# BRITISH FUNGUS-FLORA.

*** *As it has been found impossible to complete this Work conveniently in the three volumes originally contemplated, the subject will be concluded in a Supplementary Volume, which will be issued shortly.*

# BRITISH

# FUNGUS-FLORA.

## A CLASSIFIED TEXT-BOOK OF MYCOLOGY.

BY

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AUTHOR OF "PLANT LIFE," "THE PLANT WORLD," ETC.

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# FUNGUS-FLORA.

## LACTARIUS. Fries. (figs. 2, 3, p. 301, vol. ii.)

Pileus rather rigid, fleshy, becoming more or less depressed, often marked with concentric zones; gills decurrent or adnate, unequal, often branched, rather rigid, exuding a white or coloured milk when bruised; stem stout, central or very rarely excentric, its substance continuous with that of the pileus; spores subglobose, minutely echinulate, white, or sometimes with a very faint tinge of yellow.

*Lactarius*, Fries, Epicr., p. 333; Cke., Hdbk., p. 305.

The presence of white or coloured milk which flows in drops from the pileus, and especially the gills, when wounded, is the most important generic character, and is the only one separating the present genus from *Russula*.

Every part of the fungus contains numerous anastomosing laticiferous cells filled with a densely granular liquid latex—or *milk* as termed by systematists—which escapes in drops when the tissue is broken. The latex is, in the majority of species, persistently white; in a few species the latex is white at first, and gradually changes to some other colour when exposed to the air; in a still smaller number of species, the latex is coloured before escaping from the cells. In some species the latex is tasteless, or *mild;* in others again it is intensely acrid or peppery, even when only a very small quantity is applied to the tongue. These peculiarities of colour and taste of the latex are of specific importance, and require to be noted.

## *ANALYSIS OF THE SPECIES.*

*Subgen.* I. Piperites.

Stem central. Gills unchangeable, not pruinose nor becoming discoloured. Milk white at first (usually) acrid.

* *Tricholomoidei.* Pileus moist, viscid, margin incurved and downy at first.

** *Limacini.* Pileus moist, viscid, with a pellicle; margin naked.

*** *Piperati.* Pileus without a pellicle, hence absolutely dry, often more or loss downy or unpolished.

*Subgen.* II. Dapetes.

Stem central. Gills naked; milk coloured from the first.

*Subgen.* III. Russularia.

Stem central. Gills pallid, then discoloured, at length dark, becoming powdered with the white spores. Milk white at first, mild, or mild at first then becoming acrid.

* *Viscidi.* Pileus viscid at first.

** *Impoliti.* Pileus squamulose, downy, or pruinose.

*** *Glabrati.* Pileus polished, glabrous.

*Subgen.* IV. Pleuropus.

Stem excentric or lateral. Growing on trunks.

