallel with the hymenium and turn abruptly into the hymenial layer. Where the setal layer is of appreciable depth skeletal hyphae usually grow between setae and compact it.

Generative hyphae of species with a dimitic hyphal system are hyaline, of less diameter than skeletal hyphae, with walls 0 2–0·5μ thick, freely branched, and septate. Those of species with a monomitic system are brown, usually freely branched, sometimes at a wide angle, and walls may be thickened appreciably. In monomitic species generative hyphae are usually intertwined, seldom arranged parallel with the subhymenium, and in the setal layer may be erect or intertwined. All species of *Hymenochaete* are without clamp connexions in the generative hyphae.

Hyphae are seldom noteworthy save in points of diameter, form of branching, or thickness of walls. In *H. semistupposa,* however, some display submoniliform areas, an unusual condition which affords a rapid diagnostic aid (Text-fig. 9). Occasional hyphae of *H. arida* and *H. rhabarbarina* are coated in part with granules of brown mucilage; and a few hyphae of *H. mougeotii* may be coated with crystals.

Ancillary Organs

Setae. Most are subulate or aculeate, in a few species narrowly fusiform, and taper gradually from base to acuminate apex. Walls are coloured brown, the colour deepening when treated with an aqueous solution of potassium hydroxide, and usually so thickened that the lumen is capillary. Setae of some species are naked; others are coated with fine deciduous crystals near their apices; two (*H. arida, H. rhabarbarina*) may bear sheaths of mucilaginous brown granules, and in *H. vaginata* may be enmeshed in hyphal sheaths.

Although measurements of setae may be used to separate related species, these intergrade to such an extent that they cannot be employed as group features. Largest setae are present in *H. gladiola* (95–200 x 10–16μ), *H. contiformis* (95–190 x 8–12μ) and *H. vaginata* (90–160 x 9–14μ); smallest in *H. magnahypha* (24–40 x 5–7μ).

Paraphysate Hyphae. Noteworthy in a few species because of their form, paraphysate hyphae are best seen in margins of young specimens, since they tend to

collapse with age. Dendriform in *H. cinnamomea, H. mougeotii* and *H. tasmanica,* they are moniliform in *H. semistupposa,* cylindrical or filiform in *H. arida, H. dura, H. unicolor* and *H. vaginata.*

Masses of crystals occur scattered through the context of *H. contiformis, H. corticolor, H. dissimilis, H. patelliformis* and *H. separata,* and appear to be constant for the species. In a few others, scattered lenses of crystals may be present or absent, so are apparently accidental.

Hymenial Layer

Hymenial Surface. Colour of the surface has long been used as a diagnostic feature, but save in a few well marked species, this feature is too variable to be employed for such a purpose. In most species colour in some shade of brown, ranging from tan or bay through chestnut to umber, sepia, or chocolate. These shades vary in specimens from different localities, hosts, altitudes, and also may change in drying, or with long keeping. Consequently colour of the hymenial surface has been treated herein as a minor feature. A few species do display colours which are noteworthy. In *H. mougeotii,* for example, the colour ranges from brick red through India red to shades of purple; but even with this species colours vary appreciably, for Australasian collections are more deeply coloured than those from Europe.

The surface is usually velutinate when examined under a lens, because of the projecting setae, and may be tomentose through the presence of paraphysate hyphae. It may be even, but is more usually creviced, sometimes strikingly so, as in *H. obesa* in which crevices are arranged in radiate series about 10 mm in diameter. It is not infrequently colliculose, notably so in mature plants of *H. corrugata, H. fusca, H. separata,* and *H. vallata.* In addition *H. corrugata* may be finely rugulose. The surface of New Zealand collections of *H. tasmanica* is usually strongly tuberculate, whereas in Australian plants the surface may be even or only slightly roughened.

Basidia. In all species examined, basidia project for about one-third their length above the surface of the hymenium. They are usually subclavate, but in *H. lictor* and *H. separata* most are cucurbitiform. Usually they bear 2 or 4 spores on short sterigmata; in *H. bispora,* however, basidia carry 1 or 2 spores.

Paraphyses. Usually shorter and narrower than the basidia, and subclavate or cylindrical, paraphyses present few features of note. In several stratose species they persist in each setal layer to form coloured bands lying parallel with the hymenium.

Spores. Of three common shapes, spores both as to shape and size, afford useful diagnostic features. Unfortunately in earlier publications they have been described accurately for only a few species, and not at all for most They are usually present in specimens, nevertheless, and can be found in adequately stained sections taken from young parts of fructifications. Of species described herein spores are allantoid in 7, suballantoid (that is, rounded on one lateral surface, flattened on the other) in 11, oval or elliptical in 15 and obovate in *H. patelliformis.* In size they range from 2·5–3 x 1·5–2μ in *H. patelliformis* to 8–9 x 3·5–4 5μ in *H. contiformis* and *H. magnahypha,* most being 4–6μ long. All possess walls which are smooth, thin, and hyaline although Massee (1890) claimed that several had coloured spores.

Host Range. Because several species are represented by one collection, it is not yet possible to indicate whether or not endemic species possess a selective host range. Noteworthy are *H. bispora,* which develops on four endemic species of *Nothofagus; H. gladiola,* confined to two species of *Weinmannia; H. obesa* confined to *Dracophyllum subulatum; H. patelliformis,* which is found mainly on two species of *Leptospermum; H. stratura,* confined to *Podocarpus hallii* and *P. totara;* and *H. magnahypha,* restricted to *Coprosma australis.* Species produce two types of decay in their hosts, a soft white rot and a pocket rot, the latter condition being associated with 13 of the 33 species described.

18. **Hymenochaete** Leveille, Annales des Sciences Naturelles, III, *5*, 150, 1846.

Hymenophore pileate, apileate, or resupinate, annual or perennial. Pilei stipitate, or sessile when applanate, flabelliform or effused-reflexed; resupinate fructifications effused and adnate. Pileus surfaces clothed with abhymenial hairs. Context composed of setal, intermediate (absent from species of Section III) and hymenial layers; hyphal system dimitic or monomitic; skeletal hyphae coloured, sparsely septate and branched; generative hyphae hyaline or coloured, freely branched and septate, without clamp connexions. Hymenial layer composed of a palisade of basidia, paraphyses, setae and sometimes paraphysate hyphae. Basidia subclavate, sometimes cucurbitiform, projecting, bearing 1, 2 or 4 spores on sterigmata. Setae coloured brown, aculeate, subulate or narrowly fusiform, thick-walled, arranged in one or several overlapping rows, or in strata, naked or coated with crystals or granules of mucilage. Paraphysate hyphae usually coloured, filiform, moniliform or freely branched. Spores elliptical, oval, obovate, suballantoid or allantoid, smooth, hyaline.

TYPE SPECIES. *Hymenochaete tabacina* (Sow. ex Fr.) Lev. (As selected by Clements & Shear, 1931, 344).

DISTRIBUTION. World-wide.

There are about 100 valid species, most of which have been described from tropical and subtropical regions. Bourdot & Galzin (1928, 387) recorded 8 from Europe and Burt (1918, 303) 36 from North America. Of the 33 species present in New Zealand it has been possible to identify 17 by comparison with collections in Kew herbarium, slides supplied by the late E. A. Burt and specimens forwarded by overseas correspondents.

It is not possible to identify plants from most published descriptions; for early workers based species mainly on such variable features as shape, size and colour of the fructification. For accurate identification it is essential to define microfeatures since these, unlike macrofeatures, are not subject to appreciable variation. They have seldom been described in earlier publications, or essential particulars have been overlooked or inaccurately recorded. Of our species no less than 16 have been described as new, since they did not match previously described species, specimens of most of which have been examined. Descriptions given herein, together with the line drawings, should enable later workers to compare our species with those of other regions, and to ascertain if any has been described previously under some other name. For purposes of identification sections should be adequately treated to bring out essential features. In my experience, potassium hydroxide solution, with or without a stain, is unsatisfactory; instead, I have found lactic acid aniline blue solution mentioned in previous papers, to be the most suitable of those tested, since it both clears sections and enables such small objects as spores to be seen readily. Sections are essential, since morphological details cannot be ascertained if pieces of tissue are merely teased apart on a slide. Several should be prepared to show structure of the context, arrangement of hyphae, presence or absence of a cortex and paraphysate hyphae, size and arrangement of setae, basidia and spores. Usually sections from the margin, centre and near point of attachment will illustrate essential details when cut in the form of a narrow wedge ranging from 5μ to 15μ in thickness.

Thanks are due to Miss Beryl Hooton, Librarian, Plant Diseases Division, who kindly prepared the Latin descriptions; and to Misses W. M Tombs and E. M. Smith for selecting most of the specific names.

KEY TO SPECIES

SECTION I· With a colour zone of cemented hyphae forming the cortex of pileate species and the abhymenial suface of apileate and resupinate species

1 Pileate: Species with applanate or more usually effused-reflexed pilei; hyphae of the context radiately arranged parallel with the cortex.

2 Hyphal system monomitic, basidia bearing 1 or 2 spores which are elliptical, 7–8 x 4·5–5μ, setae 65–145 x 8–10μ; naked; producing a white rot — 1 *H. bispora* G. H. Cunn

2. Hyphal system dimitic.
   3. Spores allantoid.
      4. Setae 95–200 x 10–16μ, naked, arranged in one or two rows; spores 7–9 x 2–2.5μ; producing a pocket rot . 2. *H. gladiola* G. H. Cunn
      4. Setae arranged in a dense setal layer of 2–5 rows.
         5. Setae 80–130 x 14–22μ, verruculose; spores 6–8 x 1.5–2μ; hymenial surface tobacco-brown or ferruginous, margins fulvous; pileus surface tomentose; producing a white rot . 3. *H. tabacina* (Sow.) Lev.
         5. Setae 65–95 x 10–16μ, verruculose, spores 5–6.5 x 1.5–2μ; hymenial surface bay or tan; pileus surface naked;; producing a white rot . . 4. *H. obesa* G. H. Cunn.
   3. Spores elliptical or obovate; plants producing a pocket rot.
      4. Setae 80–105 x 7–9μ, naked; spores 6 x 4μ, pilei commonly umbonate sessile; hymenial surface reddish-brown with fawn margins 5 *H. rubiginosa* (Dicks. ex Fr.) Lev.
      4. Setae 30–55 x 5–7μ, naked.
         5. Spores obovate, 2 5–3 x 1.5–2μ; pilei umbonate sessile with chocolate coloured hymenium and fulvous margin 6. *H patelliformis* G. H. Cunn
         5. Spores elliptical, 3.5–4 x 2–2.5μ; pilei applanate or flabelliform, hymenial surface umber or date brown . 7 *H villosa* (Lev.) Bres.
1. Apileate: sessile or resupinate, usually with hairs clothing the abhymenial surface.
   2. Context hyphae mainly radiately arranged parallel with the substratum; hyphal system dimitic save in *H. semistupposa.*
      3. Paraphysate hyphae dendriform; spores suballantoid, 6–8 x 3–3.5μ; setae 60–95 x 8–12μ, verruculose; hymenial surface India red to testaceous; producing a white rot . . 8. *H. mougeotii* (Fr) Cke.
      3 Paraphysate hyphae (and some of the context hyphae) moniliform; spores suballantoid, 3.5–4 x 1–1.5μ; setae 40–70 x 8–12μ, naked; hymenial surface seal brown to chocolate; hyphal system monomitic; producing a pocket rot . 9 *H. semistupposa* Petch
      3. Paraphysate hyphae filiform; spores elliptical, 4 x 2μ; setae 30–60 x 5–8μ, verruculose; hymenial surface bay, tan or chestnut; producing a white rot 10 *H dura* Berk & Curt
      3. Paraphysate hyphae absent; spores allantoid, 4–5 x 1–1.5μ; setae 40–70 x 7–9μ, verruculose, producing a white rot.
         4. Hymenial surface reddish-bown with fulvous margins; setal layer of 3–5 rows occupying about half the context; fructifications effused . 11. *H. floridea* Berk. & Br.
         4. Hymenial surface ferruginous to cinnamon with concolorous margins, setal layer occupying the greater part of the context; fructifications in the form of small discrete colonies . 12. *H. plurimaesetae* G. H. Cunn.
   2. Context hyphae mainly intertwined and ascending; hyphal system monomitic.
      3. Setae in several strata with context hyphae between; paraphysate hyphae present
         4. Spores suballantoid, 4–5.5 x 3–3.5μ; setae 70–130 x 8–12μ, naked; paraphysate hyphae dendriform; producing a pocket rot . 13 *H. tasmanica* Mass.

4. Spores elliptical, 7–8 x 2–2.5μ; setae 90–160 x 9–14μ, naked or enmeshed in hyphal sheaths; paraphysate hyphae filiform; type of rot not seen — 14. *H. vaginata* G. H. Cunn

3 Setae arranged in fascicles; spores elliptical; paraphysate hyphae absent; producing a white rot.

4. Setae 40–95 x 6–8μ, naked, arranged in fascicles of 2–6; spores 5–6 x 3–3 5μ; basidia cucurbitiform and paraphyses clavate; surface reddish-brown . . . — 15 *H lictor* Petch

4. Setae 40–80 x 6–9μ, naked, arranged in fascicles of 4–12; spores 5–6 5 x 3–3.5μ, basidia and paraphyses subclavate; hymenial surface cinnamon. — 16. *H. dictator* G. H. Cunn

SECTION II: Cortex absent; context composed of a well developed intermediate tissue of parallel or intertwined hyphae.

1. Pileate: pilei effused-reflexed; hyphal system dimitic; setae 80–110 x 7–10μ, naked; spores oval, 5–6.5 x 4–5μ; producing a white rot — 17 *H attenuata* Lev.

1 Apileate: resupinate, sessile or adnate; hyphal system monomitic

2 Setae arranged in a setal layer of 2–3 overlapping rows.

3 Context composed of loosely intertwined hyphae, some setae bearing granules of mucilage; hymenial surface clay to cinnamon.

4 Setae aculeate, 65–95 x 6–8μ, many coated with mucilage granules; spores elliptical, 5–6 x 2.5–3μ; paraphysate hyphae absent, producing a pocket rot — 18 *H. rhabarbarina* (Berk) Cke

4 Setae subulate, 35–70 x 7–9μ, some in part coated with mucilage granules; spores suballantoid, 5–6 x 2–2 5μ; paraphysate hyphae filiform; producing a white rot — 19 *H. arida* (Karst.) Sacc.

3 Context composed of compact parallel hyphae, setae 35–65 x 5–7μ, naked; spores suballantoid, 3–3 5 x 2–2.5μ; paraphysate hyphae absent, hymenial surface cinnamon or umber; producing a white rot . — 20 *H stratura* G H. Cunn

2. Setae in strata with context hyphae between, or with strata indicated by coloured parallel bands.

3 Fructifications to 10 mm thick, hard and woody, umber to black, with cemented base and upright compact hyphae between setae, paraphysate hyphae filiform; setae 32–55 x 6–8μ, naked; spores elliptical, 4–4.5 x 2.5–3μ; type of rot not seen . — 21. *H. lignosa* G. H. Cunn.

3 Fructifications 1–3 mm thick, soft, cinnamon, of loosely intertwined freely branched hyphae; paraphysate hyphae branched; setae 60–90 x 5–7μ, naked; spores suballantoid, 5–6.5 x 3–3 5μ; producing a pocket rot . .... — 22. *H. cinnamomea* (Pers.) Bres.

SECTION III: Intermediate layer reduced to a narrow cemented or intertwined tissue lying upon the substratum, without a cortex and abhymenial hairs

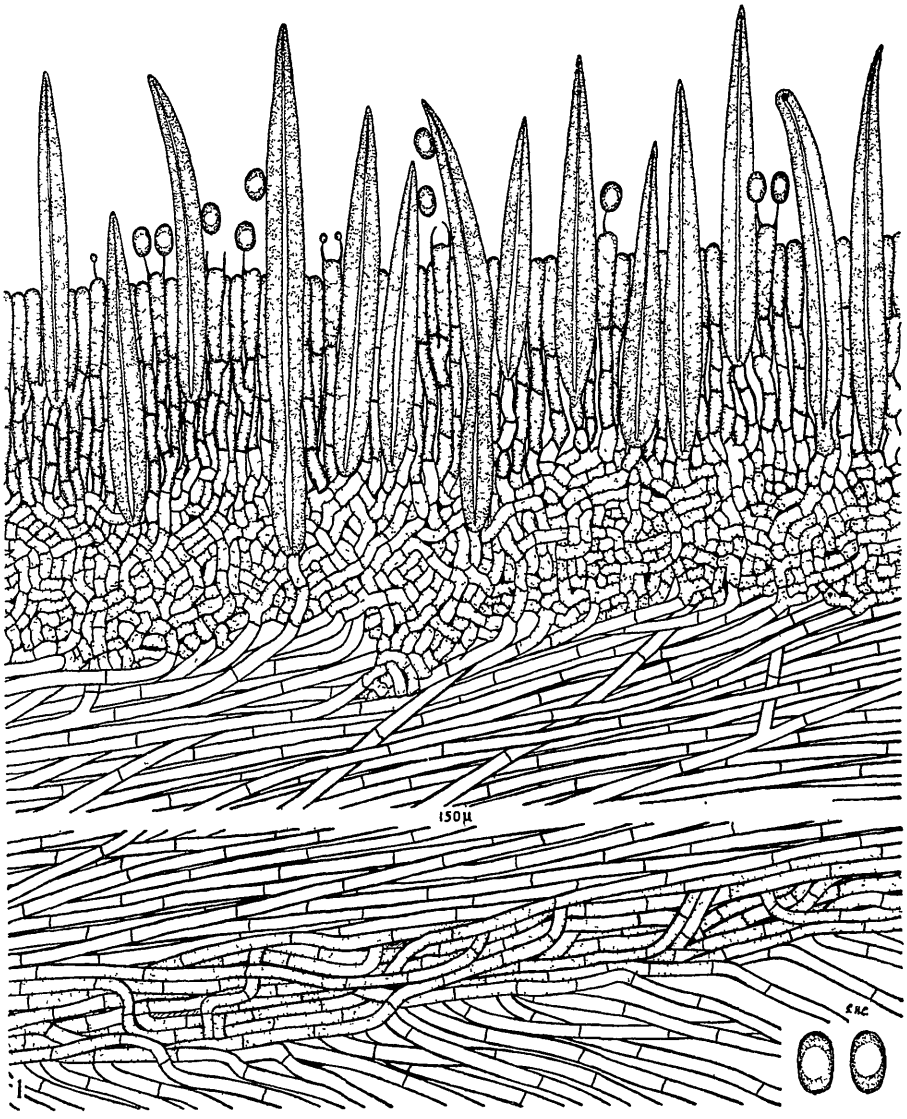
1. Subpileate· fructifications 0 3–1 mm thick, umbonate sessile with the pileus reduced to a thickened black margin; context composed of upright hyphae embedding setae and crystals, setae 66–95 x 9–12μ, verruculose; spores suballantoid, 5–6 5 x 2–2.5μ hyphal system dimitic; producing a pocket rot ... .. — 23 *H corticolor* Berk & Rav

1. Resupinate and adnate.
  2. Setal layer composed of numerous strata with parallel context hyphae between, or with strata indicated by coloured parallel bands; hyphal system monomitic.
    3. Fructifications 400–650μ in thickness; setae 40–60 x 5–7μ; spores elliptical, 4.5–5 x 3–3.5μ; crystals absent; producing a pocket rot . . . 24. *H. unicolor* Berk. & Curt.
    3. Fructifications not exceeding 160μ in thickness; setae 95–190 x 8–12μ; spores suballantoid, 8–9 x 3.5–4.5μ, crystals present; producing a pocket rot 25 *H. contiformis* G. H. Cunn
  2. Setal layer composed of 5–15 overlapping rows of setae; sections exceeding 250μ in thickness; hyphal system dimitic save in *H. magnahypha.*
    3 Fructifications 150–250μ thick, setae 65–90 x 7–9μ, naked; spores oval or obovate, 5–6.5 x 3.5–4μ; hymenial surface sepia or rubiginous; colliculose, creviced; margin chestnut; producing a white rot 26. *H fusca* (Karst.) Sacc.
    3 Fructifications 300–750μ thick, with masses of embedded crystals; setae 50–75 x 7–9μ, verruculose; spores suballantoid, 4 5–5 x 2.5–3μ; hymenial surface sepia or chocolate, creviced, margin concolorous; producing a pocket rot 27 *H. dissimilis* G. H. Cunn
    3 Fructifications 350–500μ thick, setae 24–40 x 5–7μ, verruculose; spores allantoid, 8–9 x 3–3.5μ; hymenial surface chocolate with a grey bloom, creviced; margin chocolate, producing a white rot 28 *H magnahypha* G H Cunn.
    3 Fructifications 100–260μ thick; setae 30–60 x 6–8μ, verruculose; spores suballantoid, 3.5–4 x 1.5–2μ; hymenial surface sepia or chocolate, colliculose, creviced; margin concolorous; producing a white rot 29. *H vallata* G. H. Cunn.
  2 Setal layer composed of 1–3 rows of overlapping setae; sections seldom exceeding 100μ in thickness; hyphal system monomitic
    3 Setae 55–80 x 8–10μ, naked; spores elliptical, 5 5–7 x 2 5–3μ; hymenial surface ferruginous or umber, at length creviced, margin bay or fawn; producing a white rot 30 *H innexa* G. H. Cunn
    3 Setae 40–65 x 6–8μ, naked; spores suballantoid, 4–5 x 1.5–2μ; hymenial surface olivaceous-fuscus or umber with yellow tints, colliculose, creviced, margin concolorous; producing a pocket rot 31 *H minuscula* G. H. Cunn
    3 Setae 45–75 x 10–18μ, verruculose; spores allantoid, 3–4.5 x 1–1.5μ; hymenial surface cinnamon or umber, colliculose, creviced; margin concolorous or lighter, producing a white rot 32 *H corrugata* (Fr.) Lev.
    3 Setae 35–55 x 6–8μ, naked; spores oval, 6–7 x 3 5–4μ; hymenial surface dull umber, colliculose, creviced; margins concolorous; masses of crystals in the context, producing a pocket rot 33 *H separata* G H Cunn

1. **Hymenochaete bispora** sp nov. Text-fig. 1.

Pileata, annua, membranacea. Pilei effuso-reflexi, ex partibus latis, resupinatis orti; superficie alutacea vel castanea, pilis appressis radiatim ordinatis tecta; margine crenato, hinnuleo, lacerato. Superficies hymenii fulva deinde castanea vel umbrina, rimosa; margine libero, incurvato, concolori, lacerato. Contextus hypharum hymenio parallelarum, cinnamomeus; cortex

adest Hypharum systema monomiticum Setarum stratum 2 ordinibus, subulatis vel anguste fusiformibus, nudis, 65–145 x 8–10μ, partim superimpositis, ad 80μ eminentibus. Basidia subclavata, 18–25 x 4.5–6μ, 1–2 sporis ellipticus vel ovalibus, 7–8 x 4.5–5μ



TEXT-FIG. 1 —*Hymenochaete bispora* G. H Cunn Transverse section × 500, spores × 1000 *Original*

Hymenophore pileate, annual, membranous, effused reflexed with broad resupinate base and narrow marginal pilei, or resupinate, loosely attached and readily peeling away from the substratum, forming irregularly linear areas 0 5–16 x 0.5–4 cm. Pilei either reflexed or narrow upturned edges of broad resupinate areas, to 3 mm across, surface tan or chestnut-brown, finely hirsute with adpressed radiately arranged hairs, margin crenate, often torn, fawn; hymenial surface at first fulvous, then chestnut or umber, becoming deeply creviced when the cinnamon context becomes exposed, velutinate; margin thinning out slightly, lifting readily and becoming incurved, concolorous, lacerate Context cinnamon or chestnut-brown, 150–250μ thick, composed of radiately arranged parallel hyphae bordered by the cortex and a colour zone beneath the subhymenium, sometimes with islands of similar tissue between, hyphal system monomitic; generative hyphae varying from 2.5μ to 6μ, walls 0 25μ thick, golden

yellow or hyaline, collapsing readily, freely branched and septate. Setal layer to 150μ deep, setae crowded into two overlapping rows, arising in the base of the subhymenium, sometimes limited to one row, projecting to 80μ, subulate or as often narrowly fusiform, a few slightly falcate, 65–145 x 8–10μ, walls naked, reddish-brown, lumina narrow. Hymenial layer to 50μ deep, a dense palisade of basidia and paraphyses. Basidia subclavate, 18–25 x 4.5–6μ, 1–2 spored; sterigmata erect, slender, to 8μ long. Paraphyses subclavate, the same diameter but shorter than the basidia, walls usually tinted yellow. Spores elliptical, or oval, 7–8 x 4.5–5μ, walls smooth, hyaline, 0.2μ thick.

DISTRIBUTION: New Zealand.

HABITAT: On bark of dead fallen branches associated with a white rot

Nothofagus cliffortioides (Hook. f.) Oerst. Wellington: Mt. Holdsworth, Tararua Ranges, 3,500ft, September, 1952, G. H. C.; Kaimanawa Ranges, 2,800ft, September, 1956, G. H. C. Canterbury: Christchurch Botanic Gardens, October 1921, W. K. Dallas. Otago: Routebourne Valley, Lake Wakatipu, 2,500ft, February 1948, J. M. Dingley.

Nothofagus fusca (Hook. f.) Oerst. Auckland: Lake Waikaremoana, 2,800ft, November 1955, J. M. Dingley. Nelson: Staircase Creek, Reefton, 2,000ft, November 1952, S. D. Baker; Lake Rotoiti, 2,000ft, April 1956, S. D. Brook, *type collection*, P.D.D. herbarium, No. 16548. Westland: Orwell Creek, Ahaura, November 1954, J. M. Dingley.

Nothofagus menziesii (Hook. f.) Oerst. Hawke's Bay: Poronui, Kaimanawa Ranges, 2,000ft, June 1953, J. M. Dingley. Otago: Otautau, 3,000ft, November 1946, G. B. Rawlings.

Nothofagus truncata (Col.) Ckn. Auckland: Lake Waikaremoana, 3,560ft, September 1950, G. H. C.

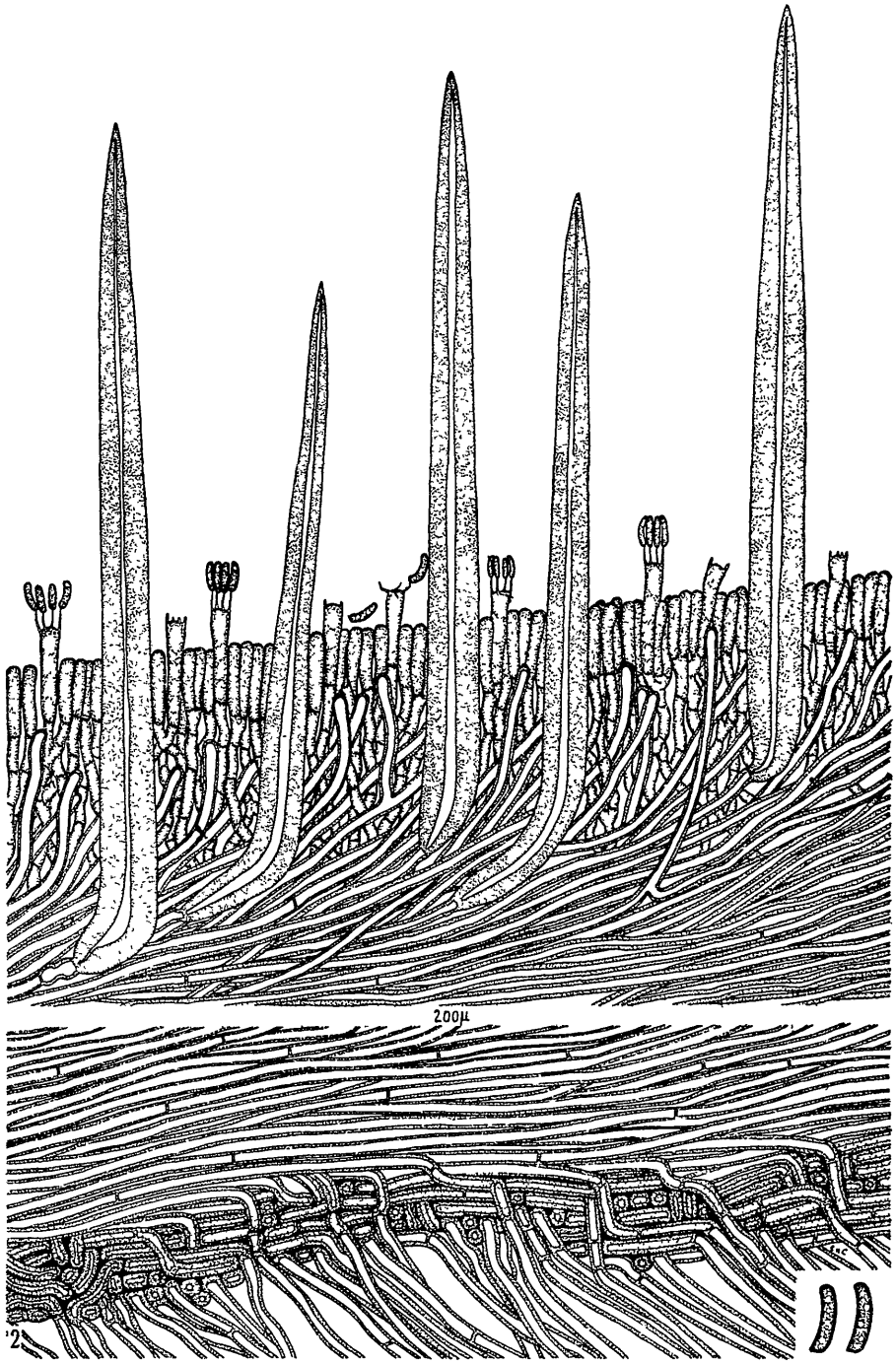
Two structures aid in separating the species from others examined. The hyphal system is monomitic, an unusual feature in species with the context composed of radiately arranged parallel hyphae. Basidia bear 1 or 2 broadly elliptical spores, instead of the usual 4.

Pilei are usually upturned margins of broadly resupinate areas, with chestnut-brown surface clothed in adpressed hairs. Fructifications are loosely attached and tend to peel from the substratum and curl upwards or inwards, exposing the abhymenial surface, which is clothed throughout with hairs. The hymenial surface is coloured a rich vandyke-brown, with broad fulvous margins, and so deeply creviced that the cinnamon context is exposed. Setae are arranged usually in two overlapping rows; in young plants, or peripheral areas of actively growing specimens, they are confined to one row. They are soft and flaccid, tending to bend rather than break when crushed. At first the cortex is scantily developed, but in fertile specimens attains a thickness of about 30μ. A second colour zone is tardily developed, although in mature plants it may form a thick layer of closely intertwined deeply coloured hyphae lying beneath the subhymenium.

2. **Hymenochaete gladiola** sp. nov. Pl. 1, Fig. 4; Text-fig. 2.

Pileata, annua, membranaceo-coriacea. Pilei effuso-reflexi, ex partibus latis resupinatis orti; superficies castanea vel umbrina, pilosa, margine castaneo, lobato. Superficies hymenii spadicea, non rimosa; margine fulvo, lobato Contextus hypharum hymenio parallelarum, castaneus; cortex adest. Hypharum systema dimiticum. Setarum stratum unius ordinis, aculeati, nudi, 95–200 x 10–16μ, cuius major pars eminet. Basidia subclavata, 22–26 x 4–5μ, 2–4 sporis, allantoidibus, 7–9 x 2–2.5μ.

Hymenophore pileate, annual, membranous-coriaceous, commonly composed of broad resupinate areas with narrow marginal pilei, sometimes umbonate sessile and orbicular with narrow reflexed edges, or occasionally resupinate, loosely attached, irregularly linear, 4–20 x 3–6 cm. Pileus surface chestnut-brown to umber, with lighter chestnut margin, tomentose, sometimes radiately zonate; hymenial surface date brown with umber periphery and fulvous margin, not creviced, even or more usually following irregularities of the pileus surface, velutinate with the dark setae; margin acuminate, lobed, slightly incurved or erect, bright fulvous. Context chestnut brown with darker abhymenial hairs, 0.25–0.4 mm thick, of mainly radiately arranged hyphae parallel with the hymenium, bordered by a conspicuous intertwined and cemented coloured cortex, and sometimes a fragmental colour zone beneath the sub-



TEXT-FIG 2.—*Hymenochaete gladiola* G H Cunn Transverse section × 500, spores × 1000 *Original*

hymenium; hyphal system dimitic; skeletal hyphae chestnut brown, 3–4μ diameter, walls 0.5–1μ thick, naked, sparsely branched, sparsely septate; generative hyphae 2–3μ diameter, walls 0.2μ thick, hyaline, freely branched and septate. Setae confined to a single row, arising from the base of the subhymenium, projecting to 150μ, aculeate, sometimes curved at the base, 95–200 x 10–16μ, walls naked, reddish brown, lumina narrow. Hymenial layer to 40μ deep, a close hyaline palisade of basidia and paraphyses. Basidia subclavate, 22–26 x 4–5μ, 2–4-spored; sterigmata slender, upright, to 6μ long. Paraphyses mostly cylindrical, the same diameter and about two-thirds the length of the basidia. Spores allantoid, 7–9 x 2–2.5μ, walls smooth, hyaline, 0.1μ thick.

DISTRIBUTION: New Zealand.

HABITAT: Effused on bark of dead branches associated with a pocket rot

Weinmannia racemosa L.f. Auckland: Wairongomai Valley, Te Aroha, October 1948, J. M. Dingley; Lake Waikaraemoana, 2,500ft, March 1949, M. Ambler; Waiotapu, 1,600ft, June 1950, J. M. Dingley; Earthquake Flat, Rotorua, 1,800ft, September 1950, G H. C ; Trig Track, Lake Waikaraemoana, 2,250ft, September 1950, G. H. C.; Mamaku Forest, 1,800ft, September 1956, G. H. C. Taranaki: Mt. Egmont, 3,500ft, January 1953, J. M. Dingley, *type collection*. P.D.D. herbarium, No. 12461. Wellington: Ohakune, 2,500ft, December 1953, J. M. Dingley

Weinmannia sylvicola Sol. ex A. Cunn Auckland: Chelsea Bush, Birkenhead, July 1950, J. M Dingley

Readily identified among species with a cortex by the unusually long, aculeate, naked setae which arise in a single row and project for the greater part of their length, and the narrow allantoid spores.

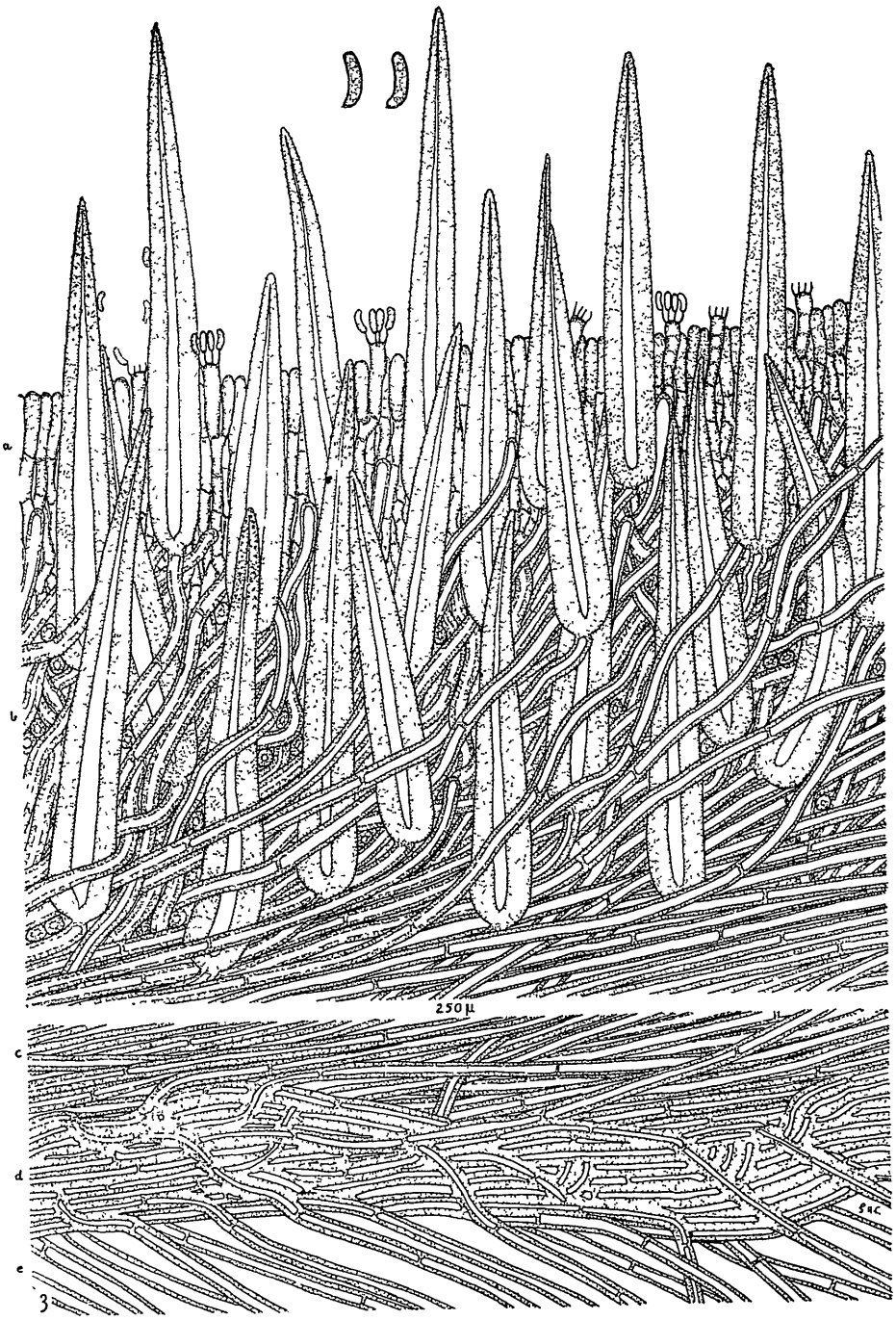
Fructifications commence as numerous small orbicular colonies. These soon merge to form (a) linear resupinate areas, (b) umbonate orbicular colonies with erect margins, or (c) umbonate-sessile patelliform plants with free plane margins At first the pileus surface is bright chestnut, and darkens with age; the hymenial surface is date-brown, changing to chestnut where rubbed, and remains even or may become tardily creviced. Margins are broad and fulvous or chestnut. Sometimes an interrupted colour zone develops beneath the subhymenium, but is as often absent. Other noteworthy features are the limited host range, and pocket rot produced in the host tissues.

The species possesses setae similar to those of *H. sallei* Berk. & Curt., and some pilei resemble those of *H. berkeleyana* (Mont.) Cke From both it differs in possessing a conspicuous cortex.

3. **Hymenochaete tabacina** (Sowerby ex Fries) Leveille, Annales des Sciences Naturelles, III, *5*, 152, 1846 Text-fig 3

(*Auricularia tabacina* Sow , British Fungi, t 25, 1797.)
Thelephora tabacina (Sow.) Fr., Syst. Myc., *1*, 437, 1821
T. avellana Fr., Syst Myc., *1*, 442, 1821.
T. imbricatula Schw., Trans. Am Phil. Soc , *4*, 166, 1832
Stereum tabacinum (Sow.) Fr , Epicrisis, 550, 1838
S. avellanum Fr., Epicrisis, 551, 1838.
Hymenochaete avellana (Fr) Cke., Grev , *8*, 146, 1880

Hymenophore pileate or resupinate, sometimes reviving a second season, membranous-coriaceous, loosely attached; pilei either conchate when attached by an umbo, dimidiate, or most frequently effused-reflexed with pilei arising from margins of broadly resupinate bases, when resupinate linear or discıform with free margins, 1–25 x 1–5 cm Pilei to 1 cm wide, of indefinite length, surface some shade of brown, lighter peripherally with fulvous margins, radiately sulcate, finely tomentose, sometimes when old naked and dingy fuscus Hymenial surface commonly tobacco-brown, with bright fulvous margins, velutinate, often with a reddish-brown tinge, resupinate portions often deeply creviced in radiate series about 10 mm diameter, sometimes creviced irregularly, or even; margin thinning out, lighter in colour, crenate, free Context ferruginous, 0.3–0 6 mm thick, composed of an intermediate layer of parallel hyphae radiately arranged, bordered on the abhymenial surface by a darker, compact and gelatinized cortex, and beneath the hymenium by a darker coloured zone associated with the setal layer, hyphal system dimitic; skeletal hyphae 4–5μ diameter, walls 0 5–1μ thick, golden brown, scantily branched and septate, generative hyphae 2–2.5μ diameter, walls 0 2μ thick, hyaline, freely branched and septate. Setal layer 160–300μ deep, composed of several (3–5) overlapping rows of setae which project to 90μ, are aculeate, 80–130 x 14–22μ, with walls finely



TEXT-FIG 3.—*Hymenochaete tabacina* (Sow.) Lev. Transverse section showing (a) hymenial layer with basidia and paraphyses, (b) setal layer, (c) intermediate tissue, (d) cortex, and (e) abhymenial hairs × 500, spores × 1000. *Original*

verruculose, reddish-brown, and narrow lumina. Hymenial layer 30–40μ deep, a close palisade of basidia and paraphyses. Basidia subclavate, 12–20 x 4–5μ, 4-spored; sterigmata erect, to 4μ long. Paraphyses subclavate, of the same diameter but slightly shorter than the basidia Spores allantoid, 6–8 x 1.5–2μ, walls smooth, hyaline, 0.2μ thick.

TYPE LOCALITY: England.

DISTRIBUTION: Great Britain, Europe, North America, New Zealand.

HABITAT: On bark of dead branches associated with a white rot.

Beilschmiedia tawa (A. Cunn.) Hook. f. & Benth. Auckland: Waitomo, 300ft, August 1946, G. H. C.; Claudelands Reserve, Hamilton, 100ft, October 1946, G. H. C.; Lake Rotoehu, 1,200ft, June 1952, September 1954, October 1955, October 1956, G. H. C.; Waiomo Valley, Thames, 200ft, August 1954, J. M. Dingley. Wellington: Lake Papaetonga, 50ft, August 1956, G. H. C.

Coprosma arborea Kirk. Auckland: Little Barrier Island, 600ft, November 1947, J. M. Dingley.

Dysoxylum spectabile (Forst. f.) Hook. f. Auckland· Little Barrier Island, November 1947, J. M. Dingley.

Edwardsia tetraptera (Forst. f.) Oliver. Auckland: Purewa Bush, August, September 1948, June 1949, D. W. McKenzie.

Elaeocarpus dentatus (Forst.) Vahl. Auckland: Mt Karioi, Raglan, March 1954, J. M. Dingley; Taupere Mt., November 1954, J. M. Dingley.

Hedycarya arborea Forst. Auckland: Waiomo Valley, Thames, June 1950, J. M. Dingley; Kauri Park, Northcote, September 1951, J. M. Dingley.

Knightia excelsa R. Br. Auckland: Manaia, Whangarei Heads, October 1947, J. M. Dingley; Puteki, Bay of Islands, June 1948, J. M. Dingley; Rangitoto Island, August 1948, J. M. Dingley; Piha, April 1953, J. M. Dingley; Mountain Road, Henderson, 900ft, September 1953, J. M. Dingley.

Myrtus bullata Sol. Auckland: Lake Rotoehu, 1,200ft, December 1953, September 1954, October 1956, G. H. C.

Nothofagus fusca (Hook. f.) Oerst Wellington: Day's Bay, May 1922, E. H Atkinson.

Nothopanax colensoi (Hook. f.) Seem. Westland· Douglas Rock, Copland Valley, 3,500ft, January 1947, G. T. Baylis.

Phyllocladus trichomanoides Don. Wellington: Oturere River, Mt. Tongariro, 4,000ft, December 1946, E. M Smith.

Pittosporum tenuifolium Banks & Sol. Auckland: Lake Rotoehu, 1,200ft, June 1952, December 1953, G. H. C.; Campbell's Bay, July 1953, J. M. Dingley.

Pittosporum umbellatum Banks & Sol. Auckland: Little Barrier Island, November 1947, J. M. Dingley.

Suttonia australis A. Rich. Auckland: Upper Piha Valley, 900ft, September 1945, J. M. Dingley; Rangitoto Island, July 1950, J. M. Dingley; Waiomo Valley, Thames, August 1954, J. M. Dingley; Kauaeranga Valley, Thames, August 1954, S. D. Baker.

Suttonia salicina Hook. f. Auckland: Anawhata Road, Waitakeres, 900ft, August 1948, J. M. Dingley; Clevedon, August 1949, J M. Dingley.

Weinmannia sylvicola Sol. Auckland: Helena Bay Road, June 1948, J. M Dingley.

One of the most abundant species present in the Dominion, *H. tabacina* may be identified by the following features Plants are either effused-reflexed or sessile with free margins of lighter colour. A deeply coloured cortex borders the abhymenial surface and a second colour zone lies beneath the subhymenium, sometimes extending into the setal layer. From the cortex abhymenial hairs arise not only in pileate specimens, but also in resupinate forms, consequently plants are loosely attached to the substratum. The setal layer is more deeply coloured than the context, and the

number of rows of setae increase with age, or position, being deeper towards the centre and thinning out towards the margins, where but one or two rows may be developed. Setae are stout, rich reddish-brown and apices are verruculose. Spores are allantoid, abundant and borne on short sterigmata.

Colour and thickness of fructifications appear to be influenced by latitude and altitude New Zealand plants are more coriaceous and of deeper colour than typical specimens from the northern latitudes of Europe and North America, save from our mountain regions. Commonly tobacco-brown, our plants often exhibit a reddish-brown colour when viewed at an angle under a lens, because of the projecting setae. Many may develop a second growth form upon an earlier fructification. They agree with European specimens in microfeatures, though even these vary appreciably. In some resupinate specimens the hymenial surface is creviced in orbicular series, each about a centimetre in diameter, crevices radiating from the centre. The condition is more common in European and North American collections than in those from New Zealand. It is not confined to this species, but occurs also in some specimens of *H. floridea* and is common in plants of *H. obesa.* No specimens of the species have been seen from Australia either in Kew herbarium or collections of Thelephoraceae forwarded by Australian collectors.

4. **Hymenochaete obesa** sp. nov. Pl. 1, fig. 3; Text-fig. 4.

Pileata, annua, coriacea. Pilei effuso-reflexi, ex partibus linearibus resupinatis orti; superficie cineracea vel fusca, raro strigosa, deinde nuda; margine lacerato, concolori. Superficies hymenii alutacea, hinnulea vel ferruginea, radiatim rimosa, margine lobato, concolori. Contextus hypharum parallelarum, luteus, compactus, cortex adest. Hypharum systema dimiticum. Setarum stratum 2–3 ordinibus, subulatis, verruculosis, 65–95 x 10–16μ, partim superimpositis, ad 50μ eminentibus Basidia subclavata, 12–25 x 4–5μ, 4 sporis allantoidibus, 5–6.5 x 1.5–2μ.

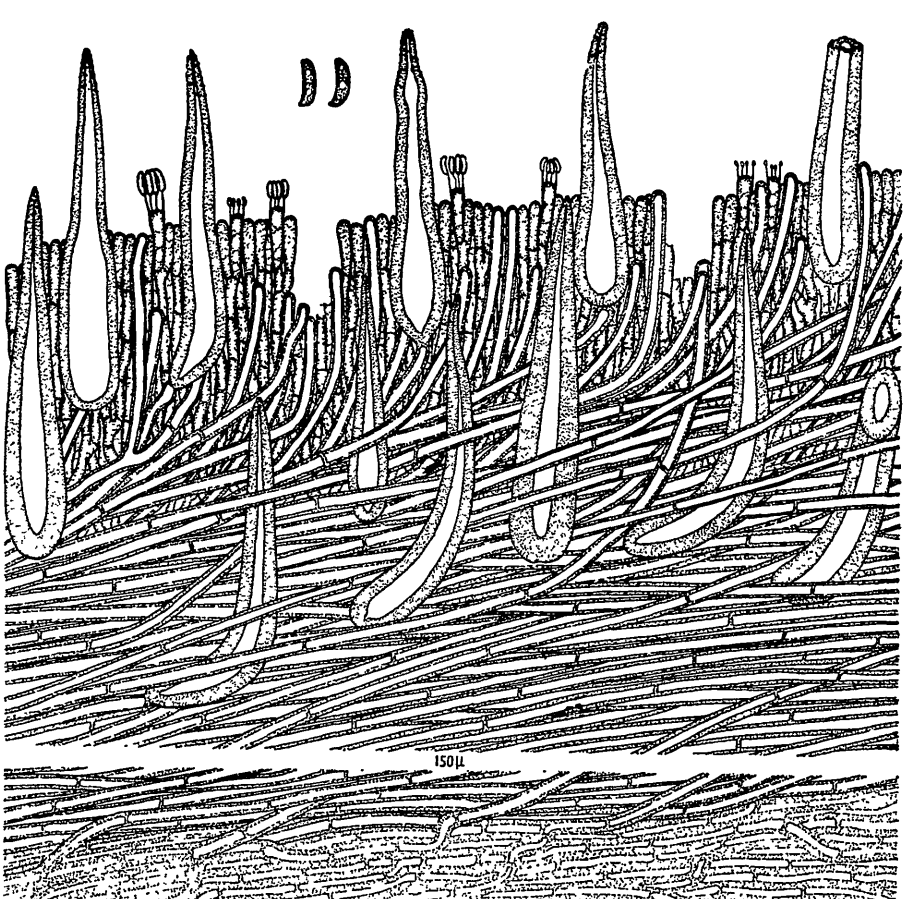
Hymenophore pileate, coriaceous, annual, adnate, consisting of narrow linear resupinate areas from which arise effused-reflexed pilei on one or commonly both lateral margins, or wholly resupinate, at first orbicular and 0 2–0.5 mm across, soon merging to form linear areas 1–15 x 0 2–1 5 cm Pilei 3–8 mm wide, surface dingy grey to fuscus, or black when old, with concolorous or lighter margins, scantily strigose, tufts imbricate and often confined to marginal areas, becoming naked; hymenial surface bright tan, fawn, or ferruginous, deeply radiately creviced in small areas about 10 mm across; margins thinning out, lighter in colour and hirsute in resupinate plants, concolorous and commonly lobed in pileate forms, free. Context golden yellow, to 250μ thick, composed of an intermediate tissue of radiate parallel hyphae bordered by two colour zones, that beneath the subhymenium pallid brown, of mainly parallel hyphae, the cortex reddish-brown, of compact, cemented, thick-walled hyphae; hyphal system dimitic; skeletal hyphae 3.5–4 5μ diameter, walls 0.5μ thick, golden yellow, sparsely branched and septate, generative hyphae to 3μ diameter, walls 0.2μ thick, hyaline, freely branched and septate. Setal layer to 130μ deep, of two or three overlapping rows of setae arising from the subhymenium; setae projecting to 50μ, subulate with broad bases sometimes curved, and bluntly acuminate apices, 65–95 x 10–16μ, walls to 4μ thick, verruculose, bright reddish-brown, with relatively wide lumina. Hymenial layer to 50μ deep, a close palisade of basidia and paraphyses. Basidia subclavate, 12–25 x 4–5μ, 4-spored; sterigmata arcuate, slender, to 6μ long. Paraphyses subclavate, same diameter, but slightly shorter than the basidia. Spores allantoid, apiculate, 5–6 5 x 1 5–2μ, walls smooth, hyaline, 0.2μ thick.

DISTRIBUTION: New Zealand.

HABITAT: On bark of dead stems and twigs associated with a white rot.