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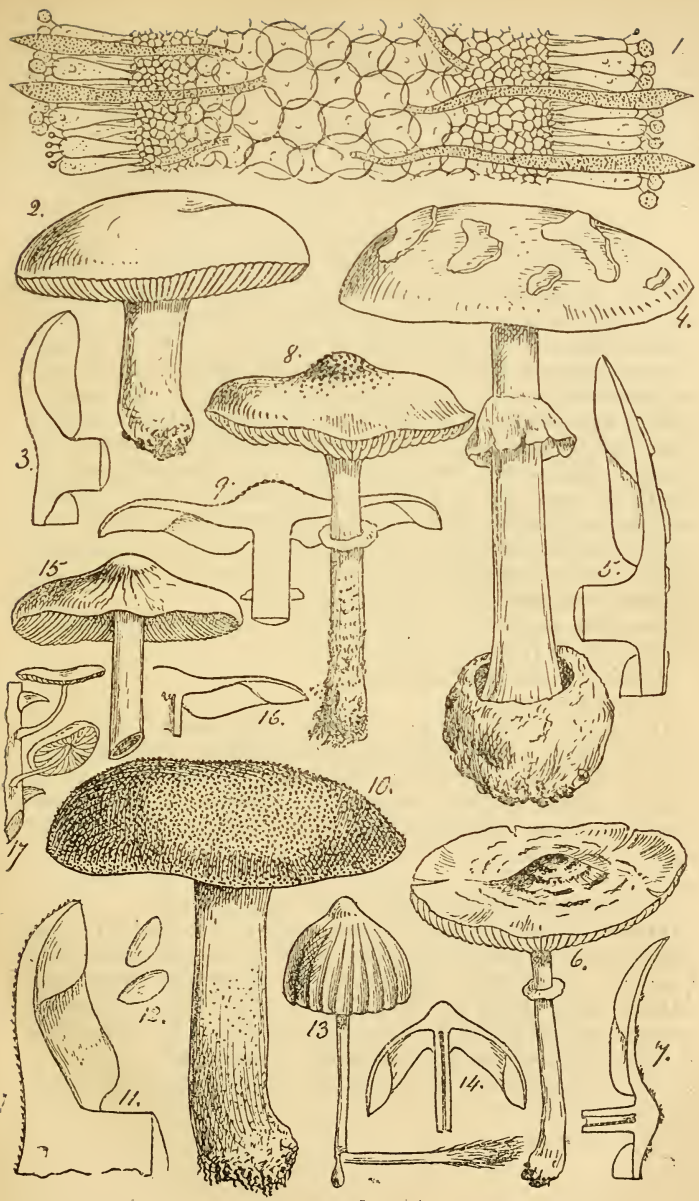
FIGURES ILLUSTRATING THE *LEUCOSPORAE.*

Fig. 1, *Russula ochroleuca*, section through the thickness of a gill, showing the vesicular trama consisting of large spherical cells; also the laticiferous vessels containing a densely granular substance, and projecting beyond the surface of the basidia forming the hymenium; × 400;—Fig. 2, *Russula lutea*, a small specimen; nat. size;—Fig. 3, section of same; nat. size;—Fig. 4, *Amanita mappa;* about half nat. size;—Fig. 5, section of same; half nat. size;—Fig. 6, *Lepiota crestata;* nat. size;—Fig. 7, section of same; nat. size;—Fig. 8, *Armillaria ramentacea;* half nat. size;—Fig. 9, section of same; half nat. size;—Fig. 10, *Tricholoma rutilans*, half nat. size;—Fig. 11, section of same; half nat. size;—Fig. 12, spores of same; × 400;—Fig. 13, *Mycena leucogala;* half nat. size;—Fig. 14, section of same; half nat. size;—Fig. 15, *Collybia butyracea*, about one-third nat. size;—Fig. 16, section of same; half nat. size;—Fig. 17, *Collybia ramealis;* nat. size.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## I. PIPERITES.

### * *Tricholomoidei.*

**Lactarius (Piper.) scrobiculatus.** Scop.

Pileus 4–8 in. across, flesh thick but not firm, whitish, usually becoming yellowish when broken; at first convex and umbilicate, then infundibuliform, obtuse, very viscid when moist, with agglutinated down, yellow, becoming pale in sunny places, usually without zones, but sometimes very conspicuously zoned; margin incurved, fringed with shaggy fibrils, expanding with age and becoming almost naked; gills slightly decurrent, thin, crowded, whitish; stem stout, often stuffed when young, but becoming distinctly hollow, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, up to 1 in. and more thick, equal, yellow, with large roundish depressions, glabrous, rather viscid, base downy; milk copious, at first white, becoming sulphur-yellow when exposed to the air, very acrid; spores subglobose, very minutely echinulate, 7–8 $\mu$.

*Lactarius scrobiculatus*, Fries, Epicr., p. 334; Cke., Hdbk., p. 305; Cke., Illustr., pl. 971.

*Agaricus scrobiculatus*, Scopoli.

In damp woods.