Dracophyllum subulatum Hook. f. Wellington: Pangarara River, Mt. Tongariro, 3,500ft, December 1946, E. M. Smith, *type collection,* P.D.D. herbarium, No. 7447; same locality, 4,000ft, January 1955, G. H. C.; Desert Road, Mt. Tongariro, 2,900ft, August 1955, September 1956, G. H. C.

Specific features are the effused-reflexed fructifications forming narrow linear areas on twigs and stems; pallid colour of the hymenial surface, dark usually naked exterior surface of the pileus, prominent colour zones, 2–3 rows of obese setae which are often distorted and with relatively wide lumina, and allantoid spores. Crevices upon the hymenial surface, present in all collections, resemble those of resupinate forms of *H. tabacina.* The subhymenial colour zone varies appreciably in thickness, is often interrupted and may form branches which traverse the context. The species



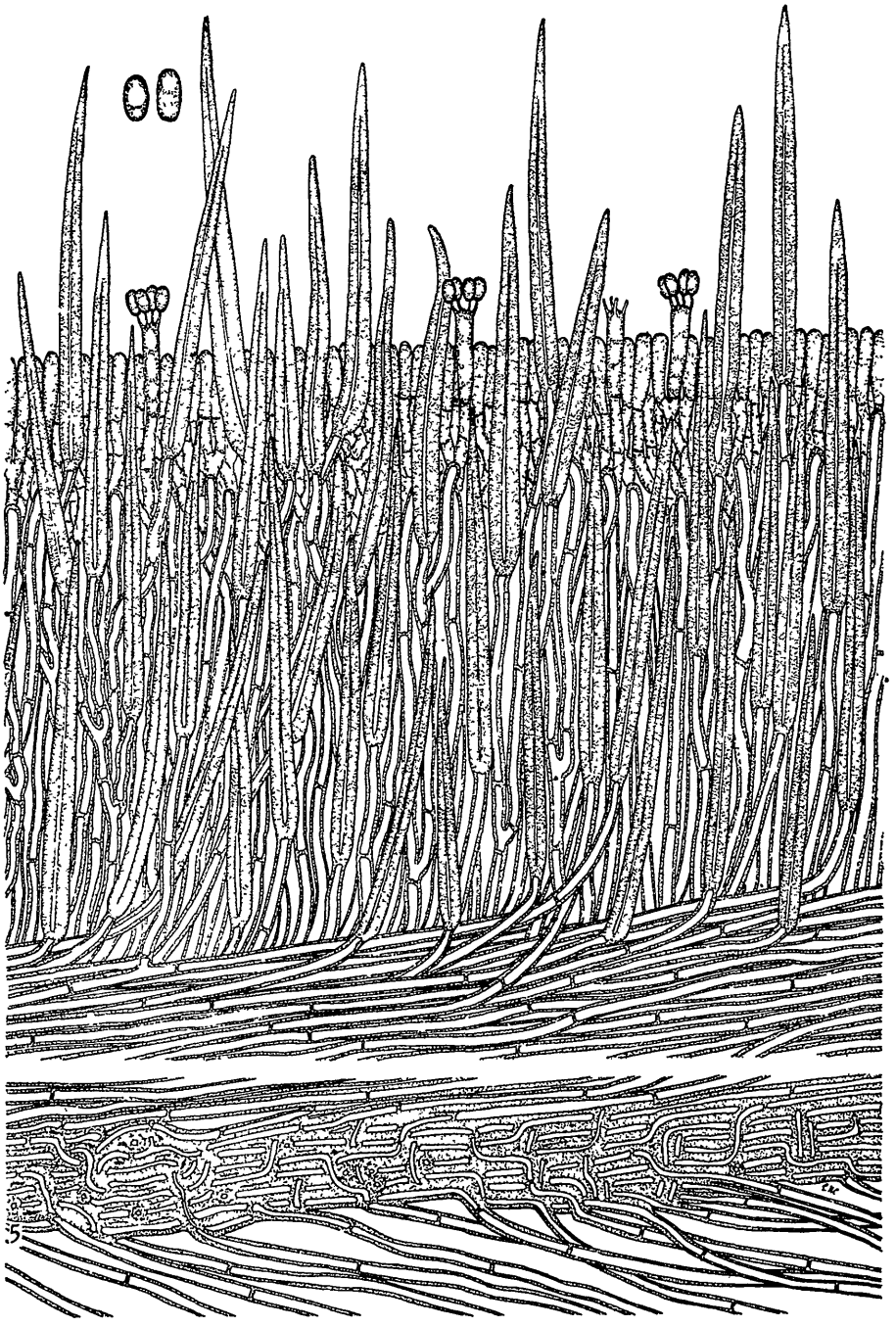
TEXT-FIG. 4.—*Hymenochaete obesa* G. H. Cunn. Transverse section × 500; spores × 1000 *Original*

appears to be confined to one host, and so far has been collected only in a small area on the eastern slopes of Mt. Tongariro, near the Desert Road.

Though resembling *H. tabacina* in many microfeatures, the species differs in that setae are less crowded, appear in fewer rows, are shorter, broader, and with wide lumina; in macrofeatures they are quite dissimilar.

5. **Hymenochaete rubiginosa** (Dickson ex Fries) Leveille, Annales des Sciences Naturelles, III, *5*, 151, 1846. Text-fig. 5.
(*Helvella rubiginosa* Dicks., Pl. Crypt. Brit., *1*, 20, 1785).
Stereum rubiginosum (Dicks) Fr., Epicrisis, 550, 1838.
S. ferrugineum (Bull) Fr., Epicrisis, 550, 1838.
Hymenochaete ferrugineum (Bull.) Mass., Jour. Linn. Soc., *27*, 103, 1890

Hymenophore pileate or umbonate-sessile, sometimes reviving a second season, coriaceous, rigid, loosely attached, appearing as effused-reflexed or orbicular colonies 5–25 mm diameter, often laterally merged forming linear areas which may extend to 15 cm. Pilei effused-reflexed with broad resupinate areas and narrow reflexed margins to 10 mm wide, when resupinate disciform with free margins; exterior surface delicately tomentose, sometimes radiately sulcate,



TEXT-FIG. 5.—*Hymenochaete rubiginosa* (Dicks.) Lev. Transverse section × 500; spores × 1000. *Original.*

ferruginous to umber, darkening with age, hymenial surface bister or chocolate with a reddish tinge, colliculose, deeply scantily creviced when old, velutinate; margin thinning out, bright fulvous, loosely attached. Context dark ferruginous or umber, 0 3–0 6 mm thick, composed of parallel hyphae radiately arranged, vertical in the setal layer, and bordered on the abhymenial surface by a deeply coloured cemented cortex of intertwined hyphae; hyphal system dimitic; skeletal hyphae 2.5–3μ diameter, walls 0.5μ thick, golden brown, sparsely branched and septate; generative hyphae 2–2 5μ diameter, walls 0.2μ thick, hyaline, freely branched and septate. Setal layer 120–250μ deep, a compact zone of 3–7 overlapping rows of setae embedded in upright skeletal hyphae; setae projecting to 90μ, aculeate, some slightly curved, 80–105 x 7μ9μ, walls naked, rich reddish-brown, lumina narrow. Hymenial layer to 40μ deep, a dense palisade of basidia and paraphyses. Basidia subclavate, 20–24 x 4–5μ, 4-spored; sterigmata arcuate, slender, to 4μ long. Spores oblong elliptical, 5.5–7 x 3.5–4μ, walls smooth, hyaline, 0.2μ thick.

TYPE LOCALITY: Great Britain.

DISTRIBUTION: Great Britain, Europe, North America, New Zealand.

HABITAT: Loosely attached on bark of dead branches and trunks associated with a pocket rot.

Dacrydium cupressinum Sol. Auckland: Moumoukai Valley, Hunua Range, 900ft, June 1949, J. M. Dingley. Otago: Half Moon Bay, Stewart Island, February 1954, J. M. Dingley.

Podocarpus ferrugineus Don. Auckland: Waipoua Kauri Forest, January 1955, J. M. Dingley.

Podocarpus spicatus R. Br. Otago: Upper Hollyford Valley, January 1950, J. M. Dingley.

Though resembling *H. tabacina* in the presence of a coloured cortex, dense setal layer, and effused-reflexed fructifications the species differs in many other features. Spores are elliptical, setae are narrower, darker in colour, naked, only one colour zone, the cortex, is present, and fructifications differ in shape and colour.

Our collections vary appreciably. Most are either umbonate-sessile, when orbicular with margins lying plane, or narrowly effused-reflexed and linear. The pileus surface is some shade of brown, becomes darker with age, in some old specimens being almost black. The hymenial surface of fresh specimens is bright reddish-brown, with a bright fulvous margin. On drying, or in old specimens, the surface may change to dingy umber or fuscus and margins become concolorous. Appreciable variations also occur in the depths of the setal layer and consequently the number of overlapping rows of setae, thickness of the context, and abundance of cortex hairs. In microfeatures New Zealand collections agree with European plants examined in Kew herbarium, which incidentally exhibit similar variations in these features. Our collections differ chiefly in their host range, all being taken from conifers, whereas in Europe and North America the species is commonly found upon frondose species. Although recorded by earlier workers from Australia and Tasmania, collections so named in Kew herbarium are of other species.

6. **Hymenochaete patelliformis** sp. nov. Pl. 2, fig. 1; Text-fig. 6.

Pileata, annua, coriacea, fragilis. Pilei umbonati, sessiles vel patelliformes; superficie castanea vel umbrina, concentraliter pilosa, deinde glabra, margine lobato, castaneo. Superficies hymenii umbrina vel spadicea, deinde badia, in medio rimosa, tuberculata; margine lobato, fulvo. Contextus hypharum hymenio parallelarum, pallide ferrugineus, cortext adest. Hypharum systema dimiticum. Setarum stratum 3–5 ordinibus, subulatis, nudis, 30–56 x 5–7μ, partim superimpositis, ad 25μ eminentibus Basidia subclavata, 10–12 x 3 5–4μ, 4 sporis obovatis, 2.5–3 x 1.5–2μ.

Hymenophore annual, coriaceous, brittle, pileate or resupinate; pilei consisting of numerous orbicular, patelliform colonies with broad resupinate base and narrow reflexed margins, some arranged in linear areas to 15 cm long, or sessile-umbonate with free margins, 2–25 mm diameter, reflexed portions to 5 mm broad, surface radiately sulcate or even, with narrow radiate bands of chestnut and umber brief hairs, soon glabrous. Hymenial surface at first umber or date-brown, soon chocolate, irregularly tuberculate, at length deeply creviced in the central area; margin thinning out, lobed, fulvous, to 1 mm wide Context pallid ferruginous, 130–200μ thick, of parallel hyphae radiately arranged and embedding masses of crystals beneath the setal layer, cortext of parallel cemented hyphae, reddish-brown, hyphal system dimitic; skeletal hyphae 3–3 5μ diameter, walls 0.5μ thick, golden yellow, scantily

branched, septate, tending to collapse; generative hyphae 2–2.5μ diameter, walls 0 2μ thick, hyaline, branched, septate. Setal layer 60–90μ deep, composed of 3–5 rows of overlapping setae, densely compacted, arising from the subhymenium and a deeply coloured zone of intertwined hyphae lying below it, setae projecting to 25μ, subulate with acuminate apices, often bent at the base, 30–56 x 5–7μ, walls naked, reddish-brown, lumina narrow. Hymenial layer to 30μ deep, a dense palisade of basidia and paraphyses Basidia subclavate, 10–12 x 3 5–4μ, 4-spored; sterigmata arcuate, slender, to 4μ long. Paraphyses subclavate, of the same diameter but shorter than the basidia. Spores obovate, 2 5–3 x 1.5–2μ, walls smooth, hyaline, 0.1μ thick.

DISTRIBUTION: New Zealand

HABITAT: On bark of dead branches associated with a coarse pocket rot.

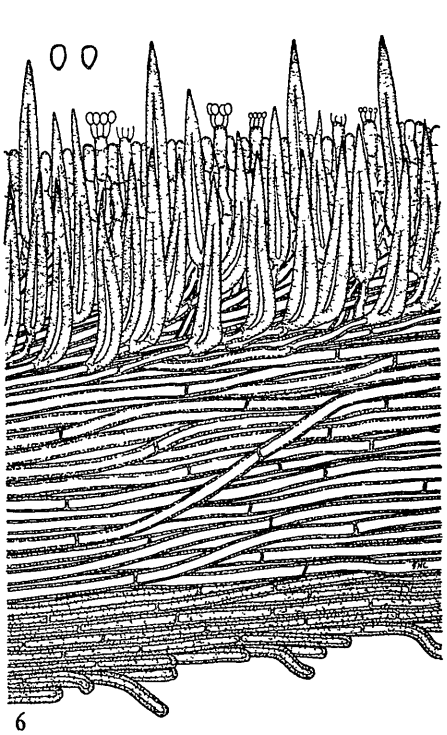
Leptospermum ericoides A. Rich. Auckland: Piha, December 1941, J. M. Dingley; Whangarei Heads, October 1947, J. M. Dingley; North-east King Island, Three Kings, December 1955, P. J. Brook. Wellington: Lake Papaetonga, 50ft, August 1956, G. H. C., *type collection,* P.D.D. herbarium, No. 16535.

Leptospermum scoparium Forst f Auckland: Titirangi, 600ft, February 1931, M. Hodgkins; same locality, coast, September 1956, S. D. Brook; Cutty Grass Road, Waitakeres, 900ft, August 1956, J M Dingley.

Leucopogon fasciculatus (Forst. f.) A. Rich Auckland: Parahaki, Whangarei, 700ft, June 1948, J. M. Dingley; White's Stream, Piha, January 1954, J. M. Dingley.

Readily recognized by the colour and shape of pilei, colliculose or tuberculate surface, thin brittle context with the cortex composed of cemented parallel hyphae, small setae, basidia, and minute spores.

Pilei at first are orbicular and patelliform or umbonate-sessile with free plane margins. They may remain thus or margins become reflexed to form narrow pilei with the surface scantily clothed in short hairs. Later, colonies may merge to form



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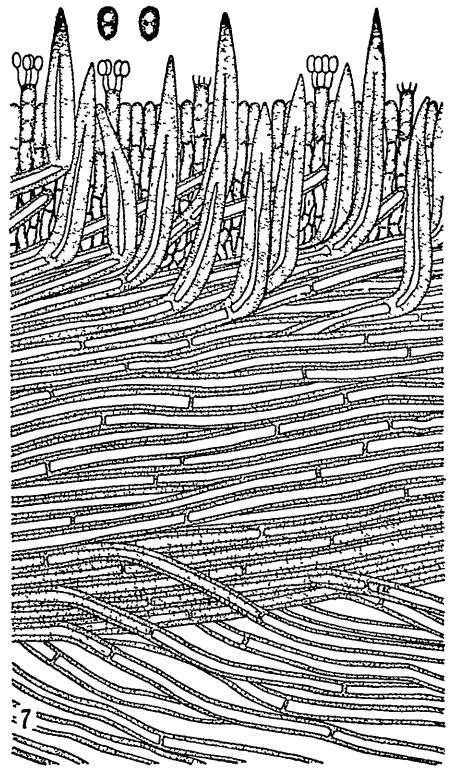

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TEXT-FIG 6.—*Hymenochaete patelliformis* G. H Cunn. Transverse section × 500, spores × 1000 *Original.*
TEXT-FIG. 7.—*Hymenochaete villosa* (Lev.) Bres Transverse section × 500, spores × 1000. *Original.*

linear areas which may attain a length of 15 cm. At first the hymenial surface is date-brown and finely colliculose; soon it changes to a rich chocolate with bright fulvous margins. Finally specimens become almost black with concolorous margins. Crevices at first appear near the centre, but as plants age extend until fructifications become coarsely segmented. The context is firm though brittle, and contains masses of crystals. Setae are small and crowded into a setal layer the thickness of which increases from periphery to centre. Setae are frequently bent at an angle and occasionally may be found embedded in the context. Spores are the smallest seen in species of the genus.

7. **Hymenochaete villosa** (Leveille) Bresadola, Annales Mycologici, *8*, 588, 1910. Pl. 1, figs. 1, 2; Text-fig. 7.

Stereum villosum Lev., Ann. Sci. Nat., III, *2*, 212, 1844
S. nigricans Lev., Ann Sci Nat., III, *2*, 212, 1844.
S. phaeum Berk., Fl. N.Z., *2*, 183, 1855.
Hymenochaete strigosa Berk. & Br., Jour. Linn. Soc., *14*, 68, 1873.
H spadicea Berk. & Br., Jour. Linn. Soc., *14*, 68, 1873.
H. phaea (Berk.) Cke., Grev., *8*, 146, 1880.
H. nigricans (Lev.) Bres., Ann. Myc., *14*, 233, 1916.

Hymenophore pileate, annual, coriaceous; pilei applanate, flabelliform, sometimes umbonate or effused-reflexed, frequently imbricate or fused laterally, 3–7 cm long, with a radius of 2–5 cm; pileus surface coloured various shades of brown—ferruginous, umber, sepia—concentrically sulcate and zoned with bands of different shades of brown hairs, often radiately sulcate, sometimes radiately plicate, coarsely tomentose, often strigose, at length becoming naked and black; margin lobed, fulvous when young. Hymenial surface duplicating irregularities of the pileus surface, radiately ridged, concentrically sulcate, umber, date-brown, or plum colour, even, tardily creviced when old, margin concolorous or lighter. Context dark umber and glistening in section, 150–200μ thick, composed of an intermediate tissue of closely compacted often cemented parallel hyphae radiately arranged, and a cortex of darker, cemented parallel hyphae; hyphal system dimitic; skeletal hyphae 4–5μ diameter, walls 1–2μ thick, reddish-brown, sparsely branched and septate; generative hyphae 2 5–3μ diameter, walls 0.25μ thick, tinted yellow, branched, septate. Setal layer to 80μ deep, of 2–3 rows of scattered setae which project to 35μ, are subulate, 35–55 x 5–7μ, walls naked, reddish-brown, lumina narrow. Hymenial layer to 30μ deep, a dense palisade of basidia and paraphyses. Basidia subclavate, 16–22 x 4–4.5μ, 4-spored; sterigmata arcuate, slender, to 4μ long Paraphyses cylindrical, the same diameter but shorter than the basidia, walls tinted yellow. Spores elliptical, apiculate, 3 5–4 x 2–2.5μ, walls smooth, hyaline, 0.1μ thick.

TYPE LOCALITY: Java.

DISTRIBUTION: Java, Malaya, Ceylon, India, Australia, Tasmania, New Zealand.

HABITAT: On bark or decorticated wood of dead branches and stems associated with a coarse pocket rot.

Acacia melanoxylon R. Br. Auckland: Silverdale, October 1950, J. M. Dingley.

Agathis australis Salisb. Auckland: Te Moehau, Coromandel Peninsula, 1,000ft, January 1947, J. M. Dingley.

Casuarina equisetifolia L. Auckland: Silverdale, October 1950, J. M. Dingley.

Eucalyptus sp. Auckland: Orewa, November 1950, J. M. Dingley

Eugenia smithii Poir. Auckland: Parnell, May 1950, J. M. Dingley.

Leptospermum ericoides A. Rich. Auckland: Mt. Te Aroha, 900ft, May 1923, G. H. C.; Sprague's Hill, Henderson, 700ft, May 1947, J. M Dingley; Manaia, Whangarei Heads, 100ft, October 1947, J. M. Dingley; Little Barrier Island, November 1947, J. M. Dingley; Kawau Island, 30ft, December 1947, J D Atkinson; Swanson, April 1949, M. Dye; Te Moehau, Coromandel Peninsula, 500ft, October 1954, J. M. Dingley; Moturoa Island, Bay of Islands, 100ft, May 1956, J. D Atkinson.

Metrosideros robusta A. Cunn. Auckland: Te Moehau, Coromandel Peninsula, 500ft, January 1947, J. M. Dingley.

Metrosideros tomentosa A. Rich. Auckland: Kawau Island, 80ft, December 1947, J. D. Atkinson; Cornwallis, 50ft, March 1953, J. D. Atkinson.

Phyllocladus trichomanoides Don. Auckland: Ngaitonga Range, 600ft, June 1948, J. M. Dingley.

Resembling *Stereum illudens* in general appearance, the species may be identified readily since it is the only *Hymenochaete* in New Zealand with applanate or flabelliform pilei. The pileus surface is coarsely tomentose, concentrically sulcate and zoned with hairs of different shades of brown, radiately sulcate and sometimes plicate. In young plants the tomentum is usually aggregated into strigose tufts, but as plants age hyphae become more lax and intertwined to form a dense mat which may attain a depth of 0·5 mm. Finally the tomentum tends to disappear, weathered plants sometimes becoming naked and almost black. The hymenial surface reflects the configuration of the pileus surface and exhibits a wide range of colours. At first ferruginous, it soon becomes date-brown, often with a plum coloured bloom, and finally dark umber. For long even, it becomes at length irregularly creviced. Under a lens sections appear dark brown and glistening. The context is composed of stout parallel hyphae, closely compacted and cemented, with a darker cortex formed from parallel hyphae and bearing the abhymenial hairs. The setal layer is narrow and composed of 2–3 overlapping rows of small setae embedded in irregularly upright hyphae. Setae are subulate with often a stout base turned at an angle and running parallel with the context hyphae. Spores are scanty and found only near margins of actively growing plants.

Choice of a specific name lies between *villosa* and *nigricans*. Both were published (as *Stereum*) on the same page by Leveille. Bresadola claimed they were applied to the same species, but this I have been unable to verify since the types have not been seen. Our collections match an authentic Leveille specimen of *Stereum villosum* in Kew herbarium; and Petch forwarded specimens to Kew from Ceylon which he named *H. nigricans,* which are of the same species. The combination *Hymenochaete villosa* was published by Bresadola six years before he used *H. nigricans;* and as the latter is inappropriate save for old weathered plants, I have preferred *H. villosa,* a combination also used by Wakefield (1915, 368) for an Australian collection.

Distribution of the species as given above is based on collections examined in Kew herbarium, filed under *H. nigricans, H. phaea* (type ex New Zealand), *H. spadicea* (type ex Ceylon), *H. strigosa* (type ex Ceylon) and *H. villosa.* Three collections from Tasmania, filed under *H. rubiginosa,* are of *H. villosa.*

8. **Hymenochaete mougeotii** (Fries) Cooke, Grevillea, *8,* 147, 1880. Text-fig. 8.
Thelephora mougeotii Fr., Elench. Fung., *1,* 188, 1828.
Corticium mougeotii Fr., Epicrisis, 558, 1838.
Hymenochaete sphaericola Lloyd Myc. Notes, No. *74,* 1338, 1925.

Hymenophore resupinate, annual or biennial, membranous, adnate, effused, at first appearing as small orbicular colonies to 0.5 cm diameter, merging to form linear areas 10–35 x 2–5 cm Hymenial surface when fresh india red with a brighter periphery, becoming reddish-purple or testaceous, even or tuberculate, at length deeply irregularly creviced. Margin thinning out, adnate, bright red with a narrow white or tinted fibrillose edge Context testaceous or umber, 150–400μ thick, composed of a narrow cortex lying upon the substratum, with or without abhymenial hairs, and a loosely arranged layer of parallel hyphae forming the intermediate tissue; hyphal system dimitic; skeletal hyphae to 4μ diameter, walls 0.5μ thick, reddish-brown, septate, freely branched, sometimes crystal coated; generative hyphae 2–2.5μ diameter, walls 0.25μ thick, hyaline, branched, septate. Setal layer commonly 100–150μ thick, in old specimens thickened to 300μ, of 3–5 (sometimes more) irregular overlapping rows of setae and brown freely branched hyphae; setae projecting to 50μ, narrowly fusiform, with acuminate apices, 60–95 x 8–12μ, walls verruculose, reddish-brown, many tinted only, lumina at first broad, becoming narrow. Hymenial layer to 30μ deep, a dense palisade of basidia, paraphyses and paraphysate hyphae. Basidia subclavate, 16–22 x 3.5–4μ, 4-spored; sterigmata arcuate, slender, to 6μ long Paraphyses subclavate, the same diameter but shorter than the basidia Paraphysate hyphae projecting, dendriform, coloured or hyaline. Spores suballantoid, 6–8 x 3–3 5μ, apiculate, walls smooth, hyaline, 0.1μ thick.

TYPE LOCALITY: Europe.

DISTRIBUTION: Europe, Great Britain, Australia, Tasmania, New Zealand.

HABITAT: Adnate on bark and decorticated wood of dead branches and stems associated with a white rot.

Albizzia lophantha Benth. Auckland: Campbell's Bay, January 1954, E. E. Chamberlain.

Beilschmiedia tawa (A. Cunn.) Hook. f. & Benth. Wellington: Lake Papaetonga, 50ft, August 1919, G. H. C.

Coprosma arborea Kirk. Auckland: Little Barrier Island, November 1947, J. M. Dingley.

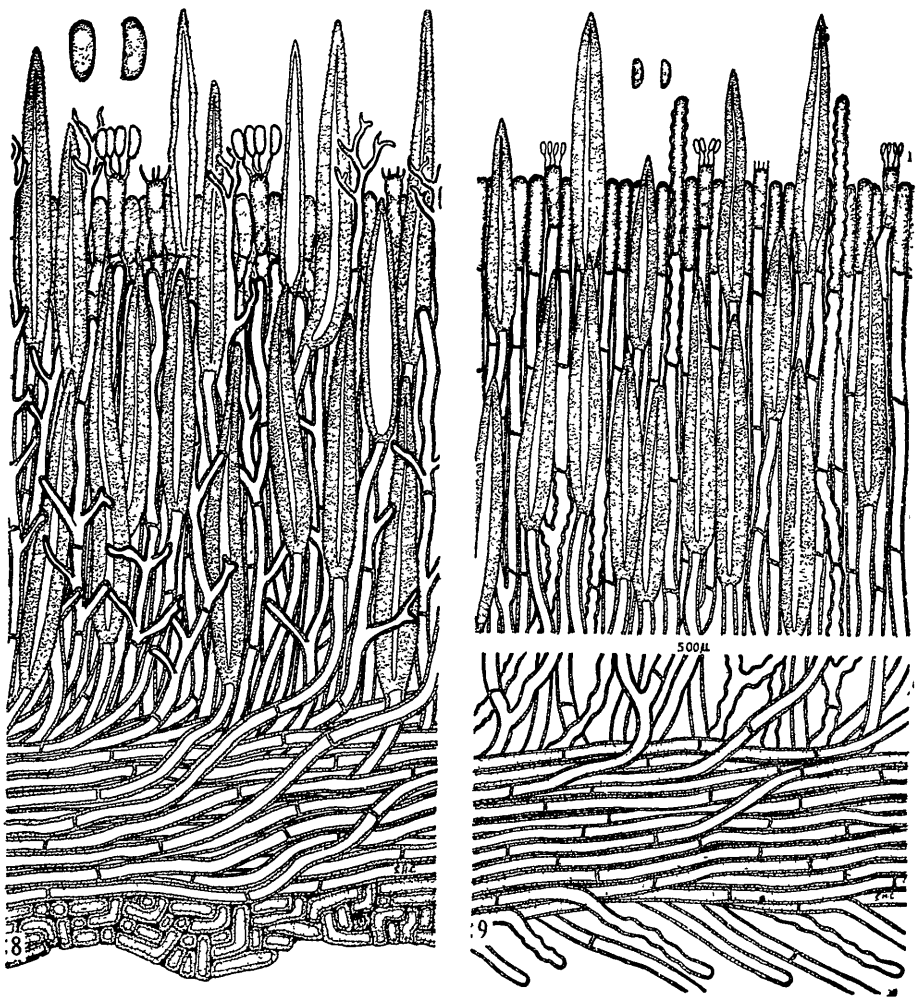
Coriaria arborea Linds. Auckland: Waiomo Valley, Thames, August 1954, J. M. Dingley.

Coriaria ruscifolia L. Auckland: Kauaeranga Valley, Thames, October 1950, J. M. Dingley.

Dysoxylum spectabile (Forst. f.) Hook. f. Auckland: Waiatarua, Waitakeres, 800ft, November 1948, J. M. Dingley.

Eucalyptus globulus Lab. Auckland: Mt. Te Aroha, 900ft, November 1946, G. H. C.

Hakea acicularis R. Br. Auckland: Waitakeres, 900ft, October 1947, J. M. Dingley; Moturoa Island, Bay of Islands, 90ft, May 1956, J. D. Atkinson.



TEXT-FIG. 8 —*Hymenochaete mougeotii* (Fr.) Cke. Transverse section × 500, spores × 1000. Note dendriform paraphysate hyphae. *Original*

TEXT-FIG. 9 —*Hymenochaete semistupposa* Petch. Transverse section × 500, spores × 1000. Showing moniliform paraphysate hyphae and submoniliform hyphae of the context and abhymenial hairs. *Original*

Ixerba brexioides A. Cunn. Auckland: Trounson Kauri Park, April 1947, J. M. Dingley.

Knightia excelsa R. Br. Auckland: Orewa, September 1954, B. J. Hooton.

Leptospermum scoparium Forst. Auckland: Waitakeres, 900ft, September 1946, J. M. Dingley; Piha, November 1946, J. M. Dingley.

Leucopogon fasciculatus (Forst. f.) A. Rich. Auckland: Mt. Te Aroha, 1,000ft, December 1953, August 1956, G. H. C.; Cornwallis, 50ft, January 1954, J. D. Atkinson; Rereatukahia Reserve, Katikati, 300ft, September 1954, G. H. C.

Metrosideros tomentosa A. Rich. Auckland: Whitianga-Coromandel Road, 300ft, November 1947, E. E. Chamberlain.

Nothopanax arboreum (Forst. f.) Seem. Auckland: Mamaku Forest, 1,800ft, December 1953, G. H. C.

Pinus radiata Don. Auckland: Atiamuri, 1,100ft, November, 1953, J. M. Dingley.

Pittosporum tenuifolium Banks & Sol. Auckland: Moumoukai Hill Road, Hunua Range, 1,000ft, May 1949, J. M. Dingley; Mountain Road, Henderson, 600ft, July 1950, J. M. Dingley; Earthquake Flat, Rotorua, 1,500ft, June 1952, G. H. C.; Titirangi, coast, September 1956, S. D. Brook.

Pittosporum umbellatum Banks & Sol. Auckland: Little Barrier Island, November, 1947, J. M. Dingley.

Rhipogonum scandens Forst. Auckland: Warkworth, A Taylor, January 1947.

Rubus australis Forst. Auckland: Waitakere Dam, 700ft, October 1951, J. M. Dingley.

Fresh specimens may be recognized readily by the resupinate, closely adnate fructifications with the hymenial surface coloured scarlet or india red, periphery bright red and margin white and fibrillose. At first plants are small and orbicular; soon they merge to form irregularly linear areas 5–10 cm long, or sometimes extending to 35cm. Sections through actively growing plants show them to be composed of a narrow setal layer of 2–3 overlapping rows of setae embedded in upright hyphae freely branched, and an intermediate tissue of parallel hyphae bordered by a coloured cortex of intertwined cemented hyphae which may or not bear abhymenial hairs. In older specimens the setal layer may occupy the greater part of the context, and be composed of as many as 15 rows of setae irregularly distributed. Numerous dendriform paraphysate hyphae project above the hymenial surface especially in the periphery of actively growing plants They may be coloured or hyaline, are formed from skeletal hyphae, and tend to disappear as plants age. In the context skeletal hyphae are scantily branched but in the setal layer become freely so, almost dendriform. Spores, usually suballantoid, may be cylindrical with rounded ends.

Our collections differ from typical European plants in several particulars. They are more deeply coloured, with purple shades rather than scarlet, margins are less brightly coloured, more closely attached to the substratum, and abhymenial hairs are usually scantily developed save in young specimens. In microfeatures they are practically identical, even to the dendriform paraphysate hyphae which have not been described hitherto. The distribution given is based on examination of specimens in Kew herbarium and those received from Australian correspondents.

9. **Hymenochaete semistupposa** Petch, Annals of the Royal Botanic Gardens, Peradeniya, *9*, 278, 1925. Text-fig. 9.

Hymenophore resupinate, annual, reviving a second season, membranous-brittle, adnate, effused, forming irregular areas 3–6 x 2–3 cm Hymenial surface seal-brown, dark umber, or chocolate, irregularly tuberculate, velutinate, not or tardily creviced; margin thinning out, cinnamon, fibrillose, loosely attached. Context dark umber or sepia, 150–300μ thick (to 800μ in stratose specimens), sometimes vertically fibrillose where fractured, composed of a layer of mainly upright branched hyphae which forms the intermediate tissue, and a cortex of parallel cemented hyphae deeply coloured and bearing abhymenial hairs of irregular length; hyphal system monomitic; generative hyphae 4–5μ diameter, walls 0.5–1μ thick, dark yellow brown, branched, septate, many submoniliform. Setal layer to 250μ deep, composed of several (2–5) overlapping rows of setae and stout vertical hyphae, setae projecting to 45μ, irregu-

larly fusiform, apices acute, 40–70 x 8–12μ, walls naked, rich reddish-brown, lumina narrow. Hymenial layer to 30μ deep, a close palisade of basidia, paraphyses and occasional moniliform paraphysate hyphae. Basidia subclavate, 12–16 x 3.5–4μ, 4-spored; sterigmata slender, upright, to 4μ long. Paraphyses cylindrical, to 24 x 5μ, longer and broader than the basidia, with walls tinted yellow. Spores suballantoid, 3.5–4 x 1–1.25μ, walls smooth, hyaline, 0.1μ thick.

TYPE LOCALITY: Hakgala, Ceylon.

DISTRIBUTION: Ceylon, South Africa, Kenya, Australia, New Zealand.

HABITAT: Effused on decorticated dead wood, associated with a pocket rot.

Metrosideros robusta A. Cunn. Auckland: Anawhata Road, Waitakeres, 900ft, June 1946, J. M. Dingley; Little Barrier Island, November 1947, J. M. Dingley; Silverdale, October 1950, J. M. Dingley.

Collections agree with the type, part of which was examined in Kew herbarium. The species may be identified by several unusual microfeatures, as the occasional submoniliform hyphae which, together with regular hyphae, appear in the context, abhymenial hairs and as paraphysate hyphae; upright hyphae of the context; presence of a stout cortex of parallel hyphae; delicate basidia and monomitic hyphal system.

Some of these features vary appreciably in different collections. In the type the context is composed of the dense layer of compacted parallel hyphae of the cortex, from which arise mainly upright hyphae forming a loose palisade. About one third of the hyphae are submoniliform, a feature not mentioned by Petch. In one New Zealand collection in which plants are somewhat immature, a dense cortex is present, and the setal layer arises directly from this with, between setae, upright palisade hyphae, a few of which are submoniliform. In our other collections the context is stratose, consisting of several setal layers with hyphae between. The latter are upright as in the type, and a few exhibit submoniliform areas as in Text-fig. 9. Basidia and spores were not described by Petch, nor found by Talbot (1952, 49). They are present in the type, nevertheless, and in all New Zealand collections. Basidia are delicate, scanty, and smaller than the cylindrical coloured paraphyses. Spores are suballantoid, and of small size. The Australian record is based on a specimen ex "Moruya, N.S.W., Cheesman, 1914" filed in Kew herbarium under the cover of *H. fuliginosa* (Pers.) Lev. sensu Berk.

10. **Hymenochaete dura** Berkeley & Curtis, Journal of the Linnean Society, *10*, 334, 1868. Text-fig. 10.

Hymenophore umbonate-sessile, or resupinate, annual, membranous, loosely attached save at the umbo, effused, appearing as numerous small orbicular colonies 3–10 mm diameter, which may merge peripherally forming irregular areas to 3.5 cm long; hymenial surface bay, tan, chestnut or ferruginous, somewhat velutinate or fibrillose, not creviced but often slightly depressed in the centre; margin thinning out, concolorous, somewhat lighter in colour, fibrillose, loosely attached, sometimes bluntly rounded. Context ferruginous, 0.2–0.45 mm thick, composed of a broad intermediate tissue of radiately arranged mainly parallel hyphae and a dense reddish-brown cortex bearing numerous abhymenial hairs; hyphal system dimitic; skeletal hyphae 3–4μ diameter, walls 0 5μ thick, pallid yellow brown, septate, sparsely branched; generative hyphae 2–2.5μ diameter, walls 0.25μ thick, hyaline, branched, septate. Setal layer to 80μ deep, a narrow area of 1–3 overlapping rows of somewhat sparse setae irregularly inserted; setae projecting to 30μ, irregularly fusiform or cylindrical with bluntly acuminate apices, often curved or bent, 30–60 x 5–8μ, walls sometimes verruculose near apices, yellow or pallid reddish-brown, with broad or narrow lumina. Hymenial layer to 30μ deep, a rather sparse palisade of basidia, paraphyses and paraphysate hyphae. Basidia subclavate, 12–16 x 3–4μ, 2–4-spored; sterigmata slightly arcuate, slender, to 4μ long. Paraphyses cylindrical, shorter and narrower than the basidia Paraphysate hyphae sparse or abundant, filiform, usually hyaline. Spores elliptical, 4 x 2μ, walls smooth, hyaline, 0.1μ thick.

TYPE LOCALITY: Cuba.

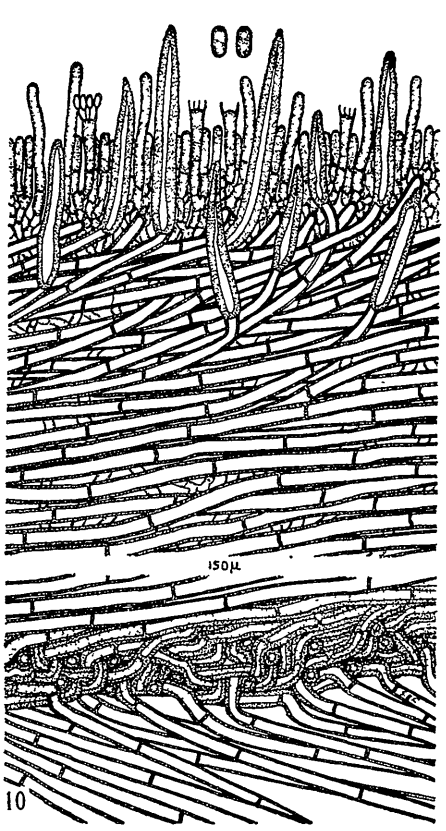
DISTRIBUTION: Cuba, Australia, New Zealand.

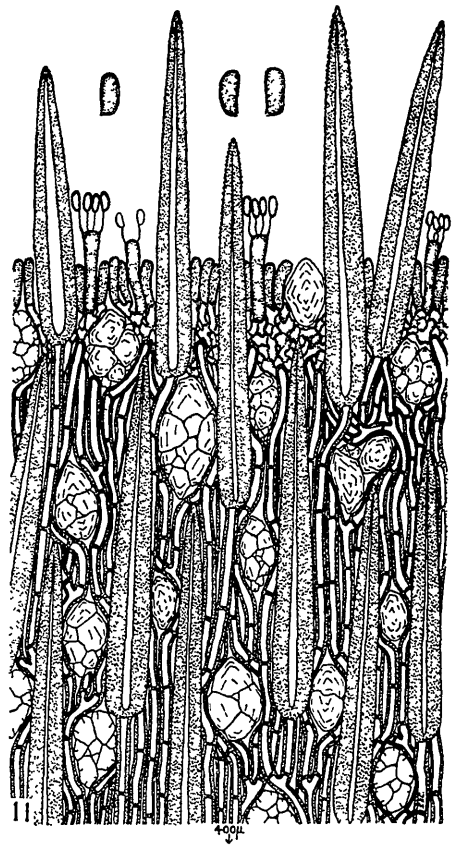
HABITAT: On bark of dead erect stems associated with a white rot.

Rubus schmidelioides A. Cunn. Otago: Horse Shoe Bay, Stewart Island, February 1954, J. M. Dingley.

Weinmannia racemosa L.f. Westland: Weheka, 600ft, April 1955, J. M. Dingley.

Collections agree with the type of *H. dura* in Kew herbarium, ex "Cuba, C. Wright, No. 241" differing in the thinner context and slightly narrower skeletal





TEXT-FIG 10.—*Hymenochaete dura* Berk & Curt. Transverse section × 500, spores × 1000. *Original.*
TEXT-FIG 11.—*Hymenochaete corticolor* Berk & Rav. Transverse section × 500; spores × 1000. Showing masses of embedded crystals. *Original.*

hyphae. Setae are the same, and unusual in their irregular shape, bluntly acuminate apices, and presence of occasional false septa. Numerous filiform paraphysate hyphae project and give to the hymenial surface its fibrillose appearance, a condition also present in the type.

Spores were not found in the type. Burt (1918, 353) gave them as 5 x 3μ for the co-type portion he examined. In Australian and New Zealand specimens they are scanty, for although basidia were present in some 20 sections examined, attached spores were seen in two slides only. These were narrowly elliptical, 4 x 2μ. Setae were sparse in portion of the type examined. In our collections they were found to be sparse or abundant, being crowded in the central part, progressively more scanty towards the periphery. Burt (1918, 352) described paraphysate hyphae as paraphyses; the latter are, however, more narrow and shorter than the basidia and do not project above them.

11. **Hymenochaete floridea** Berkeley & Broome, Journal of the Linnean Society, *14*, 68, 1873. Text-fig 12.

Hymenophore resupinate, annual, membranous, adnate, at first appearing as small orbicular scattered colonies 0·5–2 cm across, merging to form irregularly linear areas 5–15 x 2–6 cm. Hymenial surface reddish-brown, often with a purple tinge or purplish when old, even or irregularly roughened, finely velutinate, either without crevices, tardily creviced, or in old specimens sometimes exhibiting radiate series of crevices as in *H. tabacina;* margins thinning out, fibrillose, loosely attached, narrow or broad, fulvous. Context ferruginous,

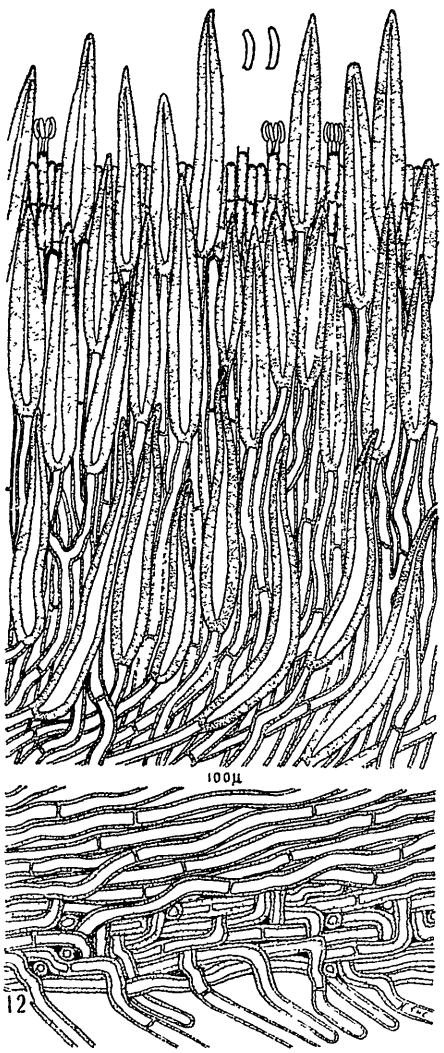
150–250μ thick, composed of an intermediate tissue of mainly parallel hyphae rather loosely arranged and a cortex of cemented intertwined hyphae bearing abhymenial hairs of irregular length; hyphal system dimitic; skeletal hyphae 4–5μ diameter, walls 0 5–1μ thick, golden yellow, branched, sparsely septate, generative hyphae 2–2 5μ diameter, walls 0 25μ thick, hyaline, branched, septate. Setal layer 80–130μ deep, of 2–5 crowded overlapping rows of setae embedded in upright skeletal hyphae and of one or more rows of larger, scattered and often distorted setae below. Setae projecting to 40μ, irregularly fusiform, a few subulate, 40–70 x 6–10μ (some in the context to 85μ) walls delicately verruculose on the apices, reddish-brown with moderately narrow lumina. Hymenial layer to 25μ deep, a close palisade of basidia and paraphyses. Basidia subclavate, 12–15 x 3–4μ, 2–4-spored; sterigmata slender, slightly arcuate, to 5μ long. Paraphyses cylindrical, the same diameter but shorter than the basidia Spores allantoid, 4–5 x 1μ, walls smooth, hyaline, 0.1μ thick.

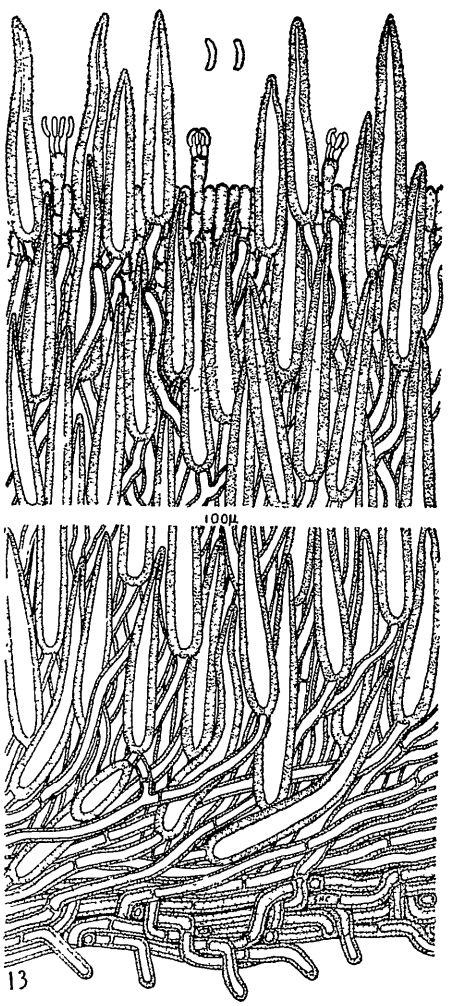
TYPE LOCALITY: Ceylon.

DISTRIBUTION: Ceylon, Australia, New Zealand.

HABITAT: On bark of dead branches and trunks associated with a white rot.

Carpodetus serratus Forst. Otago: Horse Shoe Bay, Stewart Island, February 1954, J. M. Dingley.





TEXT-FIG. 12.—*Hymenochaete floridea* Berk. & Br. Transverse section × 500, spores × 1000 *Original*
TEXT-FIG. 13.—*Hymenochaete plurimaesetae* G. H. Cunn. Transverse section × 500; spores × 1000 *Original.*

Edwardsia microphylla Salisb. Auckland: Orakei Bush, September 1948, D. W. McKenzie.

Elaeocarpus dentatus (Forst.) Vahl. Westland: Harihari, November 1954, J. M. Dingley.

Fuchsia excorticata L f. Westland: Karangarua Valley, November 1954, J. M. Dingley; Harihari, November 1954, J. M. Dingley.

Leptospermum ericoides A. Rich. Auckland: Little Barrier Island, November 1947, J. M. Dingley; Great King Island, Three Kings, December 1953, P. J. Brook.

Leptospermum scoparium Forst. Auckland: Anawhata Road, Waitakeres, 900ft, May 1955, J. M. Dingley. Otago: Ryan's Creek, Stewart Island, February 1954, J. M. Dingley.

Leucopogon fasciculatus (Forst. f.) A. Rich. Auckland: Titirangi, Waitakeres, 800ft, June 1946, J. M. Dingley; Scenic Drive, Waitakeres, 900ft, June 1949, P. M. Ambler; Kauaeranga Valley, Thames, 100ft, June 1950, J. M. Dingley.

Myrtus bullata Sol. Auckland: Lake Rotoehu, 1,200ft, September 1954, October 1956, G. H. C.

Nothofagus cliffortioides (Hook. f.) Oerst. Wellington: Tongariro River, Kaimanawas, 2,800ft, April 1955, J. M. Dingley; same locality, 3,000ft, December 1955, September 1956, G. H. C. Westland: Karangarua Valley, November 1954, J. M. Dingley.

Nothofagus menziesii (Hook. f) Oerst. Otago: Longwood Range, 2,000ft, November 1924, J. C Neill.

Nothopanax colensoi (Hook. f.) Seem. Wellington: Whakapapa Stream, Mt Ruapehu, 3,000ft, October 1949, J. M. Dingley.

Podocarpus ferrugineus Don. Wellington: Mt. Tongariro, 2,700ft, March 1952, G. H. C.; Blyth Track, Ohakune, 2,500ft, January 1954, S. D. Baker.

Podocarpus spicatus R. Br. Auckland: Hauhangaroa Range, Taupo, 2,250ft, March 1953, J. M. Dingley.

Quintinia serrata A. Cunn. Westland: Harihari, November 1954, J. M. Dingley.

Weinmannia racemosa L.f. Auckland: Kaimai Range, 2,500ft, July 1950, J. M. Dingley; Te Whaiti, 2,000ft, June 1951, J. M. Dingley; Camel's Back, Coromandel Peninsula, 1,000ft, October 1954, J. M. Dingley; Mamaku Forest, 1,800ft, September 1956, G. H. C. Wellington: Mt. Pihanga, Taupo, 2,500ft, October 1949, J. M. Dingley; Mt. Hauhangatahi, 3,000ft, February 1952, G. H. C.; Ohakune Track, Mt. Ruapehu, 2,500ft, December 1953, J. M. Dingley. Westland: Waiho, 600ft, November 1946, J. M. Dingley; Harihari, November 1954, J. M. Dingley; Karangarua Valley, November 1954, J. M. Dingley; Weheka, April 1955, J. M. Dingley. Otago: Doubtful Sound, February 1948, J. M. Dingley; Half Moon Bay, Stewart Island, February 1954, J M Dingley; Alton Valley, Tuatapere, 400ft, February 1954, J. M. Dingley.

New Zealand collections agree in microfeatures with the type of *H. floridea* in Kew herbarium, ex "Central Provinces, Ceylon, Thwaites, No. 336." Many differ in being less brightly coloured, a feature of little taxonomic significance.

The species may be separated from others of the section in which a cortex is present, intermediate tissue is composed of parallel hyphae and plants resupinate, by the small allantoid spores, small setae crowded into several overlapping rows, reddish-brown colour of the hymenial surface and fulvous margins. It is liable to confusion only with *H. plurimaesetae,* differing in features discussed under the latter. Sometimes the cortex is suppressed where tissues are in close contact with the substratum; but sections through the free peripheral region will demonstrate its presence. Most collections exhibit a partiality for upright dead trunks and saplings, when the upper margins become thickened to simulate rudimentary pilei.

12. **Hymenochaete plurimaesetae** sp. nov. Pl. 3, fig. 2; Text-fig. 13.

Resupinata, annua, coriacea, fragilis, adnata. Superficies hymenii ferruginea vel cinnamomea, tuberculata, rimosa; margine concolori, lobato, adnato. Contextus hypharum laxe

ordinatarum maxime parallelarum, ferrugineus; cortex adest. Hypharum systema dimiticum. Setarum stratum 10–15 ordinibus, subulatis vel interdum inaequaliter fusiformibus, verruculosis, 40–65 x 7–9μ, partim superimpositis, ad 40μ eminentibus. Basidia subclavata, 12–16 x 3.5–4μ, 2–4 sporis allantoidibus, 4–5 x 1–1.5μ.

Hymenophore resupinate, annual, coriaceous-brittle, closely adnate, forming irregularly orbicular colonies 2–20 mm across. Hymenial surface ferruginous or cinnamon, tuberculate, deeply irregularly creviced, especially towards the centre; margin concolorous, thinning out, definite, lobed. Context ferruginous, 150–250μ thick, composed of an intermediate tissue of loosely arranged parallel hyphae and a cortex 10–15μ thick bearing a few brief abhymenial hairs; hyphal system dimitic; skeletal hyphae varying in thickness, 2–4–6μ diameter, walls 0.5–1.5μ thick, golden yellow, branched, septate; generative hyphae 2.5–3μ diameter, walls 0.25μ thick, hyaline, branched, septate. Setal layer occupying the greater part of the context, 150–200μ deep, of 10–15 overlapping rows of setae embedded in branched brown hyphae; setae projecting to 40μ, commonly subulate, or irregularly fusiform, 40–65 x 7–9μ, many buried in the context when laying at all angles, often distorted, walls irregularly and often coarsely verruculose, reddish-brown, lumina broad. Hymenial layer to 40μ deep, a dense palisade of basidia and paraphyses Basidia subclavate, 12–16 x 3.5–4μ, 2–4-spored; sterigmata slender, slightly arcuate, to 5μ long. Spores allantoid, 4–5 x 1–1 5μ, walls smooth, hyaline 0.1μ thick

DISTRIBUTION: New Zealand.