Distinguished by the yellow colour of pileus and stem, and by the white milk becoming sulphur-colour when exposed to the air. Fries says that the pileus is sometimes 12 in. across. When growing in very wet places the flesh sometimes becomes bluish-purple when broken. Very acrid, smell not unpleasant.

**Lactarius (Piper.) intermedius.** Krombh.

Pileus 4–6 in. across, fleshy, broadly infundibuliform, viscid, smooth, ochraceous, margin involute, tomentose then smooth; gills broad lurid-whitish, somewhat decurrent, entire; stem $1\frac{1}{2}$–2 in. long, up to 1 in. thick, yellowish, covered with spot-like depressions, solid, or sometimes hollow; milk white then yellowish, rather acrid,

*Lactarius intermedius*, Krombholz, t. 58, figs. 11–13; Cke., Hdbk., p. 305.

In woods.

Referred by Fries to *L. cilicioides*, from which it differs more especially in the pitted stem. Differs from *L. scrobiculatus* in the infundibuliform pileus.

British specimens agree with Krombholz's plant, except that when fresh and dried they are more or less zoned, as in *L. insulsus*. (B. & Br.)

**Lactarius (Piper.) torminosus.** Schaeff.

Pileus 3–4 in. across, even, viscid when moist, rather fragile, obtuse, depressed, slightly zoned, margin strongly involute for some time, shaggy with whitish fibrils, pale flesh-colour, with often a tinge of ochre; flesh pallid; milk white, acrid, not changing colour; gills slightly decurrent, 1–1½ line broad, very thin and crowded, unequal but rarely connected by branches, paler in colour than the pileus; stem up to 3½ in. long, ¾–1 in. thick, slightly adpressedly tomentose or almost glabrous, even or obsoletely scrobiculate, dry, equal or attenuated downwards, stuffed soon hollow, like the pileus in colour or paler; spores echinulate, 9–10 × 7–8 μ.

*Agaricus torminosus*, Schaeffer, t. 12.

*Lactarius torminosus*, Cke., Hdbk., p. 305; Cke., Illustr., pl. 972.

Among grass, heather, &c.

Inodorous, acrid, pale flesh-colour; gills paler. Pileus not unfrequently pallid ochraceous, also at times entirely white and tomentose. (Fries.)

Allied to *L. cilicioides* in the strongly incurved, bearded margin of the pileus, but known by the slightly zoned pileus and persistently white milk.

Pileus 2–5 in. broad, smooth or nearly so, except the involute margin, which is most copiously shaggy, depressed, more or less zoned, of a beautiful ochre or (sometimes) strawberry colour, at first viscid. Milk white, very acrid, not changeable. Gills rather narrow, nearly of the same colour as the pileus, but yellower and paler, slightly forked. Stem 1½–2 in. long, ½ in. thick, sometimes shining, obtuse, paler than the pileus, at length hollow, clothed with a minute depressed down. Very acrid, but the Russians preserve it in salt, and eat it seasoned with oil and vinegar. (Berk.)

**Lactarius (Piper.) cilicioides.** Fr.

Pileus 2–4 in. across, convex then expanded and the centre depressed, every part tomentose, viscid, not zoned, pale flesh-colour with a fuscous tinge, margin involute, fibrillose and woolly; flesh yellowish-white, milk acrid, white or with a tinge of yellow eventually; gills decurrent, crowded, branched, yellowish-white; stem firm, stuffed, usually more or less hollow with age, equal, 2–3 in. long, 1 in. thick, even, pruinosely-silky under a lens, pallid, not roughened nor spotted; spores minutely echinulate, 8 × 6–7 $\mu$.

*Lactarius cilicioides*, Fries, Epicr., p. 334; Cke., Hdbk., p. 306; Cke., Illustr., pl. 973.

In woods, pastures, &c.

Intermediate between *L. torminosus* and *L. turpis*. Stem dingy, not pure in colour like *L. torminosus*. (Fries.)