HABITAT: Scattered or crowded on bark and decorticated wood of branches and stems, associated with a white rot.

Coprosma cuneata Hook. f. Wellington: Tongariro River, Kaimanawas, 2,800ft, December 1955, G. H. C., *type collection,* P.D.D. herbarium, No. 16540; Pangarara River, Mt. Tongariro, 3,000ft, December 1955, G. H. C.

Leptospermum ericoides A. Rich. Auckland: Great Island, Three Kings, January 1951, G. T. S. Baylis.

Leptospermum scoparium Forst Wellington: Tongariro River, Kaimanawas, 2,800ft, December 1955, G. H. C.

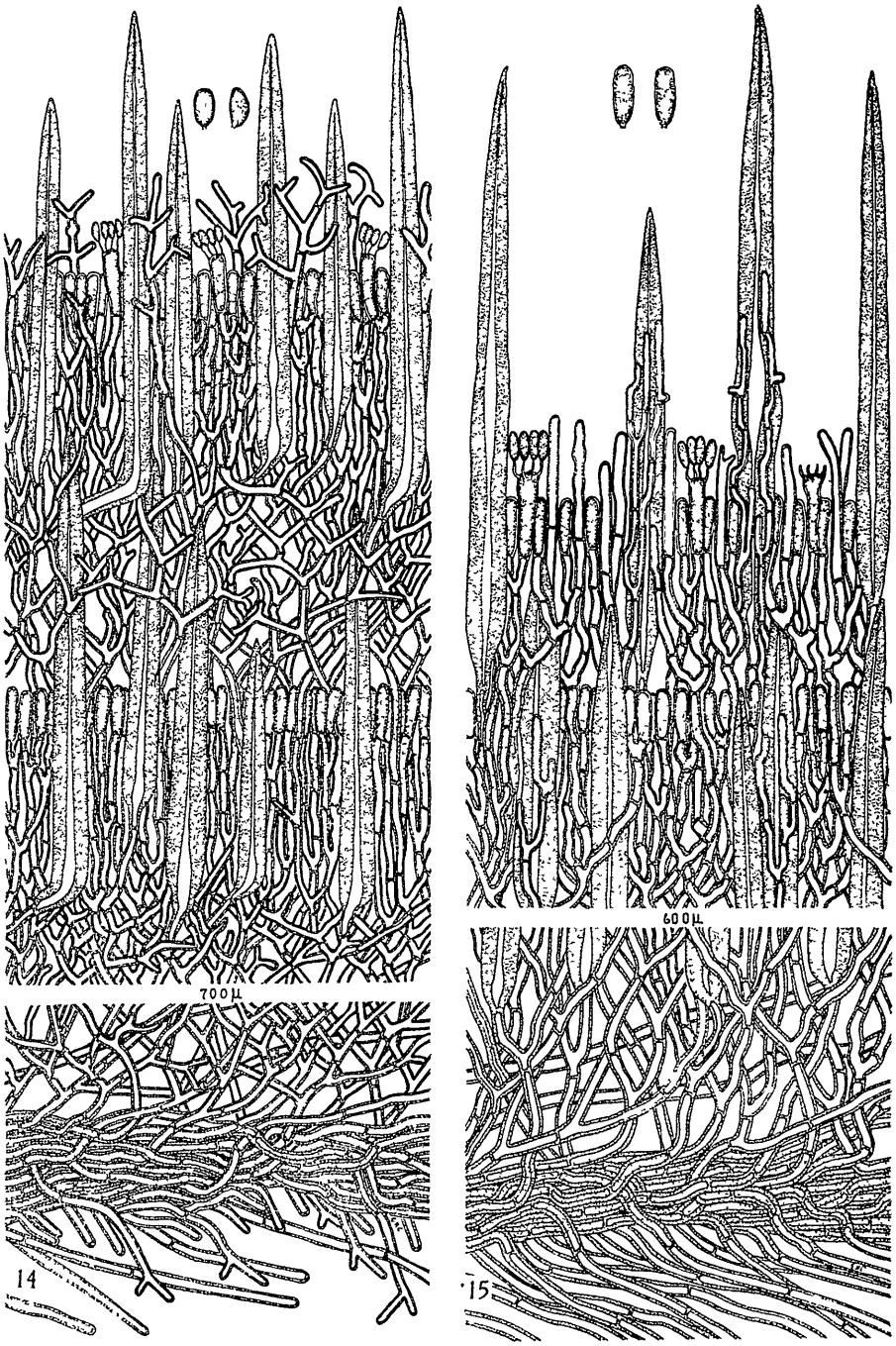
Nothofagus cliffortioides (Hook. f.) Oerst. Wellington: Maungatorotoro Stream, Mt. Ruapehu, 3,000ft, March 1948, J. M. Dingley; Kaimanawa Ranges, 3,000ft, January 1955, G. H. C.

Phyllocladus alpinus Hook. f. Wellington: Mt. Hauhangatahi, 2,500ft, January 1954, S. D. Baker; Tongariro River, Kaimanawas, 2,800ft, April 1955, J. M. Dingley.

Separated from *H. floridea,* which it resembles in microfeatures, by the ferruginous or cinnamon colour of the hymenial surface, absence of a differently coloured margin, and brittle context. In minor microfeatures they also differ; for in *H. plurimaesetae* the setal layer is so thickened as to occupy the greater part of the context, so that the intermediate tissue is reduced to a somewhat tenuous layer. The cortex may be well developed, scanty or, where the section contacts the substratum, suppressed. It is always present in some portion of the plant, however, as may be demonstrated by sections prepared from different parts. In some collections two or three darker bands traverse the setal layer; they are absent from others so are without taxonomic import.

13. **Hymenochaete tasmanica** Massee, Journal of the Linnean Society, *27*, 105, 1890. Pl. 3, fig. 1; Text-fig. 14.

Hymenophore resupinate, perennial, stratose, membranous, adnate, at first appearing as numerous small orbicular or linear colonies 2–10 mm across with free fulvous fibrillose margins, merging to form irregular areas to 10 x 5 cm. Hymenial surface at first reddish-brown, with bright fulvous margin, becoming ferruginous or pallid umber when margins are concolorous, commonly coarsely and densely tuberculate, sometimes even when slightly velutinate, not creviced. Context ferruginous, 0.25–4 mm thick, in annual plants composed of one or two rows of rather scanty setae arising near the hymenial surface, a broad intermediate layer of intertwined usually dendriform hyphae and a narrow reddish-brown, compacted cortex bearing dense brief abhymenial hairs; when perennial stratose with numerous layers (5–16) of setae with context hyphae between and parallel lines of darker colour; hyphal system monomitic; generative hyphae 2–2 5μ diameter (rarely to 3μ), walls 0.5–1μ thick, golden brown, freely dendriform, with short lateral branches, sometimes in turn branched, others scantily branched, scantily septate. Setal layers 95–130μ deep, of 5–16 zones with context tissue between; setae projecting to 70μ, acicular, apices long-acuminate, 70–130 x 8–12μ, walls naked, reddish-brown, lumina narrow, expanded towards bases. Hymenial layer a close palisade



TEXT-FIG. 14 —*Hymenochaete tasmanica* Mass. Transverse section × 500; spores × 1000. Showing dendriform paraphysate hyphae and persistent paraphyses of the setal layer. *Original*

TEXT-FIG. 15 —*Hymenochaete vaginata* G H Cunn Transverse section × 500; spores × 1000. Showing filiform paraphysate hyphae and setae ensheathed in hyphae. *Original.*

of basidia, paraphyses and paraphysate hyphae. Basidia subclavate, 14–18 x 4 5–5μ, 2–4-spored; sterigmata slender, erect, to 5μ long Paraphyses the same diameter but shorter than the basidia. Paraphysate hyphae dendriform, brown. Spores suballantoid, apiculate, 4–5.5 x 3–3.5μ, walls smooth, hyaline, 0.1μ thick.

TYPE LOCALITY: Tasmania.

DISTRIBUTION: Australia, Tasmania, New Zealand.

HABITAT: On bark or decorticated wood of dead branches and trunks associated with a pocket rot.

Dysoxylum spectabile (Forst. f.) Hook. f. Auckland: Little Barrier Island, November 1947, J. M. Dingley.

Knightia excelsa R. Br. Auckland: Waikaretu, 400ft, October 1946, E. E. Chamberlain; Purewa Bush, April 1953, D. W. McKenzie.

Meterosideros tomentosa A. Rich. Auckland: Buffalo Beach, Whitianga, 100ft, November 1947, Mrs E. E Chamberlain.

Vitex lucens Kirk. Auckland: Purewa Bush, December 1948, D. W. McKenzie.

Weinmannia sylvicola Sol. Auckland: Little Barrier Island, November 1947, E. G. Turbott.

Wintera colorata (Raoul) Dandy. Westland: Okarito, April 1955, J. M. Dingley.

Among species of this section, *H. tasmanica* may be identified by the usually coarsely tuberculate, ferruginous hymenial surface, fulvous margin of young plants, long, narrow, reddish-brown setae arranged in strata in thick plants, thick-walled narrow hyphae which are commonly dendriform, dendriform brown paraphysate hyphae and suballantoid spores

Australian collections are much less tuberculate, though one New Zealand collection from *Wintera colorata* resembles typical Australian plants in the almost smooth surface. Setae are slightly longer in smooth forms, but show an appreciable range in length in all specimens. Spores are scantily produced and found only in young actively growing specimens Text-figure 14 was drawn from a young plant showing only two setal layers; in thick specimens as many as 16 layers may develop to occupy the greater part of the context.

H. vaginata differs in that setae are of different shape, larger, and usually enmeshed in hyphal sheaths; hyphae are not dendriform, paraphysate hyphae are simple, spores are longer and of different shape. Both *H. tasmanica* and *H. vaginata* show a general resemblance to *H. cinnamomea* since all three are stratose, and composed of branched generative hyphae. They differ in possessing a deeply coloured cortex of intertwined cemented hyphae.

Massee's description of the type is faulty in several particulars. For setae are much shorter than he had described them, and spores are shorter and suballantoid. The type specimen was collected in Tasmania, as the note on the type sheet shows, not New Zealand as he had recorded.

14. **Hymenochaete vaginata** sp. nov. Text-fig. 15.

Resupinata, perennis, membranacea, fragilis, laxe adjuncta. Superficies hymenii cinnamomea, deinde siccans spadicea, tuberculata, non rimosa; margine late lobato, fulvo, laxe adjuncto. Contextus ferrugineus, plurium stratorum setarum hyphis intertextis, strato medio hypharum intertextarum; cortex adest Hypharum systema monomiticum Stratum setarum sparsarum, anguste fusiformium, ad 110μ eminentium, nudarum vel in hypharum vagina implicatarum, 90–160 x 9–14μ. Basidia cylindricalia vel subclavata, 16–20 x 4–5μ, 4 sporis anguste ellipticis, 7–8 x 2.5μ.

Hymenophore resupinate, perennial, membranous-brittle, loosely attached, appearing as irregular orbicular or linear areas 1.5–4 cm across Hymenial surface cinnamon, drying date-brown, irregularly tuberculate, velutinate, not creviced; margin thinning out, fulvous, often upturned or twisted inwards, coarsely lobed and delicately fibrillose, free. Context ferruginous, 0.5–1 mm thick, almost wholly composed of setal layers with intertwined hyphae between, zoned with more deeply coloured reddish-brown bands, near the base composed of mainly upright intertwined hyphae, cortex reddish-brown, cemented and interwoven, bearing a dense mat of long abhymenial hairs; hyphal system monomitic; generative hyphae 3–3.5μ diameter,

walls 0 5–1μ thick, golden brown, branched, sometimes bifid at the apices, sparsely septate Setal layers 5–9, each to 150μ deep, with rather scattered overlapping setae and narrow bands of context hyphae between, setae projcting to 110μ, narrowly fusiform with long acuminate apices, 90–160 x 9–14μ, partly or wholly enmeshed in hyphal sheaths, walls reddish-brown, lumina narow. Hymenial layer to 30μ deep, a scanty palisade of basidia, paraphyses and paraphysate hyphae. Basidia cylindrical or subclavate, 16–20 x 4–5μ, 4-spored; sterigmata arcuate, rather stout, to 4μ long. Paraphyses cylindrical, shorter and slightly narrower than the basidia. Paraphysate hyphae abundant, filiform, seldom bifid at the apices, projecting slightly. Spores narrowly elliptical, 7–8 x 2.5μ, apiculate, walls smooth, hyaline, 0.1μ thick.

DISTRIBUTION: New Zealand.

HABITAT: Loosely attached to bark of dead branches and trunks; type of rot not seen.

Phyllocladus alpinus Hook. f. Wellington: Whakapapa, Mt. Ruapehu, 3,000ft, October 1949, J. M. Dingley, *type collection,* P.D.D. herbarium, No. 7437.

In its stratose structure, monomitic hyphal system, and presence of a cortex the species resembles smooth forms of *H. tasmanica.* It differs in the filiform paraphysate hyphae, different spores, larger basidia, context hyphae of larger diameter, and without dendriform branches. Setae are much larger and most are enmeshed in hyphal sheaths like cystidia of *Peniophora vermifera.* When dry the hymenophore is brittle, and when fractured surfaces appear vertically fibrillose. Spores are rare, the few seen attached to basidia being of the dimensions described. Plants are loosely attached to bark, and when dry tend to curl from the margin either erect or inwards.

15. **Hymenochaete lictor** Petch, Annals of the Royal Botanic Gardens, Peradeniya, *9,* 277, 1925. Text-fig. 16.

Hymenophore resupinate, annual, reviving a second season, membranous, adnate, effused forming linear areas to 30 x 1–1.5 cm. Hymenial surface dark reddish-brown with a purple tinge, velutinate, even, becoming deeply areolately creviced; margins thinning out, definite, fibrillose, ferruginous, adnate. Context 150–250μ thick, umber, composed of loosely woven and parallel hyphae forming the intermediate tissue, bordered by a pseudoparenchymatous cortex bearing short abhymenial hairs; hyphal system monomitic; generative hyphae 3–3.5μ diameter, walls 0.25–0.5μ thick, golden brown, scantily branched, moderately septate. Setal layer to 130μ deep, composed of scattered fascicles of 2–6 setae with single setae between arising from the subhymenium; setae projecting to 60μ, subulate, apices acute, 40–95 x 6–8μ, walls naked, deep reddish-brown, lumina narrow. Hymenial layer to 50μ deep, a dense palisade of basidia and paraphyses. Basidia subclavate or more often cucurbitiform, 12–16 x 4–5μ, 4-spored; sterigmata arcuate, slender, to 6μ long. Paraphyses clavate, 10–12 x 5–6μ. Spores elliptical or obovate, apiculate, 5–6 x 3–3.5μ, walls smooth, hyaline, 0.2μ thick.

TYPE LOCALITY: Ceylon.

DISTRIBUTION: Ceylon, New Zealand.

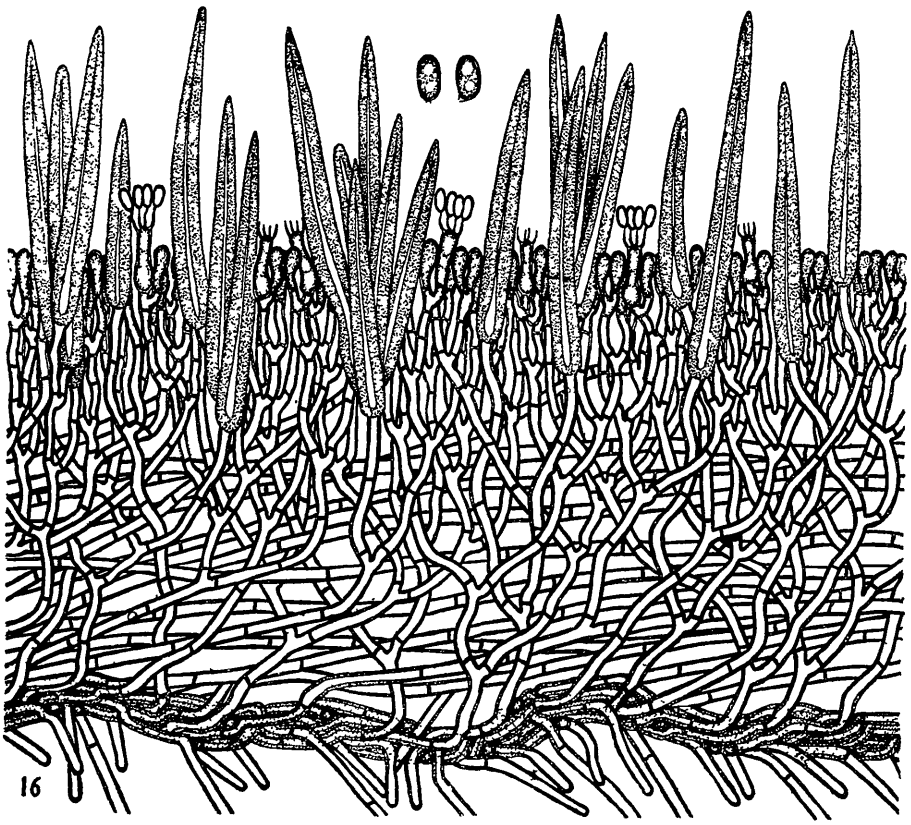
HABITAT: Effused on bark of dead stems associated with a white rot.

Fuchsia excorticata L f Auckland: Lake Okataina, 1,500ft, December 1953, G. H. C.

Muehlenbeckia australis (Forst. f.) Meissn. Otago: Taieri Mouth, 200ft, May 1952, G. T. S. Baylis.

Specimens agree with a co-type collection from Ceylon in Kew herbarium, differing in that hyphae are of slightly larger diameter and fascicles more scattered. Fructifications at hand extend for 30 cm upon dead stems, are closely adnate, with an even surface which is dark reddish-brown with a purple tinge. The margin is concolorous and fibrillose. Setae are sometimes arranged in slightly projecting fascicles of 2–6 with solitary setae between; or may be arranged in a narrow setal layer without evident fascicles. They are confined to the subhymenial layer and not scattered through the context as in *H. dictator.* About half of the basidia are cucurbitiform with bases inflated, the others subclavate and narrower than the clavate paraphyses. Spores are abundant, commonly elliptical or sometimes slightly obovate with a lateral apiculus.

Three species with fasciculate setae have been described. *H. lictor* differs from *H. dictator* by several features discussed under the latter; and the South African



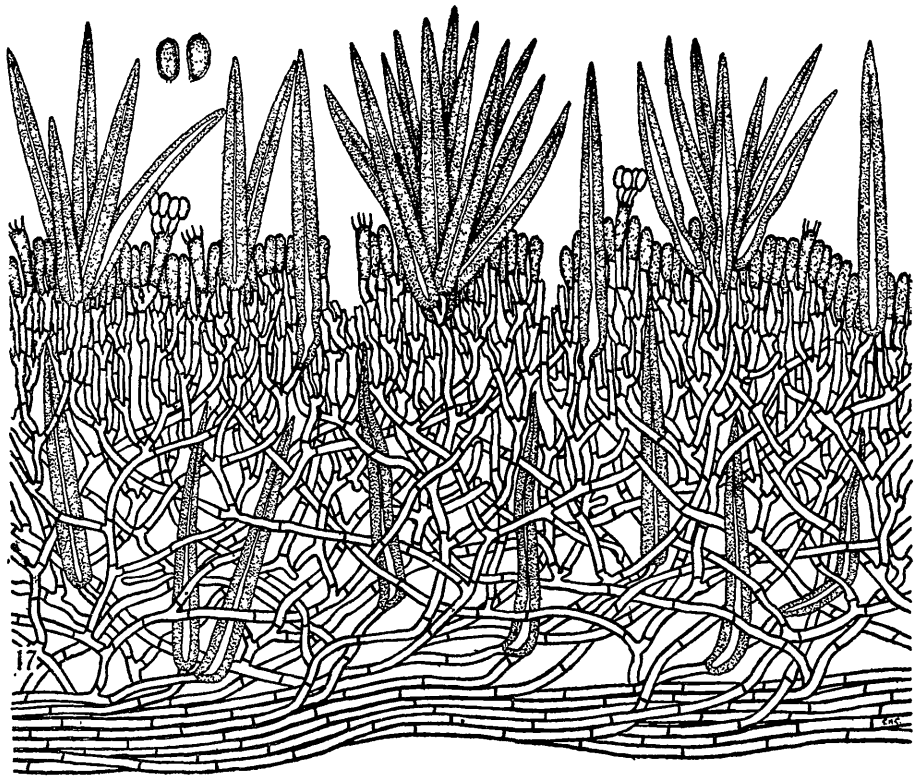
TEXT-FIG. 16.—*Hymenochaete lictor* Petch Transverse section × 500, spores × 1000 Showing setae aggregated into fascicles of 3-6 *Original*

H. fasciculata Talbot differs from both in its larger setae arranged in fascicles of 8–12, stratose context and dendriform generative hyphae.

16. **Hymenochaete dictator** sp. nov. Pl. 2, fig. 3; Text-fig. 17.

Resupinata, annua, iterum renascens, membranacea, deinde fragilis, adnata Superficies hymenii clare cinnamomea, subtiliter tuberculata, alte areolata rimosa; margine fibrilloso, fulvo vel pallide cinnamomeo, adnato. Contextus hypharum laxe intertextarum, fulvus; cortex hypharum parallelarum laxe ordinatarum adest. Hypharum systema monomiticum. Setarum stratum 2–3 ordinibus partim superimpositis. Setae superiores partim in fasciculis 4–12 ordinatae, subulatae vel anguste fusiformes, ad 50μ eminentes, nudae, 40–80 x 6–9μ. Basidia subclavata, 14–18 x 4–5μ, 4 sporis ellipticis vel obovatis, 5–6.5 x 3–3.5μ.

Hymenophore resupinate, annual, reviving a second season, membranous, becoming brittle, adnate, at first composed of numerous irregularly orbicular colonies 2–10 mm diameter, becoming merged to form linear areas to 7 x 2 cm. Hymenial surface bright cinnamon, darker towards the centre, finely tuberculate, velutinate, becoming deeply areolately creviced; margin thinning out, fibrillose, light cinnamon or fulvous, adnate. Context fulvous, 110–250μ thick, of loosely intertwined hyphae bordered on the abhymenial surface by a narrow coloured cortex of loosely intertwined hyphae, without abhymenial hairs; hyphal system monomitic; generative hyphae 2–2.5μ diameter, walls 0.25μ thick, pallid yellow brown, freely branched, septate. Setal layer to 130μ deep, composed of fascicles of 4–12 setae arising in the subhymenium, mainly in the tubercules, of scattered setae forming 2–3 vague overlapping rows, and of setae scattered in the context and arising from its base; setae projecting to 50μ, subulate, some narrowly fusiform, 40–80 x 6–9μ, walls naked, yellow brown, lumina narrow. Hymenial layer to 30μ deep, hyaline, a close palisade of basidia and paraphyses. Basidia subclavate, 14–18 x 4–5μ, 4-spored; sterigmata slender, arcuate, to 6μ long. Paraphyses subclavate, same diameter but shorter than the basidia. Spores elliptical or obovate, 5–6.5 x 3–3.5μ, walls smooth, hyaline, 0.2μ thick.



TEXT-FIG. 17.—*Hymenochaete dictator* G. H. Cunn Transverse section × 500; spores × 1000 Showing setae aggregated into fascicles of 5-11, also scattered setae in context, and cortex without abhymenial hairs *Original.*

DISTRIBUTION: New Zealand.

HABITAT: Effused on bark of dead branches associated with a white rot.

Beilschmiedia tawa (A. Cunn.) Hook. f. & Benth. Wellington: Carter's Bush, Carterton, 150ft, December 1952, G. H. C., *type collection,* P.D.D. herbarium, No. 12466.

Fascicles of setae arise mainly from tubercules in bundles of 3–12, with solitary setae between; scattered setae are also present in the context. The cortex is without abhymenial hairs, and composed of compacted, partly cemented parallel hyphae. From *H. lictor* the species is separated by the tuberculate surface of different colour, narrower context hyphae with thinner walls, different structure of the cortex, greater number of setae in the fascicles, differently shaped basidia and paraphyses.

17. **Hymenochaete attenuata** Leveille, Annales des Sciences Naturelles, III, *5,* 152, 1846. Text-fig. 18.

Stereum attenuatum Lev., Ann. Sci. Nat., III, *2,* 212, 1844

Hymenophore pileate, coriaceous, annual, sometimes reviving a second season; pilei at first orbicular and attached by a narrow umbo with reflexed margins, soon merged laterally to form effused-reflexed linear areas to 12 x 2 cm, sometimes resupinate when loosely attached, reflexed portions with a radius of 1–2 cm, extending laterally for the length of the fructification, surface at first fulvous, remaining so or becoming ferruginous, weathering to grey, banded with concentric zones of different shades of brown, sometimes radiately sulcate, tomentose, hairs often arranged in tufts; margin fibrillose, fulvous, entire or torn. Hymenial surface at first fulvous, becoming ferruginous or date-brown, sometimes colliculose, at length deeply creviced in small radiate areas exposing the fulvous context; margin thinning out, fibrillose, fulvous. Context fulvous, 150–200μ thick, intermediate layer composed of hyphae parallel

with the hymenium, cortex absent, abhymenial hairs arising directly from the intermediate layer; hyphal system dimitic; skeletal hyphae 3–4μ diameter, walls 0.5μ thick, golden yellow, branched, septate; generative hyphae 1.5–2μ diameter, walls 0.2μ thick, branched, septate, hyaline. Setal layer to 120μ deep, composed of 1–3 rows of overlapping setae. Setae projecting to 80μ, aculeate, often twisted on their axes, with acute apices (a few dome shaped), 80–110 x 7–10μ (some to 120μ), walls naked, deep reddish-brown, lumina narrow. Hymenial layer to 30μ deep, a close palisade of basidia, paraphyses and coloured ends of skeletal hyphae not projecting Basidia subclavate, 20–24 x 4–5μ, 4-spored; sterigmata arcuate, slender, to 5μ long. Spores broadly elliptical, 5.5–6 x 4–5μ, walls smooth, hyaline, 0.2μ thick.

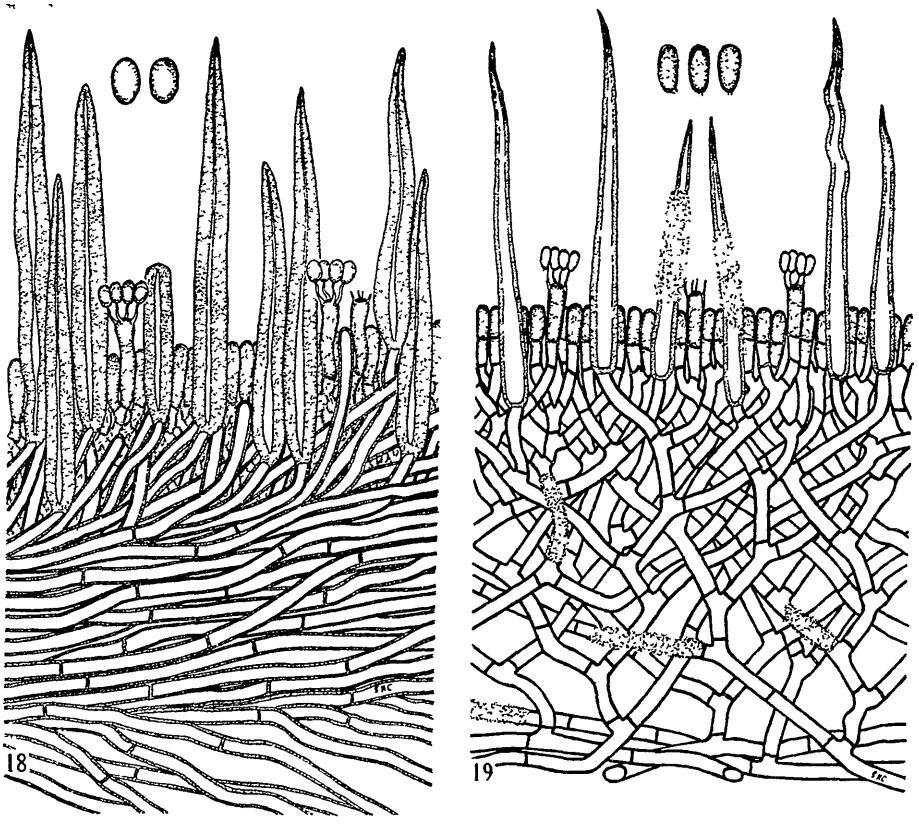
TYPE LOCALITY: Java.

DISTRIBUTION: Java, Malaya, Japan, Ceylon, Australia, New Zealand.

HABITAT: Crowded on bark of dead twigs, branches and saplings associated with a white rot.

Nothofagus cliffortioides (Hook. f.) Oerst. Wellington: Tongariro River, Kaimanawa Ranges, 2,800ft, December 1946, March 1952, January 1955, G. H. C.; Waihouhounou River, Mt. Tongariro, 3,500ft, January 1947, J. D. Atkinson; Whakapapa, Mt. Ruapehu, 3,500ft, October 1949, J. M. Dingley.

Nothofagus fusca (Hook. f.) Oerst. Auckland: Upper Mohaka River, Kaimanawas, 2,000ft, May 1953, J. M. Dingley; Lake Waikaraemoana, 2,500ft, November 1955, J. M. Dingley. Hawke's Bay: Ahimanawa Range, 2,500ft, November 1955, J. M. Dingley. Nelson: Staircase Creek, Reefton, 2,000ft, November 1952, S. D. Baker. Westland: Orwell Creek, Ahaura, April 1955, J. M. Dingley; Totara Flat, Granville Forest, April 1955, J. M. Dingley.



TEXT-FIG. 18.—*Hymenochaete attenuata* Lev Transverse section × 500; spores × 1000. Note absence of the cortex. *Original.*

TEXT-FIG 19.—*Hymenochaete rhabarbarina* (Berk.) Cke Transverse section × 500, spores × 1000 Note granules of mucilage ensheathing some of the setae and context hyphae. *Original.*

Nothofagus menziesii (Hook f.) Oerst. Auckland: Lake Waikaraeiti Track, 2,400ft, September 1950, G. H. C.; Upper Mohaka River, Kaimanawas, 2,000ft, May 1953, J. M. Dingley. Hawke's Bay: Poronui, 2,000ft, June 1953, J. M. Dingley. Wellington: Tongariro River, Kaimanawas, 2,800ft, December 1955, G. H. C.

In microfeatures our collections match an authentic Leveille specimen from Java in Kew harbarium. They differ in that pilei are not so well developed and the hymenium becomes deeply creviced when old. The species has been placed under Section II, which contains plants with a well developed intermediate tissue but are without a cortex. It is the only pileate species of this section present in the Dominion.

Plants are at first orbicular and either resupinate or sessile-umbonate with upturned margins. Soon they merge laterally to form linear areas with broad resupinate bases and narrow reflexed margins. The pileus surface is tomentose, hairs becoming compacted into tufts, and arranged in concentric zones of various shades of brown. Pilei are both concentrically and radiately sulcate, these conditions being reflected in the hymenial surface. At first bright fulvous, colour of the pileus surface changes to ferruginous with fulvous margin, and weathers to some shade of grey. Pilei are soft and papery, and may be folded without fracture. The hymenium is at first fulvous, soon becoming date-brown and in our collections fissured so deeply that the fulvous context is exposed. Crevices are often arranged in radiate areas not unlike those of some resupinate collections of *H. tabacina.* Setae are narrowly aculeate and naked, some being twisted on their axes. A few are short with rounded domed apices, similar setae being present in the Leveille specimen. Spores are abundant in many collections and broadly elliptical with one large gutta. In New Zealand collections are confined to three endemic species of *Nothofagus.*

18. **Hymenochaete rhabarbarina** (Berkeley) Cooke, Grevillea, *8,* 148, 1880. Text-fig. 19.

Corticium rhabarbarinum Berk., Fl. N.Z., *2,* 184, 1855.

Hymenophore resupinate, annual, membranous, adnate, at first developing as numerous orbicular scattered colonies 2–5 mm diameter, merging to form elongate areas to 15 x 5 cm Hymenial surface at first fulvous, or rhubarb, becoming cinnamon, even, at length irregularly areolately creviced; margin thinning out, fulvous, fibrillose, adnate. Context fulvous, 100–300μ thick, composed of loosely intertwined hyphae, without a cortex; hyphal system monomitic; generative hyphae 4–5μ diameter, walls 0.25μ thick, pallid yellow brown, freely branched at a wide angle, corymbose beneath the hymenium, septate. Setal layer confined to the subhymenium, of one or two rows with occasional scattered setae in the context; setae somewhat sparse, projecting for the greater part of their length, aculeate, 65–95 x 6–8μ, walls naked or coated with brown gelatinous granules, fragile, light reddish-brown, lumina narrow. Hymenial layer a dense palisade of basidia and paraphyses. Basidia subclavate, 14–18 x 5–6μ, 4-spored; sterigmata arcuate, slender, to 5μ long. Paraphyses subclavate, 6–9 x 4–5μ, tinted below. Spores elliptical or obovate, apiculate, 5–6 x 2.5–3μ, walls smooth, hyaline, 0.1μ thick.

TYPE LOCALITY: Otawa, New Zealand.

DISTRIBUTION: Australia, New Zealand.

HABITAT: Effused on bark of dead trunks and limbs associated with a pocket rot.

Dacrydium cupressinum Sol. Auckland: Waipoua Kauri Forest, January 1955, J. M. Dingley. Wellington: Mt. Hauhangatahi, 2,500ft, January 1954, S. D. Baker.

Dysoxylum spectabile (Forst. f.) Hook. f. Auckland: Waikaretu, 400ft, October 1946, E. E. Chamberlain; Waipoua Kauri Forest, January 1955, J. M. Dingley.

Leptospermum ericoides A. Rich. Auckland: Rereatukahia Reserve, Katikati, 300ft, October 1956, G. H. C.

Oxylobium callystachys Bentn. Auckland: Campbell's Bay, 150ft, November 1946, Mrs. E. E. Chamberlain.

Podocarpus totara Don. Auckland: Hauhangaroa Range, Taupo, 2,800ft, March 1953, J. M. Dingley; Camel's Back, Coromandel Peninsula, 1,000ft, October 1954, J. M. Dingley.

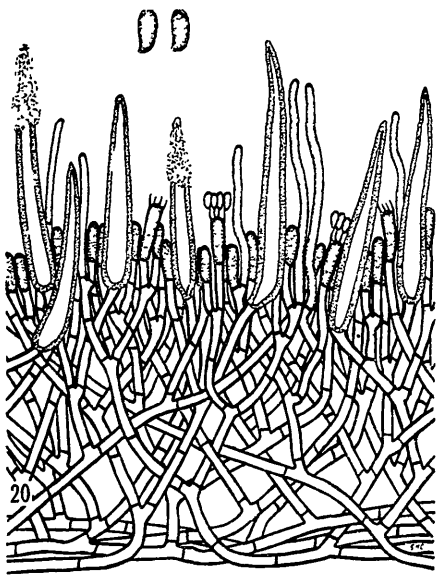
Rhipogonum scandens Forst. Auckland: Coromandel Peninsula, 1,000ft, August 1954, J. M. Dingley.

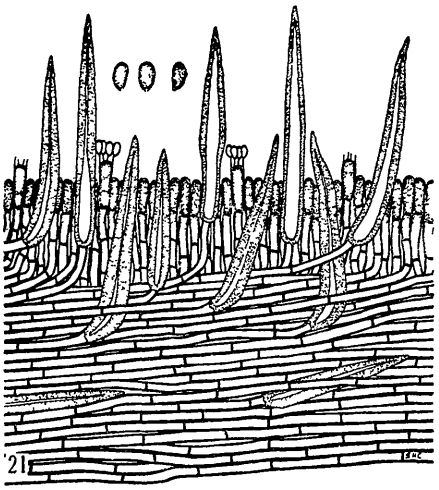
Collections match the type in Kew herbarium, ex " Colenso, N.Z." The species may be identified by the resupinate, fulvous or cinnamon fructifications, with long aculeate setae. The latter project for the greater part of their length, and are often partly coated with sheaths of gelatinous granules. Similar granules are present on occasional hyphae of the context. Context hyphae branch at a wide angle, are 4–5μ diameter with thin walls, and beneath the hymenium become almost corymbose. They resemble the hyphae of *H. cinnamomea,* from which the species may be separated by the absence of strata and paraphysate hyphae, presence of mucilage granules, different setae and spores. In old specimens setae may be arranged in two or three obscure layers. Such plants may be confused with *H. unicolor,* from which the species is separated by the different arrangement of context hyphae, different spores and presence of a well developed intermediate tissue.

19. **Hymenochaete arida** (Karsten) Saccardo, Sylloge Fungorum, *9,* 228, 1891. Text-fig. 20.

Hymenochaetella arida Karst., Bidr. Nat. och Folk, *48,* 429, 1889.
H. laxa Karst., Bidr. Nat. och Folk, *48,* 429, 1889.
Hymenochaete laxa (Karst.) Sacc., Syll. Fung., *9,* 228, 1891.

Hymenophore resupinate, annual, membranous, adnate, at first appearing as numerous orbicular colonies 2–5 mm diameter, merging to form linear areas 5–10 x 1–2 cm. Hymenial surface at first clay colour, becoming rhubarb or cinnamon, finely colliculose, not creviced; margin thinning out, concolorous or lighter, fibrillose, closely adnate. Context tan or cinnamon, 40–120μ deep, of closely intertwined mainly upright hyphae, cortex absent; hyphal system monomitic; generative hyphae irregular, 2–4μ diameter, walls 0.25μ thick, yellow brown, branched, septate. Setae in one or two vague rows arising from the subhymenium, projecting to 40μ, scattered, subulate, 35–70 x 7–9μ, walls reddish-brown, thin, sometimes partly coated with masses of brown gelatinous granules. Hymenial layer to 30μ deep, a close palisade of basidia, paraphyses and paraphysate hyphae Basidia subclavate, 12–16 x 4–4.5μ, 4-spored; sterigmata upright, slender, to 4μ long. Paraphyses subclavate, shorter and slightly narrower than the basidia. Paraphysate hyphae filiform, hyaline, sometimes branched, projecting in tufts in the vicinity of the setae, or wanting. Spores suballantoid, 5–6 x 2–2 5μ, walls smooth, hyaline, 0.1μ thick.





TEXT-FIG 20.—*Hymenochaete arida* (Karst.) Sacc. Transverse section × 500, spores × 1000. Showing filiform paraphysate hyphae and some of the setae partly enclosed in gelatinous granules. *Original*

TEXT-FIG 21.—*Hymenochaete stratura* G. H. Cunn. Transverse section × 500; spores × 1000. Showing intermediate tissue composed of parallel cemented hyphae embedding a few setae. *Original*

TYPE LOCALITY: Mustiala, Finland.

DISTRIBUTION: Northern Europe, North America, New Zealand.

HABITAT: Adnate on bark of dead branches associated with a white rot.

Coriaria arborea Linds. Auckland: Kauaeranga Valley, Thames, 200ft, June 1950, J. M. Dingley.

Crataegus oxyacantha L. Auckland: Orakei Bush, September 1948, D. W. McKenzie.

Hypericum androsaemum L. Auckland: Raglan, August 1954, S. D. Baker.

Leucopogon fasciculatus (Forst. f.) A. Rich. Auckland: Rereatukahia Reserve, Katikati, 500ft, September 1950, G. H. C.

Suttonia australis A. Rich. Auckland: Mountain Road, Waitakeres, 700ft, March 1954, J. M Dingley.

Weinmannia racemosa L f Auckland: Kauaeranga Valley, Thames, 150ft, October 1950, August 1954, J. M. Dingley; Camel's Back, Coromandel Peninsula, 1,000ft, October 1954, J. M. Dingley. Taranaki: Mt. Egmont, 3,000ft, March 1951, J. M. Dingley. Westland: Harihari, November 1954, J. M. Dingley; Weheka, 600ft, April 1955, J. M. Dingley. Otago: Ryan's Creek, Stewart Island, February 1954, J M. Dingley

Weinmannia sylvicola Sol. Auckland: Waipoua Kauri Forest, January 1955, J. M. Dingley.

Though resembling *H. rhabarbarina* somewhat closely, the species differs in the thinner hyphae of the context, differently shaped setae, and presence of filiform paraphysate hyphae. From thin forms of *H. cinnamomea,* which it resembles in surface colour and arrangement of context hyphae, it may be separated by the thinner context hyphae, absence of strata, differently shaped setae and filiform paraphysate hyphae.

H. arida may be identified by the closely adnate clay or cinnamon coloured fructifications, thin context with intertwined mainly upright hyphae, narrow setal layer with somewhat scattered setae which are subulate, small, with wide lumina and are sometimes coated with gelatinous granules. Spores apparently vary in shape and size. In our collections they are suballantoid and 5–6 x 2–2 5μ, whereas Burt (1918, 341) found them to be 6–7 x 3·5–4μ in North American specimens and allantoid, 6–7 x 2·5–3μ in a plant from Sweden.

20. Hymenochaete stratura sp. nov. Text-fig. 21.

Resupinata, annua, ceracea, fragilis, adnata. Superficies hymenii cinnamomea deinde ferruginea vel umbrina, colliculosa, rimosa; margine primo fulvo, deinde concolori, fibrilloso, laxe adjuncto et apto ad vertendum. Contextus ferrugineus, hypharum parallelarum compactarum; cortex abest Hypharum systema monomiticum. Setarum stratum 1–3 ordinibus, subulatis, nudis, 35–65 x 5–7μ, partim superimpositis, ad 35μ eminentibus. Basidia subclavata, 12–14 x 4–4.5μ, 4 sporis suballantoidibus, 3–3.5 x 2–2.5μ.

Hymenophore resupinate, annual, waxy, brittle, adnate, at first appearing as numerous scattered colonies 2–10 mm diameter, merging to form linear areas to 12 x 3 cm. Hymenial surface at first cinnamon, becoming ferruginous or umber, deeply creviced with edges lifting to expose the substratum, colliculose, velutinate; margin thinning out, fulvous, later concolorous, fibrillose, loosely attached, finally lifting and curling upwards or inwards. Context ferruginous, 70–160μ deep, composed of an intermediate tissue of parallel densely compacted cemented hyphae turning abruptly into the hymenial layer; hyphal system monomitic; generative hyphae 2.5–3μ diameter, walls 0 25–0.5μ thick, reddish-brown, sparsely branched, septate. Setal layer to 90μ deep, of 2–3 vague rows (often confined to one) of overlapping setae arising in the subhymenium, setae projecting to 35μ, subulate, often angled near the base, 35–65 x 5–7μ, walls naked, reddish-brown, lumina narrow or broad. Hymenial layer to 25μ deep, a close palisade of basidia and paraphyses, tinted below. Basidia subclavate, 12–14 x 4–4.5μ, 4-spored; sterigmata upright, slender, to 4μ long Paraphyses subclavate or cylindrical, shorter and slightly narrower than the basidia. Spores suballantoid, 3–3.5 x 2–2.5μ, walls smooth, hyaline, 0 1μ thick

DISTRIBUTION: New Zealand.

HABITAT: Effused on bark of dead branches associated with a white rot.

Podocarpus hallii Kirk. Taranaki: Dawson Falls, Mt. Egmont, 3,500ft, November 1953, J. M. Dingley, *type collection,* P.D.D. herbarium, No. 12463.

Podocarpus totara Don. Auckland: Waipoua Kauri Forest, January 1955, J. M Dingley.

Separated from other species of the section by the densely compacted, cemented, narrow parallel hyphae forming the intermediate layer, small spores and setae, and surface features. Young plants are scattered, orbicular with fulvous, fibrillose, loosely attached margins. When dry plants become brittle, margins lift and become incurved or erect, and edges of crevices curl upwards to expose the substratum. Spores are small and vary somewhat in shape; most are suballantoid, some narrowly elliptical or obovate. The taxad hosts may provide an aid to identification if later collections show the species to be confined to these.

21. **Hymenochaete lignosa** sp. nov. Pl. 2, fig. 2; Text-fig. 22.

Resupinata, perennis, stratosa, lignosa atque indurata, adnata. Superficies hymenii umbrina, nigra et ubi abrasa lucida, non rimosa; margine ad 1 cm crasso, nigro, lobato. Contextus umbrinus, ad 1 cm crassus, plurium stratorum setarum in medio hyphis erectis, basim hyphis intertextis, conglutinatis, pseudoparenchymatis; cortex abest. Hypharum systema monomiticum. Setarum strata partim superimposita, aliquot stratis hypharum contextus intertextarum definita. Setae anguste fusiformes, ad 30μ eminentes, nudae, 32–55 x 6–8μ. Basidia subclavata, 12–16 x 4–4.5μ, 4 sporis ellipticis, 4–4.5 x 2.5–3μ.

Hymenophore resupinate, perennial, stratose, woody and indurated, adnate, effused forming irregular linear areas to 10 x 4 cm. Hymenial surface even, finely floccose, umber, black and shining where rubbed, each layer tending to recede slightly, not creviced; margin dark umber, almost black, cliff-like, to 10 mm thick, often striated with parallel bands representing lateral margins of the strata, coarsely lobed. Context umber, to 10 mm thick, showing irregular parallel growth zones, brittle, hard and indurated like the stroma of a Hypoxylon, composed of many parallel layers of overlapping setae (sometimes with bands of context hyphae between) and mainly upright hyphae compacted and cemented, towards the base context hyphae cemented into a fuscous amorphous tissue; hyphal system monomitic; generative hyphae 4–5μ diameter, walls 0.5–1μ thick, golden brown, freely branched and septate. Setal layers overlapping and poorly defined, to 80μ deep, some demarked by persistent palisades of paraphyses or context hyphae; setae projecting to 30μ, narrowly fusiform, 32–55 x 6–8μ, larger in the context, walls naked, bright reddish-brown, lumina narrow. Hymenial layer a scanty palisade of basidia, paraphyses and scattered paraphysate hyphae. Basidia subclavate, 12–16 x 4–4.5μ, 4-spored, sterigmata slightly arcuate, slender, 4–5μ long. Paraphyses cylindrical or subclavate, tinted, about the same diameter but narrower than the basidia. Paraphysate hyphae slightly projecting, coloured, filiform, sometimes branched near apices. Spores elliptical with rounded ends, apiculate, 4–4.5 x 2.5–3μ, walls smooth, hyaline, 0.1μ thick.

DISTRIBUTION: New Zealand.

HABITAT: Adnate on decorticated decaying trunks; type of rot not seen.

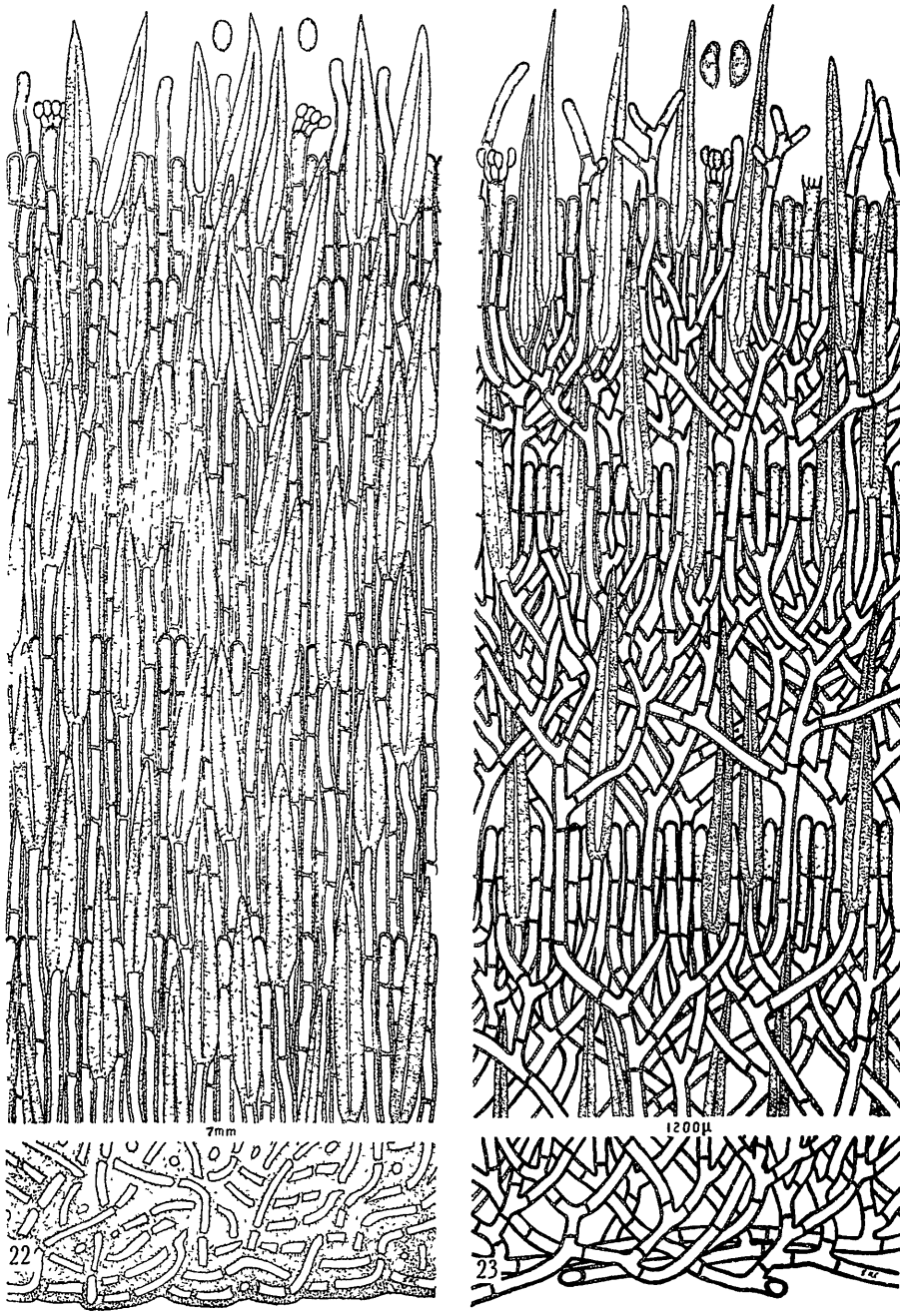
Nothofagus fusca (Hook. f.) Oerst. Nelson: Staircase Creek, Reefton, 2,000ft, December 1952, S. D. Baker, *type collection,* P.D.D. herbarium, No. 16637.

Specimens resemble in colour and external appearance stromata of certain species of *Hypoxylon*. Plants may attain a thickness of 10 mm, are woody and brittle, and break with a clean fracture, exposing parallel growth lines. Sections show them to be composed of overlapping rows of setae embedded in upright cemented hyphae, with a thick base of hyphae cemented into an amorphous tissue. The abhymenial surface is glabrous, polished where free from wood debris, and without abhymenial hairs. Strata are evident in some sections, being demarked by persistent layers of paraphyses or intertwined context hyphae; in others they may not be visible or be indicated only by darker parallel colour zones. Setae are closely arranged, usually possess narrow lumina and those projecting may become enmeshed within hyphal sheaths Only a few spores were found attached to basidia. These were elliptical with rounded ends. A few suballantoid spores were seen floating in the mountant, but none of this shape was found attached, so they may have been contaminants.