Pileus 2–4 in. broad, depressed, margin rounded, involute, reddish-buff sometimes glutinous, very downy, becoming fibrillose at the margin. Gills yellowish, irregular and often branching, apparently decurrent from the expansion of the stipes into the substance of the pileus. Flesh yellowish-white, darker towards the surface. Stem about 2 in. high, nearly 1 in. thick, dingy white, yellow or brown. There is no juice, but a considerable moisture on the surface of the pileus which seems to originate from the plant. (Grev.)

**Lactarius (Russ.) lateritioroseus.** Karst.

Pileus up to 3½ in. broad, convex with an umbilicus, soon depressed, often at length somewhat infundibuliform and wavy, often unequal, zoneless or rarely slightly zoned, flesh up to 4 lines thick, becoming very thin towards the margin, dry, becoming broken up at the disc into minute, granule-like squamules, scales larger towards the margin, and disappearing eventually, flesh-colour or brick-red with a rosy tinge, becoming pale; gills decurrent, rather distant, thin, up to 3 lines broad, often furcate and connected by veins, becoming yellowish; stem up to 3 in. long and ⅔ in. thick, stuffed, sometimes becoming hollow at the base; unequal, incrassated at the base, curved or flexuous, rarely straight, very slightly flocculose, colour of the pileus or paler; spores subglobose, echinulate, uniguttulate, white, 8–9 × 6–8 $\mu$; milk acrid, white.

*Lactarius lateritioroseus*, Karsten, Medd. ad Soc. pro Fauna et Flora Fenn., 1888–91, p. 15, and description emended, l.c., p. 20.

In woods.

**Lactarius (Piper.) turpis.** Fr.

Pileus 3–7 in. across, fleshy, rigid, convex then expanded, disciform or umbilicate then depressed, innately downy at the margin only or all over, covered with a tenacious olive gluten, zoneless, sometimes with a tawny tinge near the margin, at length more or less umber; margin for a long time involute, downy at first, yellowish-olive, then more or less expanded, at length often densely rivulosely sulcate; flesh compact, white, unchangeable; gills adnato-decurrent, thin, 1–2 lines broad, much crowded, forked, pale straw-colour, spotted with brown when bruised; stem $1\frac{1}{2}$–3 in. long, $\frac{1}{2}$–1 in. thick, even or rough and unequal, but not spotted, viscid or dry, pallid or dark olive, apex pale whitish-ochre, solid, hard; spores minutely spinulose, 6–8 $\mu$ diameter.

*Lactarius turpis*, Fries, Epicr., p. 335; Cke., Hdbk., p. 306; Cke., Illustr., pl. 987.

In woods.

*R. blennius* somewhat resembles the present species, but differs in the concentrically spotted pileus; stuffed then hollow stem, and white gills.

Gregarious. Distinguished by the olive tone of pileus and stem. Fries says that this species sometimes measures 1 foot across; flesh compact and rigid. The habit is almost that of *Paxillus involutus*. Stem sometimes hollow, and the pileus sometimes slightly zoned.

*Var.* **plumbeus**, Cke., Hdbk., p. 306.

*Agaricus plumbeus*, Bull., Champ., t. 282, and 559, f 2.

*Agaricus Listeri*, Sow., t. 245,

Pileus compact, convex, at length infundibuliform, dry, unpolished, dingy, then blackish-brown; stem solid, equal, blunt; gills crowded, white then yellowish; milk acrid, white, unchangeable.

In woods.