22. **Hymenochaete cinnamomea** (Persoon) Bresadola, Atti della I. R. Accademia . . . Agiati, III, *3*, 110, 1897. Text-fig. 23.

Thelephora cinnamomea Pers., Myc. Eur , *1*, 141, 1822.

Corticium cinnamomeum (Pers.) Fr., Epicrisis, 561, 1838.



TEXT-FIG 22.—*Hymenochaete lignosa* G H. Cunn Transverse section × 500, spores × 1000 *Original*

TEXT-FIG. 23.—*Hymenochaete cinnamomea* (Pers.) Bres Transverse section × 500, spores × 1000. *Original.*

Hymenophore resupinate, perennial, stratose, membranous, adnate, effused forming irregular areas 2–4 cm across. Hymenial surface cinnamon, even, delicately velutinate, not creviced; margin thinning out, concolorous, fibrillose, adnate. Context cinnamon, 1–3 mm thick, stratose, composed of numerous setal layers (3–15) with layers of loosely intertwined hyphae between and a broad intermediate tissue of intertwined hyphae at the base; hyphal system monomitic; generative hyphae 4–5μ diameter, walls 0.5–1μ thick, pallid yellow, freely branched at a wide angle, septate. Setal layers to 95μ deep, with somewhat scattered setae overlapping into each context layer; setae projecting to 50μ, acicular, 60–90 x 5–7μ, walls naked, golden brown near the surface, darker in the context, lumina narrow. Hymenial layer to 35μ deep, a close palisade of scanty basidia, abundant paraphyses and paraphysate hyphae Basidia subclavate, 16–20 x 4–5μ, 4-spored; sterigmata arcuate, slender, to 4μ long. Paraphyses cylindrical, shorter but the same diameter as the basidia, tinted. Paraphysate hyphae to 4μ diameter, most branched, tinted yellow or hyaline. Spores suballantoid, 5–6.5 x 3–3 5μ, walls smooth, hyaline, 0.1μ thick.

TYPE LOCALITY: Europe.

DISTRIBUTION: Europe, North America, New Zealand.

HABITAT: Adnate on bark or decorticated dead wood associated with a pocket rot.

Nothofagus menziesii (Hook. f.) Oerst. Otago: Alton Valley, Tuatapere, 600ft, February 1954, J. M. Dingley.

But one collection has yet been made in New Zealand. This matches authentic specimens from Europe seen in Kew herbarium, save that plants are thicker and bear more setal layers. Specific features are the cinnamon colour of the hymenial surface, rather broad hyphae branched at a wide angle, and almost corymbose beneath the subhymenium, stratose context, small suballantoid spores and absence of a cortex. Paraphysate hyphae may be abundant or scanty, but are always present, and in some sections may be seen almost covering the hymenium, giving the surface its tomentose appearance.

H. cinnamomea, H. arida and *H. rhabarbarina* are related species All are without a cortex, possess a monomitic hyphal system, a context composed of similar intertwined hyphae, and similar spores. *H. cinnamomea* differs mainly in the stratose context, branched paraphysate hyphae and much thicker context. In such stratose species as *H. cinnamomea, H. lignosa, H. tasmanica, H. vaginata* each stratum is demarked by layers of persistent paraphyses which usually stain with aniline blue These show that each layer represents a growth period, and afford a useful character by which stratose species may be separated from those bearing many rows of overlapping setae, such as *H. fusca* or *H. magnahypha.*

23. **Hymenochaete corticolor** Berkeley & Ravenel, Grevillea, *1*, 165, 1873. Text-fig. 11.

Hymenophore subpileate when umbonate-sessile, or resupinate, probably perennial, woody-coriaceous, loosely attached, forming irregular orbicular colonies 2–10 mm diameter, or merging to form linear areas 2–3 x 1–2 5 cm; when pileate the pilei reduced to thickened upper edges of specimens growing vertically, naked, black, longitudinally striate, 1–1.5 mm thick. Hymenial surface pallid ferruginous, or cinnamon, not creviced, even; margin usually abrupt, sometimes thinning out, crenate, concolorous, free. Context ferruginous, black next the substratum, 0.3–1 mm thick, composed throughout of scattered setae and numerous large crystals embedded among upright hyphae; hyphal system dimitic; skeletal hyphae 3–4μ diameter, walls to 1μ thick, golden brown, branched, septate; generative hyphae 2 5–3μ diameter, walls 0.2μ thick, hyaline, branched, septate. Setal layer occupying the entire fructification, composed of numerous overlapping rows of setae which are sometimes arranged in irregular strata; setae projecting to 60μ, subulate, 65–95 x 9–12μ, walls naked or coated with crystals, ferruginous, lumina narrow. Hymenial layer to 35μ deep, a close palisade of basidia and paraphyses Basidia subclavate, 14–22 x 3.5–4μ, 2–4-spored; sterigmata slightly arcuate, slender, to 6μ long. Paraphyses cylindrical, 2 5–3μ diameter, shorter than the basidia. Spores suballantoid, 5–6 5 x 2–2.5μ, walls smooth, hyaline, 0.1μ thick

TYPE LOCALITY: South Carolina, U.S.A.

DISTRIBUTION: North America, West Indies, New Zealand.

HABITAT: On living trunks associated with a pocket rot.

Nothofagus fusca (Hook. f.) Oerst. Otago: Routebourne Valley, 1,300ft, January 1942, G. H. C.

Our collection agrees with authentic specimens examined in Kew herbarium as to macrofeatures, size, shape and distribution of setae and spores. It differs in that it was collected on dead wood of an axe blaze on a living trunk, whereas North American specimens were taken from bark of living trunks.

The species is a difficult one to place within the key; for fructifications, though often resupinate, are not uncommonly umbonate-sessile with the upper margin (on those growing upright on standing trunks) thickened into a black glabrous pileus. The context is composed of upright hyphae embedding setae arranged in overlapping rows, though sometimes they may occur in strata; and as setae are present throughout the fructification, an intermediate tissue, present in most pileate species, is wanting. The plant therefore belongs to Section III, and has been regarded as a stratose (or perennial) species with rudimentary pilei. Scattered through the context are numerous coarse crystals; or cavities in which they were once present. Projecting setae are usually coated with crystals, and sometimes enmeshed in hyphal sheaths.

24. **Hymenochaete unicolor** Berkeley & Curtis, Journal of the Linnean Society, *10*, 355, 1868. Text-fig 24

Hymenophore resupinate, perennial, membranous, brittle, adnate, at first appearing as numerous orbicular colonies 2–15 mm across, soon merging to form linear areas to 12 x 3 cm. Hymenial surface cinnamon, deeply irregularly areolately creviced, tending to lift at edges of crevices; margin thinning out, fulvous, fibrillose, adnate. Context ferruginous, 400-650μ deep, composed of irregular rows of overlapping setae embedded in upright, closely compacted hyphae, sometimes with a narrow zone of intertwined hyphae of deeper colour in the base of the abhymenial region; hyphal system monomitic; generative hyphae 3–4μ diameter, walls 0 5μ thick, yellow brown, sparsely branched, septate. Setae scattered in irregular rows throughout the context, projecting to 35μ, subulate, 40–60 x 5–7μ, walls naked, reddish-brown, lumina narrow. Hymenial layer to 30μ deep, a close palisade of basidia, paraphyses and paraphysate hyphae. Basidia subclavate, 12–16 x 4–5μ, 4-spored; sterigmata slightly arcuate, slender, to 5μ long. Paraphyses subclavate or cylindrical, shorter and slightly narrower than the basidia. Paraphysate hyphae abundant or scanty, projecting to 25μ, filiform, hyaline. Spores elliptical, 4.5–5.5 x 3–3.5μ, walls smooth, hyaline, 0.1μ thick.

TYPE LOCALITY: Cuba.

DISTRIBUTION: West Indies, South America, New Zealand.

HABITAT: Effused on bark or decorticated dead branches, or leaf bases, associated with a pocket rot.

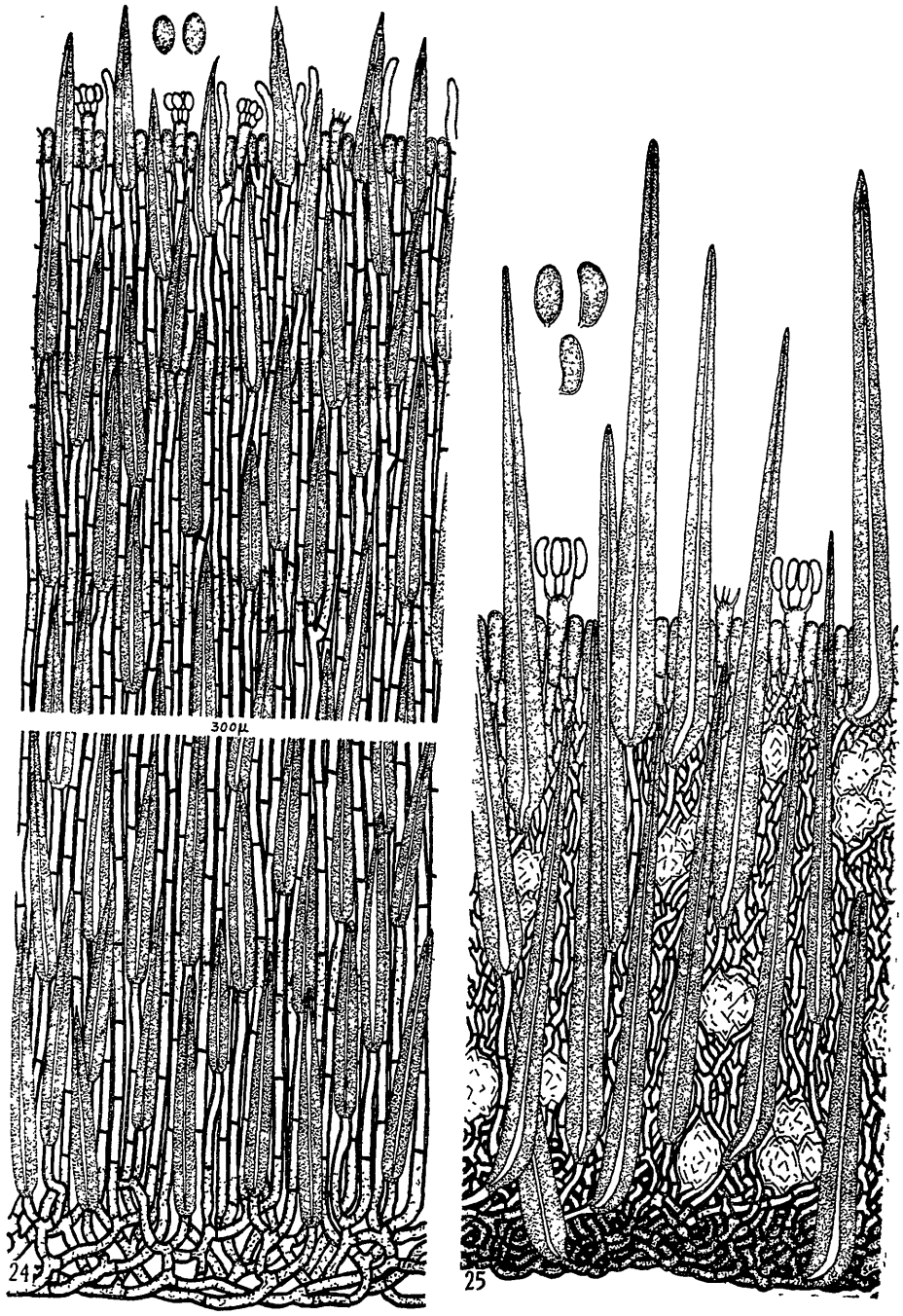
Rhopalostylis sapida (Sol.) Wendl. & Drude. Auckland: Whitianga Road, Coromandel Peninsula, 750ft, October 1954, J. M. Dingley.

In microfeatures specimens match the type collection in Kew herbarium, ex "Cuba, C. Wright, No. 541." They differ somewhat in size and colour of fructifications. The context is composed almost entirely of overlapping rows of setae embedded in compact vertical hyphae, with the abhymenial part of a narrow layer of interwoven hyphae more deeply coloured and compacted. The colour of the hymenial surface resembles that of *H. cinnamomea* and *H. rhabarbarina*. *H. unicolor* differs from these in that setae are slightly shorter, and arranged in overlapping rows with vertical hyphae between; an intermediate tissue is absent; and although stratose, layers are indicated by dark parallel lines and not by zones of intermediate tissue. Spores likewise differ in being elliptical and not suballantoid.

25. **Hymenochaete contiformis** sp. nov. Text-fig. 25.

Resupinata, annua, membranacea, adnata Superficies hymenii primo olivacea deinde brunneo-rubra, tarde rimosa; margine fulvo vel concolori, fibrilloso, adnato. Contextus ferrugineus, hypharum maxime erectarum, partim conglutinarum; cortex abest. Hypharum systema monomiticum. Setarum stratum 3–5 ordinibus, acicularibus, nudis, 95–190 x 8–12μ, partim superimpositis, ad 140μ eminentibus. Basidia subclavata, 18–24 x 5–6μ, 4 sporis suballantoidibus, 8–9 x 3.5–4.5μ.

Hymenophore resupinate, annual, membranous, adnate, at first appearing as numerous small elliptical colonies 1–2.5 cm long, merging to form effused linear areas 5–20 x 1–2.5 cm. Hymenial surface at first olivaceous, becoming reddish-brown, velutinate, tardily laterally creviced, margin thinning out, adnate, fibrillose, fulvous or concolorous. Context ferruginous, 70–130μ thick, of mainly upright hyphae becoming partly cemented and somewhat cellular



TEXT-FIG 24 —*Hymenochaete unicolor* Berk & Curt. Transverse section × 500, spores × 1000 *Original.*

TEXT-FIG 25 —*Hymenochaete contiformis* G H Cunn Transverse section × 500, spores × 1000 Showing masses of embedded crystals *Original*

when old, embedding setae and coarse irregular crystals; hyphal system monomitic; generative hyphae 2–2.5μ diameter, walls 0.5μ thick, golden yellow, branched, septate. Setal layer at first confined to a single row arising from the abhymenial zone, in older plants composed of 3–5 overlapping irregular rows; setae projecting to 140μ, acicular, 95–190 x 8–12μ, walls naked, reddish-brown, sometimes embedded in hyphal sheaths, lumina narrow. Hymenial layer to 30μ deep, a close palisade of basidia and paraphyses. Basidia subclavate, 18–24 x 5–6μ, 4-spored; sterigmata arcuate, slender, to 7μ long. Paraphyses subclavate, shorter and narrower than the basidia Spores suballantoid, 8–9 x 3.5–5μ, walls smooth, hyaline, 0.1μ thick.

DISTRIBUTION: New Zealand

HABITAT: Effused on bark of dead branches associated with a pocket rot.

Brachyglottis repanda Forst. Auckland: Clevedon, 150ft, August 1949, J. M. Dingley.

Leptospermum ericoides A. Rich. Auckland: Great King Island, Three Kings, January 1952, E. E. Chamberlain; same locality, December 1955, P. J. Brook.

Leptospermum scoparium Forst. Auckland: Rereatukahia Reserve, Katikati, 300ft, September 1954, G. H. C., *type collection*, P.D.D. herbarium, No. 16604.

Myrtus pedunculata Hook f. Auckland: Woodhill, 100ft, July 1953, J. M. Dingley.

Separated from other species placed under Section III by the large setae and spores. At first fructifications consist of a thin cemented layer lying upon the substratum. From this the setae arise; at first in a single row, in older plants setae are arranged in several overlapping rows embedded in intertwined hyphae. The hymenial surface of young plants is olivaceous with a narrow fulvous border; in older specimens, because of the projecting setae it becomes velutinate and reddish-brown with a reddish tinge. Spores vary in form, even in the same collection. They may be elliptical or suballantoid, and in diameter range from 3·5μ to 4·5μ, though fairly constant as to length.

26. **Hymenochaete fusca** (Karsten) Saccardo, Sylloge Fungorum, *14*, 218, 1900. Text-fig. 26.

Hymenochaetella fusca Karst., Hedwigia, *35*, 174, 1896.

Hymenochaete fuliginosa Bres., Ann. Myc, *1*, 93, 1903; non *H. fuliginosa* (Pers.) Lev., sensu Berk.

Hymenophore resupinate, annual, membranous, adnate, at first appearing as numerous scattered orbicular colonies 3–10 mm diameter, merging to form effused linear areas 4–7 x 1 5–2 cm. Hymenial surface sepia, umber, or reddish-brown, colliculose, at length deeply irregularly creviced, margin thinning out, crenate, chestnut-brown when young, becoming concolorous. Context sepia or fuliginous in section, 150–250μ deep, composed of numerous rows of overlapping setae embedded in erect hyphae, with a delicate layer of intertwined hyphae on the abhymenial surface, sometimes suppressed; hyphal system dimitic; skeletal hyphae 3–3.5μ diameter, walls 0.5μ thick, yellow brown, sparsely branched, septate; generative hyphae 2–2.5μ diameter, walls 0.1μ thick, hyaline, branched, septate Setae projecting to 50μ, subulate with acute apices, 65–90 x 7–9μ, walls naked, reddish-brown, lumina narrow. Hymenial layer to 35μ deep, a close palisade of basidia and paraphyses. Basidia subclavate, 14–18 x 3.5–4μ, 4-spored; sterigmata slightly arcuate, slender, to 5μ long. Paraphyses subclavate, same diameter but shorter than the basidia. Spores oval or obovate, a few laterally apiculate, 5–6.5 x 3.5–4μ, walls smooth, hyaline, 0 1μ thick.

TYPE LOCALITY: Sweden.

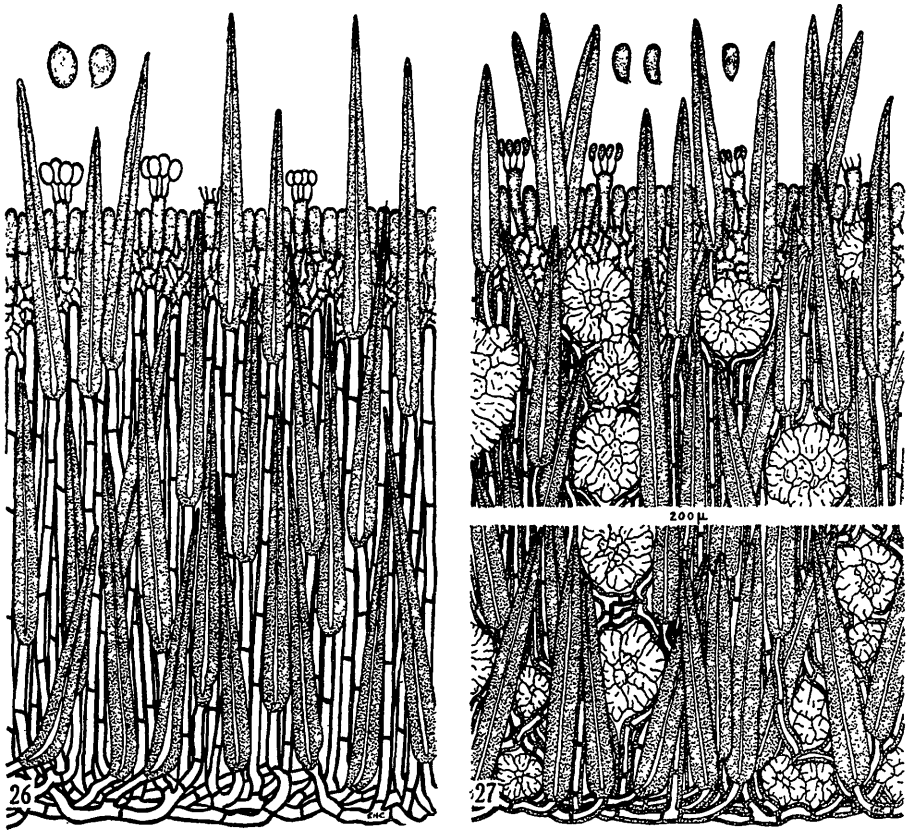
DISTRIBUTION: Europe, North America, West Indies, New Zealand.

HABITAT: Effused on decorticated wood of trunks associated with a white rot.

Podocarpus hallii Kirk. Taranaki: Mt. Egmont, 2,700ft, February 1952, G. H. C. Wellington· Mt. Hauhangatahi, 3,000ft, February 1952, G. H. C.

In shape, size and arrangement of setae, size and shape of spores and colour of the hymenial surface the species resembles *H. rubiginosa*. It differs in that fructifications are completely resupinate, and cortex and intermediate tissues are absent. The species may be recognized by the acute, naked setae arranged in a setal layer occupying the entire context, oval or obovate spores, usually small orbicular colonies with dark hymenial surface.

Collections agree with a specimen examined in Kew herbarium ex "Tyrol, V. Litschauer". This was filed under *H. fuliginosa* (Lev.) Bres., a name also used by



TEXT-FIG. 26.—*Hymenochaete fusca* (Karst.) Sacc. Transverse section × 500; spores × 1000 *Original.*
TEXT-FIG. 27.—*Hymenochaete dissimilis* G. H. Cunn. Transverse section × 500; spores × 1000 Showing masses of embedded crystals. *Original.*

Burt (1918, 365), but untenable since it is pre-occupied by *H. fuliginosa* (Pers.) Lev. which, according to Bresadola, is a different plant. Burt suggested that the correct name for this species is *H. fusca,* since he found Swedish specimens to agree with *H. fuliginosa* (Lev.) Bres.

27. **Hymenochaete dissimilis** sp. nov. Pl. 3, fig. 3; Text-fig. 27.

Resupinata, perennis, membranacea vel lignosa, adnata. Superficies hymenii sepiacea, badia vel nigra, rimosa; margine abrupto, adnato, concolori. Contextus sepiaceus multarum setarum in ordinibus partim superimpositis, in hyphis erectis mature pseudoparenchymatis inclusis. Hypharum systema dimiticum. Setae subulatae, ad 40μ eminentes, nudae vel subtiliter verruculosae, 50–75 x 7–9μ. Basidia subclavate, 16–20 x 4–4.5μ, 4 sporis suballantoidibus, 4–5.5 x 2.5–3μ.

Hymenophore resupinate, perennial, membranous-woody, adnate, following closely the irregularities of the substratum, effused forming irregular linear areas 3–15 x 3–5 cm. Hymenial surface sepia, chocolate or black when old, velutinate, deeply irregularly creviced; margin abrupt, often cliff-like, adnate, concolorous. Context sepia, 300–750μ thick, composed of masses of setae arranged in overlapping rows, embedded in upright hyphae, pseudoparenchymatous when old and containing numerous groups of coarse crystals, abhymenial area reduced to a delicate cemented zone lying upon the substratum; hyphal system dimitic; skeletal hyphae 3–4μ diameter, walls 1μ thick, golden brown, freely branched, septate; generative hyphae 2–2.5μ diameter, walls 0.25μ thick, hyaline, branched, septate. Setae projecting to 40μ, subulate, 50–75 x 7–9μ, walls naked or finely verruculose, reddish-brown, lumina narrow. Hymenial layer to 30μ deep, a dense palisade of basidia and paraphyses. Basidia subclavate, 16–20 x 4–4.5μ, 4-spored; sterigmata arcuate, slender, to 6μ long. Paraphyses subclavate, shorter and slightly narrower than the basidia. Spores suballantoid, 4–5.5 x 2.5–3μ, walls smooth, hyaline, 0.1μ thick.

DISTRIBUTION: New Zealand.

HABITAT: Effused on bark or decorticated dead wood of branches and trunks, associated with a pocket rot.

Beilschmiedia tawa (A. Cunn.) Hook. f. & Benth. Auckland: Huia, 100ft, November 1945, G. H. C.

Leptospermum ericoides A. Rich. Auckland: Rereatukahia Reserve, Katikati, 300ft, October 1956, G. H. C.

Leptospermum scoparium Forst Auckland: Huia, 200ft, January 1954, E. E. Chamberlain.

Metrosideros excelsa Sol. ex Gaertn. Auckland: Rangitoto Island, July 1950, J. M. Dingley.

Metrosideros robusta A. Cunn. Auckland: Lake Okataina, 1,500ft, September 1954, G. H. C.

Nothofagus fusca (Hook. f.) Oerst. Westland: Totara Flats, Granville Forest, April 1955, J. M. Dingley.

Nothofagus menziesii (Hook. f.) Oerst Otago: Alton Valley, Tuatapere, 400ft, February 1954, J. M. Dingley.

Nothofagus truncata (Col.) Ckn. Auckland: Lake Waikaraeiti track, 2,800ft, September 1950, G. H. C., *type collection,* P.D.D. herbarium, No. 7644.

Specific features are the coffee-coloured or chocolate surface, thick context composed entirely of numerous overlapping rows of setae and masses of crystals embedded in upright hyphae cemented to form a pseudoparenchyma; suballantoid somewhat small spores and absence of a cortex and intermediate tissue. The species shows a general resemblance to *H. unicolor,* and produces a similar pocket rot; it differs in surface colour, setal arrangement, suballantoid spores, presence of masses of crystals and absence of definite strata. In a few collections some setae of the hymenial layer are grouped in small fascicles of 2–5; in other collections this feature is absent, so is not of diagnostic value. Setae vary in length in different collections, in some being almost as short as those of *H. vallata,* in others exceeding slightly the dimensions for those of typical plants. Plants growing horizontally upon the sides of trunks become thickened on the upper margin, simulating specimens of slightly reflexed species. Their margins are glabrous and black, and in sections show the typical thick setal layer, so are evidently accidental growth conditions.

28. **Hymenochaete magnahypha** sp. nov. Text-fig. 28.