**Lactarius (Piper.) controversus.** Pers.

Pileus 3–5 in. across, fleshy, firm, rigid, at first convex

broadly umbilicate, when adult, somewhat infundibuliform, oblique, emerging from the ground, dry, flocculose, whitish, then after rain glabrous, viscid, reddish, and with red zones and spots, especially near the margin; margin acute when young, strongly involute, more or less downy; flesh very firm, milk white, acrid, not changing colour; gills decurrent, thin, closely crowded, 1–2 lines broad, short ones numerous, rarely branched, white with a pallid flesh-coloured tinge; stem solid, stout, 1 in. thick and long, sometimes quite 2 in. long, and evidently attenuated from the base, often excentric, even, but mealy at the apex; and from the decurrent teeth of the gills, appearing striate, entirely white, never scrobiculate; spores rough, globose, 6–8 $\mu$ diameter.

*Lactarius controversus*, Pers., Syn., p. 430; Fries, Epicr., p. 335; Cke., Hdbk., p. 306; Cke., Illustr., pl. 1003.

In woods, pastures, &c.

Smell weak but pleasant, taste very acrid.

**Lactarius (Piper.) pubescens.** Fr.

Pileus 2–3 in. across, almost plane, centre depressed, then broadly infundibuliform, zoneless, even, dry, disc almost glabrous, shining, white tinged flesh-colour; margin involute, fibrilloso-pubescent; flesh firm but thin, tough, white, or with a flesh-coloured tinge near the margin, unchangeable; milk white, unchangeable, not copious, very acrid; gills adnate or slightly decurrent, crowded, narrower than thickness of flesh of pileus, pallid, slightly tinted flesh-colour; stem stuffed, soft inside, short, about $\frac{1}{2}$ in. thick at the apex, attenuated downwards, and sometimes compressed, even (not scrobiculate), usually minutely downy when young, then becoming glabrous, pale flesh-colour then whitish; spores globose, rough, 7–8 $\mu$.

*Lactarius pubescens*, Fries, Epicr., p, 335; Cke., Hdbk., p. 306; Cke., Illustr., pl. 974.

In grassy places.

Allied to *L. controversus*, but much smaller and more slender; inodorous, taste very acrid. (Fries.)

Somewhat resembling *L. torminosus* and *L. cilicioides*, but differing from both in being altogether smaller and more slender, and in the margin not being shaggy but only fibrillosely downy.

**Lactarius (Piper.) aspideus.** Fr.

Acrid; every part dingy straw-colour, stem and gills paler than the pileus; giving out everywhere when broken, white milk that becomes lilac. Pileus 2–4 in. across, flesh whitish, rather thin, loose; plano-convex, unequal, somewhat papillate then rather depressed, even, viscid, zoneless; gills adnate, subdecurrent, rather crowded, about 1 line broad, very unequal, connected by branches; stem almost equal, stuffed then hollow, 2–3 in. long, up to $\frac{1}{2}$ in. thick, even, glabrous, dry; spores globose, rough, 8–10 $\mu$ diameter.

*Lactarius aspideus*, Fries, Epicr., p. 336; Cke., Hdbk., p. 307; Cke., Illustr., pl. 1083.

In damp meadows, &c.

Distinguished from all other species by the presence of a white, tomentose, deciduous silky zone near the margin of the pilleus; when this disappears the margin is very glabrous. *L. uvidus* also has milk that turns lilac, but differs in the broad gills and obsoletely zoned pileus.

** *Limacini.*

**Lactarius (Piper.) utilis.** Weinm.

Pileus 5–8 in. across, flesh thick; convex then plane, obtuse, at length infundibuliform, humid but dry in fine weather, glabrous, even, often cracked at maturity, tan-colour; gills adnate, crowded, 4–5 lines broad, pallid; stem 2–3 in. long, 1 in. thick, fragile, even, coloured like the pileus, hollow; milk persistently white, somewhat acrid.

*Lactarius utilis*, Weinmann, Hym. Ross., p. 43; Cke., Hdbk., p. 307; Cke., Illustr., pl. 1084.

In woods.

In the specimen found for the first time in Britain the pileus was pale, and rather a dirty ochre, the stem darker, and longitudinally striate, but otherwise in accord with the description. (Cooke.)

**Lactarius (Piper.) insulsus.** Fr.

Pileus 3–4 in. across, fleshy, and not very compact, flesh pallid, indistinctly zoned under the cuticle; deeply umbilicate, at length infundibuliform, rigid, zoned, especially near the margin, glabrous, yellowish brick-red, the viscid

pellicle separating; margin naked; stem stuffed when young, hollow when old, often short and attenuated below, 1½ in. long, up to 1 in. thick, rarely drawn out to 3 in. and then equal, more slender, glabrous, even or rarely scrobiculately spotted; gills decurrent, closely crowded, forked at the base, 1 line or little more in breadth, whitish then pallid; sphores subglobose, rough, pallid, 10 × 8 $\mu$ diameter.

*Lactarius insulsus*, Fries, Epicr., p. 336; Cke., Hdbk., p. 307; Cke., Illustr., pl. 975.

In pastures, &c.

Resembling *L. deliciosus* in size and habit, but distinguished by the paler colour; white, unchangeable, acrid milk, and absence of red colour in the flesh at every age. From *L. zonalis*, to which the present species is closely allied, it is distinguished by the solid, yellowish stem.

**Lactarius (Piper.) zonarius.** Fr.

Pileus 2–4 in. across, flesh rather thick, white; convex then flattened, depressed, sometimes deeply umbilicate; margin naked, for a long time involute, glabrous and even at first, pellicle closely adnate, viscid, pale orange or pinkish-yellow, often prettily zoned towards the margin, at length—commencing at the margin—minutely rugulosely flocculose; gills slightly rounded behind and adnately decurrent, arcuate, thin, narrow, scarcely 1 line broad, thin, rather crowded, branched, whitish, at length dingy yellow, becoming sordid or somewhat greenish when bruised; stem 2–3 in. long, ½–1 in. thick, equal or attenuated at the base, even, glabrous, dry, white then yellowish, not spotted, paler above, solid, firm, elastic; milk white, unchangeable, acrid; spores, 9–10 × 8 $\mu$.

*Lactarius zonarius*, Fries, Epicr., p. 336; Cke., Hdbk., p. 307.

Among grass, &c.

Stem sometimes hollow; pileus sometimes wavy, glabrous, and zoneless. (Fries.)

**Lactarius (Piper.) blennius.** Fr. (figs. 2, 3, p. 301, vol. ii.)

Pileus 3–5 in. across, flesh thick, firm; soon expanded and more or less depressed, glutinous, dingy greenish-grey, often more or less zoned with drop-like markings; margin at first

incurved and downy; gills slightly decurrent, crowded, narrow, whitish or with an ochraceous tinge; stem 1–2 in. long, up to 1 in. thick at the apex, where it expands into the thick flesh of the pileus, often attenuated at the base, viscid, coloured like the stem or paler, soon hollow; milk persistently white, very acrid; spores subglobose, 7–8 × 6 $\mu$.

*Lactarius blennius*, Fries, Epicr., p. 337; Cke., Hdbk., p. 308; Cke., Illustr., pl. 988.

In woods, on the ground, very rarely on trunks.

*L. turpis* somewhat resembles the present species, but differs in the darker olive-brown pileus and the yellow down on the incurved margin, especially when young.

Pileus 2–4 in. broad, fleshy, rarely subzonate, convex, the margin generally involute and adpresso-tomentose (quite smooth, Fr.); at length more or less depressed, dull cinereous green, at first viscid; more or less pitted. Milk white, not changeable. Gills rather narrow, pale ochraceous, scarcely forked, not connected by veins. Stem 1 in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. thick, paler than the pileus, attenuated downwards, obtuse, smooth, at length hollow, sometimes pitted, Very acrid. (Berk.)