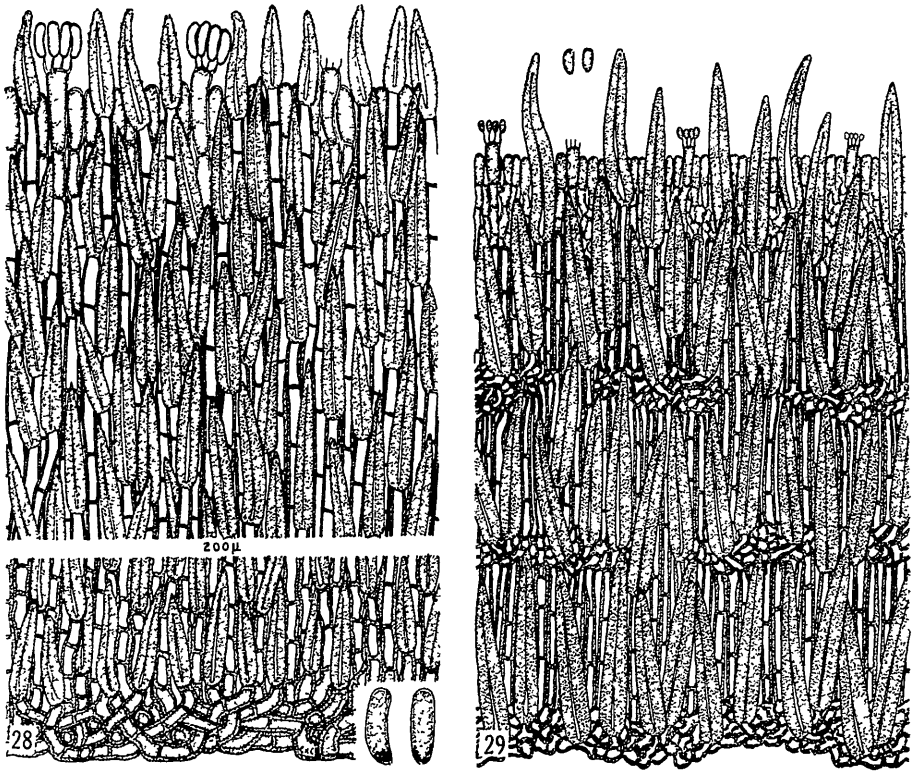
Resupinata, perennis, membranacea, fragilis, adnata. Superficies hymenii badia, rimosa; margine badia, crenato, adnato. Contextus badius, ordinibus setarum partim superimpositis, in hyphis erectis inclusis. Hypharum systema monomiticum. Setae subulatae, ad 20μ eminentes, crasse verruculosae, 24–40 x 5–7μ. Basidia subclavata vel cylindricalia, 20–24 x 5–6μ, 4 sporis allantoidibus, 8–9 x 3–3.5μ

Hymenophore resupinate, perennial, brittle, membranous, adnate, effused forming linear areas to 25 x 3 cm. Hymenial surface chocolate with a grey bloom, even, at length deeply irregularly creviced; margin thinning out, chocolate, crenate, closely adnate. Context chocolate, to 500μ deep, composed of many rows of overlapping setae embedded in scanty upright cemented hyphae, with a delicate zone of compact hyphae lying upon the substratum; hyphal system monomitic; generative hyphae to 5μ diameter, walls 1μ thick, dingy brown, or fuscus, sparsely branched, freely and closely septate. Setae arranged in many overlapping rows, projecting to 20μ, subulate, 24–40 x 5–7μ, walls coarsely verruculose, ferruginous, lumina narrow. Hymenial layer to 30μ deep, a scanty palisade of basidia and paraphyses. Basidia subclavate or cylindrical, 20–24 x 5–6μ, 4-spored; sterigmata arcuate, slender, to 5μ long. Paraphyses cylindrical, shorter and narrower than the basidia. Spores allantoid, apiculate, 8–9 x 3–3.5μ, walls hyaline, smooth, 0.1μ thick.

DISTRIBUTION: New Zealand.

HABITAT: Effused on bark of dead branches associated with a white rot.

Coprosma australis (A. Rich.) Robinson. Auckland: House Creek, Little Barrier Island, November 1947, J. M. Dingley, *type collection,* P.D.D. herbarium, No. 5916; Cow's Creek, Little Barrier Island, November 1947, J M. Dingley.



TEXT-FIG. 28.—*Hymenochaete magnahypha* G. H. Cunn. Transverse section × 500, spores × 1000. *Original.*
TEXT-FIG. 29.—*Hymenochaete vallata* G. H. Cunn. Transverse section × 500, spores × 1000. *Original.*

Specific features are the crowded small setae occupying the thickness of the context, large-diameter thick-walled cemented hyphae, and large allantoid spores. Basidia collapse as soon as spores are shed so are difficult to find save in growing margins. Immature setae of young plants are hyaline, thin-walled, naked and simulate gloeocystidia even to the contents. The surface colour is exactly the shade of weathered chocolate which has developed a greyish bloom. The species most closely resembles *H. vallata* in surface features, differing in the smaller setae, larger basidia and large spores.

29. **Hymenochaete vallata** sp. nov. Text-fig. 29.

Resupinata, annua vel biennalis, membranacea, adnata. Superficies hymenii olivacea deinde sepiacea vel badia, colliculosa, rimosa, margine fulvo vel concolori, fibrilloso, adnato. Contextus sepiaceus, ordinibus setarum partim superimpositis, in hyphis erectis inclusis. Hypharum systema dimiticum. Setae subulatae, ad 25μ eminentes, subtiliter verruculosae, 30–60 x 6–8μ. Basidia subcylindricalia, 12–18 x 4–4.5μ, 4 sporis suballantoidibus, 3.5–4 x 1.5–2μ.

Hymenophore resupinate, annual or biennial, membranous, adnate, effused forming linear areas 5–25 x 1–2.5 cm, following closely the contours of the substratum. Hymenial surface at first olivaceous, soon sepia or chocolate, colliculose, velutinate, at length deeply areolately creviced; margin thinning out, fulvous or concolorous, fibrillose, adnate. Context sepia, 100–260μ thick, composed of numerous overlapping irregular rows of setae, sometimes arranged in strata with cemented compacted parallel hyphae between, embedded in upright hyphae, arising from a narrow basal, cemented, intertwined zone; hyphal system dimitic; skeletal hyphae 2.5–3μ diameter, walls 1μ thick, yellow brown, sparsely branched, septate; generative hyphae 2–2.5μ diameter, walls 0.2μ thick, hyaline, branched, septate. Setae projecting to 25μ, subulate, crowded, 30–60 x 6–8μ, walls reddish-brown, finely verruculose on apices, with narrow lumina. Hymenial layer a dense palisade of basidia and paraphyses. Basidia subcylindrical, 12–18

x 4–4.5μ, 4-spored; sterigmata erect, slender, to 5μ long. Paraphyses cylindrical, shorter and narrower than the basidia. Spores suballantoid, 3.5–4 x 1.5–2μ, walls smooth, hyaline, 0.1μ thick.

DISTRIBUTION: New Zealand.

HABITAT: Effused on bark and decorticated dead branches associated with a white rot.

Beilschmiedia tawa (A. Cunn.) Hook. f. & Benth. Auckland: Awhitu Central, Awhitu Peninsula, 300ft, April 1946, G. H. C.; Huia, 100ft, January 1954, E. E. Chamberlain.

Coprosma arborea Kirk. Auckland: Papatoetoe Flat, 50ft, August 1947, J. M. Dingley; Cascade Kauri Park, Waitakeres, 700ft, September 1948, J. M. Dingley; Scenic Drive, Waitakeres, 900ft, June 1949, J. M. Dingley; Atkinson Park, Titirangi, 900ft, June 1953, J. M. Dingley; Huia, October 1953, February 1954, J. M. Dingley; Wilson's Point, Coromandel Peninsula, August 1954, J. M. Dingley, *type collection,* P.D.D. herbarium, No. 16529; Titirangi, coast, September 1956, S. D. Brook.

Hedycarya arborea Forst. Auckland: Glen Esk Valley, 500ft, May 1951, J. M. Dingley.

Leptospermum scoparium Forst. Auckland: Upper Mohaka River, Kaimanawas, 2,000ft, May 1953, J. M. Dingley; Kawakawa, Bay of Islands, January 1954, J. M. Dingley.

Pittosporum tenuifolium Banks & Sol. Auckland: Glen Esk Valley, Piha, 500ft, May 1951, J. M. Dingley.

Weinmannia racemosa L.f. Auckland: Rereatukahia Reserve, Katikati, 500ft, October 1955, G. H. C.

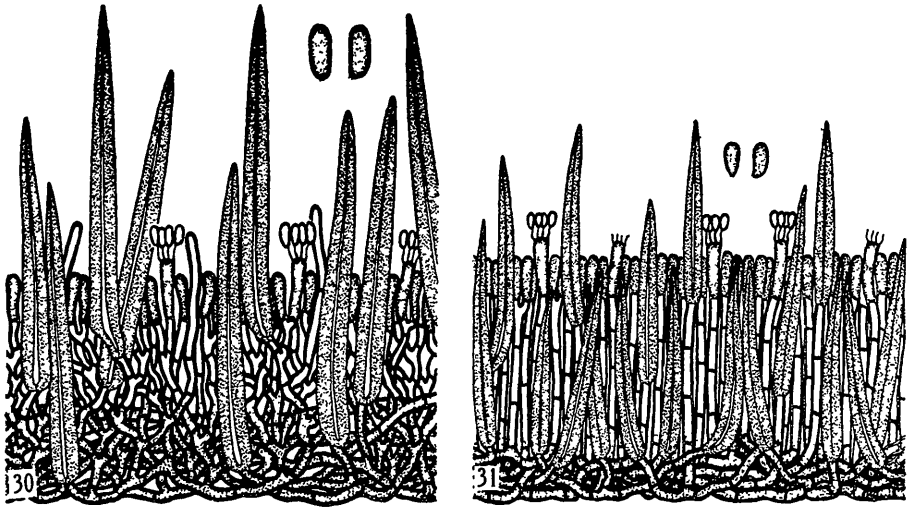
Characters of the species are the small setae crowded into overlapping rows occupying the entire context, suballantoid small spores, small cylindrical basidia, and effused adnate fructifications with sepia or chocolate colliculose surface. At first fructifications are olivaceous with fulvous margins; they soon change to sepia or chocolate with concolorous margins. Finally plants become deeply areolately creviced, and may peel away in segments from the substratum. Sometimes a second stratum develops upon a preceding season's fructification. Setae are usually arranged in overlapping rows embedded in scanty erect hyphae. Sometimes definite strata are visible, each setal layer then arising from an interrupted zone of compacted, intertwined and cemented hyphae. Spores are small, suballantoid and basidia slender and almost cylindrical.

Most closely resembling *H. magnahyphae,* the species may be separated by the dimitic hyphal system, much smaller spores and basidia, narrower hyphae and larger setae.

30. **Hymenochaete innexa** sp. nov. Text-fig. 30.

Resupinata, annua, membranacea, adnata. Superficies hymenii ferruginea, deinde umbrina vel brunneo-rubra, non rimosa; margine badio vel hinnuleo, fibrilloso, adnato. Contextus ferrugineus, 2–3 ordinibus setarum partim superimpositis, hyphis intertextis in medio. Hypharum systema monomiticium Setae subulatae, ad 65μ eminentes, nudae, 55–80 x 8–10μ. Basidia subclavatis, 14–18 x 3.5–4μ, 4 sporis ellipticis, 5.5–7 x 2.5–3μ.

Hymenophore resupinate, annual, membranous, adnate, at first developing as numerous small orbicular colonies 2–5 mm across, merging to form linear areas to 8 x 3 cm. Hymenial surface ferruginous, becoming umber or reddish-brown, velutinate, not creviced, margin thinning out, bay or fawn, fibrillose, adnate. Context ferruginous, together with the hymenium 50–100μ thick, a narrow zone of intertwined partly cemented hyphae embedding the setae; hyphal system monomitic; generative hyphae 2.5–3μ diameter, walls 0.5μ thick, golden brown, branched, septate. Setal layer occupying most of the fructification, composed of 2–3 overlapping rows of setae which arise from the subhymenium and context, project to 65μ, are subulate, 55–80 x 8–10μ, with walls naked, reddish-brown, lumina narrow. Hymenial layer to 25μ deep, a close palisade of basidia, paraphyses and paraphysate hyphae. Basidia subclavate, 14–18 x 3.5–4μ, 4-spored; sterigmata arcuate, slender, to 5μ long. Paraphyses clavate, same diameter but shorter than the basidia. Paraphysate hyphae brown, filiform, to 3μ diameter. Spores elliptical, apiculate, 5.5–7 x 2.5–3μ, walls smooth, hyaline, 0.1μ thick.



TEXT-FIG. 30.—*Hymenochaete innexa* G H. Cunn. Transverse section × 500; spores × 1000 *Original*
TEXT-FIG. 31.—*Hymenochaete minuscula* G. H Cunn. Transverse section × 500, spores × 1000. *Original.*

DISTRIBUTION: New Zealand.

HABITAT: Effused on bark of dead branches associated with a white rot.

Fuchsia excorticata L.f. Otago: Morrison's Creek, Dunedin, 500ft, June 1952, G. T. S. Baylis.

Griselinia littoralis Raoul. Hawke's Bay: Ahimanawa Range, 2,500ft, November 1955, J. M. Dingley.

Griselinia lucida Forst. f. Wellington: Mt. Hauhangatahi, 3,000ft, February 1952, G. H. C., *type collection,* P.D.D. herbarium, No. 16627.

There are few outstanding features separating the species from others of this section. The hymenial surface is ferruginous, becoming umber or reddish-brown because of projecting setae, and tardily or not creviced. The context is composed of 2–3 overlapping rows of setae embedded in intertwined, partly cemented hyphae. Setae project to 65μ, are naked, fairly broad for their length, and associated with coloured paraphysate hyphae. Spores are elliptical and vary somewhat in size; in one collection they are 7 x 3μ, in a second 6 x 2·5μ. The fungus produces a soft white rot in the host tissues. It has the largest setae of the four related species *H. innexa, H. minuscula, H. corrugata* and *H. separata.* The interwoven hyphae free from crystals separates it from *H. minuscula* and *H. separata;* and narrower setae and different spores separate it from *H. corrugata.*

31. **Hymenochaete minuscula** sp. nov. Text-fig. 31.

Resupinata, annua, membranacea, adnata. Superficies hymenii pallide olivacea, fusca vel flavide umbrina, colliculosa, rimosa; margine concolori, fibrilloso, adnato. Contextus ferrugineus, 1–3 ordinibus setarum partim superimpositis, hyphis erectis in medio. Hypharum systema monomiticum. Setae subulatae, ad 35μ eminentes, nudae, 40–65 x 6–8μ. Basidia subclavata, 12–16 x 3.5–4μ, 4 sporis suballantoidibus, 4–5 x 1.5–2μ.

Hymenophore resupinate, annual, membranous, adnate, following surfaces of the host closely, at first appearing as numerous irregular colonies 1–3 cm across, merging to form linear areas to 13 x 3 cm. Hymenial surface pallid olivaceous, olivaceous-fuscus, or umber with a yellow tinge, colliculose, finely areolately creviced; margin thinning out, concolorous, delicately fibrillose, adnate. Context ferruginous, 50–80μ thick, composed of 2–3 overlapping rows of setae embedded in upright hyphae; hyphal system monomitic; generative hyphae 2.5–3μ diameter, walls 0.25μ thick, reddish-brown, branched, septate. Setal layer composed of 1–3 overlapping rows of setae arising from the subhymenium and basal zone; setae projecting to 35μ, subulate, 40–65 x 6–8μ, walls naked, reddish-brown, lumina narrow. Hymenial layer to 25μ deep, a close palisade of basidia and paraphyses. Basidia subclavate, 12–16 x 3 5–4μ, 4-spored; sterigmata slightly arcuate, slender, to 4μ long. Paraphyses subclavate, slightly shorter

and the same diameter as the basidia. Spores suballantoid, apiculate, 4–5 x 1.5–2μ, walls smooth, hyaline, 0.1μ thick.

DISTRIBUTION: New Zealand.

HABITAT: Effused on bark of dead branches associated with a pocket rot.

Leptospermum ericoides A. Rich. Auckland: North-east King Island, Three Kings, December 1955, P. J. Brook.

Leptospermum scoparium Forst. Auckland: Orakei Bush, September 1948, D. W. McKenzie.

Metrosideros excelsa Sol. ex Gaertn. Auckland: White's Stream, Piha, January 1951, J. M. Dingley, *type collection,* P.D.D. herbarium, No. 11242; same locality, January 1953, J M. Dingley.

Metrosideros tomentosa A. Rich. Auckland: One Tree Hill, October 1955, S. D. Baker.

From the other three species of this section *H. minuscula* may be separated by the colour of the strongly colliculose, minutely creviced hymenial surface, thin context, small setae and spores. The surface to the eye appears pallid olivaceous or yellowish-brown; under a dissecting microscope it appears umber, velutinate with the small setae, and coated with yellow granules. The context is scanty and in old specimens contains masses of crystals, though these are wanting in the type and other well developed specimens. Setae are small, naked, acute and sometimes bear delicate lateral projections 0·5μ in length. Spores are suballantoid with prominent apiculi. The species resembles *H. multisetae* Burt in several particulars, differing in the larger setae and differently coloured, strongly colliculose hymenial surface.

32. **Hymenochaete corrugata** (Fries) Leveille, Annales des Sciences Naturelles, III, *5,* 152, 1846. Text-fig. 32.

Thelephora corrugata Fr. (Obs. Myc , *1,* 154, 1815) ex Pers , Myc. Eur , *1,* 134, 1822.
Corticium corrugatum Fr., Epicrisis, 565, 1838.
Hymenochaete insularis Berk., Grev., *1,* 165, 1873.

Hymenophore resupinate, annual, membranous, adnate, at first appearing as scattered orbicular colonies 2–10 mm across, merging to form linear areas to 25 x 3 cm. Hymenial surface cinnamon or umber, sometimes reddish-brown, colliculose, often rugulose, becoming deeply, finely areolately creviced; margin thinning out, concolorous or white, tan, or bay-brown, fibrillose, adnate. Context ferruginous, 90–150μ thick, composed of intertwined hyphae often compacted and cemented, embedding the setae; hyphal system monomitic; generative hyphae 2 5–3μ diameter, walls 0.5–1μ thick, golden brown, branched, septate Setal layer occupying the entire context, of several overlapping rows; setae projecting to 35μ, subulate, sometimes geniculated or distorted, 45–75 x 10–18μ, walls reddish-brown, apices verruculose, lumina usually wide and occasionally exhibiting false septa. Hymenial layer to 30μ deep, a close palisade of basidia and paraphyses. Basidia subclavate, 12–16 x 3.5–4μ, 2–4-spored; sterigmata slightly arcuate, slender, to 4μ long. Paraphyses subclavate, shorter and slightly narrower than the basidia. Spores allantoid, 3–4.5 x 1–1.5μ, walls smooth, hyaline, 0.1μ thick

TYPE LOCALITY: Europe.

DISTRIBUTION: Europe, Great Britain, North America, New Zealand.

HABITAT: Effused on bark of dead branches associated with a white rot.

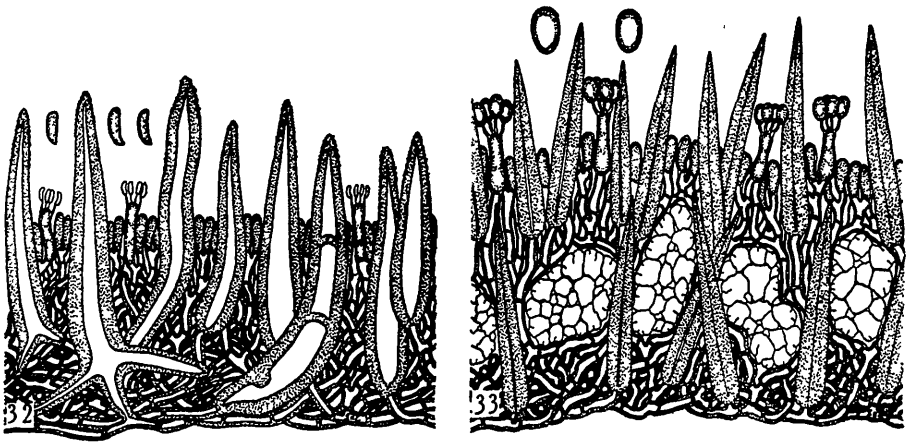
Aristotelia serrata (Forst. f) Oliver Auckland: Lake Waikaraemoana, 2,600ft, November 1955, J. M. Dingley.

Nothofagus menziesii (Hook. f) Oerst. Otago: Alton Valley, Tuatapere, 400ft, February 1954, J. M. Dingley.

Pittosporum tenuifolium Banks & Sol. Auckland: Kauri Glen, Northcote, August 1951, J M Dingley.

Weinmannia racemosa L f. Taranaki: Mt. Egmont, 2,800ft, February 1952, G. H. C.; Dawson Falls, Mt Egmont, 2,600ft, January 1953, J. M. Dingley. Wellington: Ohakune Track, Mt. Ruapehu, 2,500ft, December 1953, J. M. Dingley.

Collections agree with authentic European specimens examined in Kew herbarium. The species may be separated from others of this section by the areolately creviced often rugulose surface, stout often distorted or radicate setae verruculose on their apices and sometimes exhibiting false septa in the lumina. Spores are allantoid and small, our collections agreeing in this feature with European specimens,



TEXT-FIG. 32.—*Hymenochaete corrugata* (Fr.) Lev. Transverse section × 500; spores × 1000. Note occasional bridging septa and radicate bases of the setae. *Original*
TEXT-FIG. 33.—*Hymenochaete separata* G. H. Cunn Transverse section × 500; spores × 1000. Note masses of crystals almost separating the hymenial layer from its base. *Original.*

but smaller than measurements given by Burt (1918, 359) for North American material. The surface ranges in colour from dusky cinnamon to umber or reddish-brown; and may be colliculose or, when examined under a lens, finely rugulose as well as velutinate with the stout setae. The latter vary appreciably in shape and size; of those buried in the context some may be geniculated, inserted laterally, or strongly radicate. A few exhibit one or more false septa, accidental bridges across the wide lumina.

33. **Hymenochaete separata** sp. nov. Text-fig. 33.

Resupinata, annua, membranacea, fragilis, adnata. Superficies hymenii obscurate umbrina, colliculosa, rimosa; margine concolori, fibrilloso, adnato. Contextus ferrugineus, 2 ordinibus setarum hyphis erectis et multis crassis crystallis. Setae subulate, ad 30μ eminentes, nudae, 35–55 x 6–8μ. Basidia cucurbitiformis, aliquot clavata, 12–16 x 4–4.5μ, 2–4 sporis ovalibus vel late ellipticis, 6–7 x 3.5–4μ.

Hymenophore resupinate, annual, membranous, fragile, adnate, appearing as irregular linear areas 2–10 x 1–2.5 cm. Hymenial surface dull umber, colliculose, deeply areolately creviced, tending to lift at margins of crevices; margin thinning out, concolorous, fibrillose, adnate. Context ferruginous, together with the hymenial layer 60–80μ deep, consisting of a reddish-brown cemented zone lying upon the substratum and bearing scattered upright hyphae embedding masses of crystals; hyphal system monomitic; generative hyphae 2 5–3μ diameter, walls 0 5μ thick, branched, septate Setal layer occupying the whole fructification, arranged in two rows, the upper arising from the subhymenium, the lower from the basal zone; setae projecting to 30μ, subulate with acute apices, 35–55 x 6–8μ, walls naked, reddish-brown, lumina narrow. Hymenial layer to 30μ deep, a close palisade of basidia and paraphyses. Basidia cucurbitiform, a few clavate, 12–16 x 4–4.5μ, 2–4-spored; sterigmata arcuate, rather stout, to 4μ long. Paraphyses subclavate, about half the length and the same diameter as the basidia. Spores oval or broadly elliptical, 6–7 x 3.5–4μ, walls smooth, hyaline, 0 2μ thick

DISTRIBUTION: New Zealand.

HABITAT: Effused on bark of dead stems associated with a white rot.

Geniostoma ligustrifolium A. Cunn. Auckland: Te Araroa, 600ft, May 1952, G. H. C., *type collection,* P.D.D. herbarium, No. 11499.

Leptospermum scoparium Forst. Auckland: Great King Island, Three Kings. 900ft, January 1952, E. E. Chamberlain; Moturoa Island, Bay of Islands, 100ft, May 1956, J. D. Atkinson.

Separated from others of this section by the large oval or elliptical spores, small naked setae, narrow context and masses of embedded crystals. The hymenial surface is dingy umber and, as the margin is concolorous, colonies are difficult to see upon dead bark. Spores are broadly elliptical or oval, abundant, and possess one large gutta,

Crystals are so abundant as to appear in an almost continuous seam lying between the hymenial layer and the cemented basal zone. Between them lie a few upright hyphae which are sometimes difficult to detect.

EXCLUDED SPECIES

1. *agathicola, Hymenochaete* P. Henn. Engl. Bot. Jahrb., *18,* 24, 1894. Recorded upon *Agathis australis* from Auckland, N.Z. It was based on a collection of *Lopharia vinosa* (Berk.) G. H. Cunn.

2. *archeri, Hymenochaete* (Berk.) Cke. = *Stereum illudens* Berk.

3. *kalchbrenneri, Hymenochaete* Mass. The type, together with collections "N.Z. b. 570", "N.Z. 1866, b. 521" are filed in Kew herbarium. All are collections of *Lopharia vinosa.*

4. *phaea, Hymenochaete* (Berk.) Cke. The type in Kew herbarium, ex "Bay of Islands, J. D. Hooker", also "N.Z., Sinclair" and "N.Z., Colenso" and "N.Z., Waimea, 338" filed on one sheet are collections of *H. villosa.*

5. *rheicolor, Hymenochaete* (Mont.) Lev. Under the cover of *H. rhabarbarina* at Kew is a collection "N.Z., Colenso, b. 391" which on the type sheet Bresadola had referred to *H. rheicolor.* It is a specimen of *H. plurimaesetae* G. H. Cunn.

6. *sphaericola, Hymenochaete* Lloyd. The type ex "J. Mitchell, N.Z." as the description and illustration show, was based on a specimen of *H. mougeotii.*

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