**Lactarius (Piper.) hysginus.** Fr.

Pileus 3–4 in. across, flesh white, rigid, rather thin, flattened, umbilicate, margin thin, incurved, even, viscid, reddish flesh-colour or brownish-red, zoneless or slightly zoned, often shining; gills very slightly decurrent, thin, crowded, 1–2 lines broad, white then yellowish-ochre, but not pruinose; stem 2–4 in. long, $\frac{3}{4}$–1 in. thick, glabrous, roughened with small points or somewhat spotted, stuffed then hollow, often inflated and constricted at the apex; milk acrid, white, unchangeable; spores verruculose, 10 × 7–8 $\mu$.

*Lactarius hysginus*, Fries, Epicr., p. 337; Cke., Hdbk., p. 308; Cke., Illustr., pl. 989.

Among grass in woods, &c.

Rigidly fragile, fleshy-red, pileus rather slender, somewhat wavy; milk white, unchangeable, taste acrid. (Fries.)

**Lactarius (Piper.) trivialis.** Fr.

Pileus 4–8 in. across, fleshy, rigid and fragile, convex, soon depressed, at length infundibuliform, margin at first

involute then expanded, the pellicle at the margin becoming considerably inflexed; even, glabrous, viscid, at first dark lurid, then becoming pale, pale yellowish or pinky-tan, not zoned; flesh equal, rather rigid, white; gills subdecurrent, crowded, whitish, then pallid; stem stout 1–6 in. long, up to 1 in. or even more thick, usually inflated and hollow, but shorter and firmer in dry localities, even, glabrous, slimy, not spotted, paler than the pileus; milk acrid, white, unchangeable; spores 9–10 $\mu$ diameter.

*Lactarius trivialis*, Fries, Epicr., p. 337; Cke., Hdbk., p. 308; Cke., Illustr., pl. 976.

In damp mossy places in pine woods.

**Lactarius (Piper.) circellatus.** Fr.

Pileus 2–4 in. across, flesh compact, rather thick. white; convex and umbilicate at first, then flattened and the centre depressed, usually wavy when old, even, glabrous, very viscid and rufous-brown when moist, variegated with darker zones, becoming pale; gills adnate with a somewhat decurrent tooth, very thin and crowded, narrow, often forked, whitish then with a yellowish tinge, horizontal (not arcuate); stem $1\frac{1}{2}$–2 in. long, $\frac{1}{2}$ in. and more thick, equal or attenuated at the base, and often ascending, even, glabrous, pallid, solid; milk white, unchangeable, very acrid; spores subglobose, echinulate, 7–8 $\mu$.

*Latarius circellatus*, Fries, Epicr., p. 338; Cke., Hdbk., p. 308; Cke., Illustr., pl. 990.

In woods.

Stem usually short, firm. Pileus brownish or rufescent, becoming pale; flesh white but rather dark under the separable pellicle. Gills horizontal, at length somewhat coloured, but the milk unchangeable. Care is required in distinguishing between this and *L. flexuosus* and *L. pyrogalus*. (Fries.)

**Lactarius (Piper.) uvidus.** Fr.

Pileus $1\frac{1}{2}$–3 in. across, flesh rather thick; convex and sometimes slightly umbonate or gibbous, then depressed, not zoned, viscid, dingy pale ochraceous-tan; margin naked, involute at first; gills very slightly decurrent, thin, crowded, white, becoming lilac when bruised; stem 2–3 in. long, 4–8 lines thick, soon hollow, viscid, pallid; milk mild at first,

slowly becoming acrid; white, changing to lilac; spores globose, 10 $\mu$ diameter.

*Lactarius uvidus*, Fries, Epicr., p. 338; Cke., Illustr., pl. 991; Cke., Hdbk., p. 308.

In woods.

Distinguished at once by the milk changing from white to a distinct lilac colour when exposed to the air.

Pileus 2–2½ in. broad, fleshy, depressed, sometimes obsoletely zoned, viscid, pale dirty rufescent or cinereous with a shade of lilac, speckled with small watery spots, which originate beneath the epidermis. Gills paler, adnato-decurrent, the shorter ones very obtuse and truncate behind, connected by veins. Milk white, acrid. Stem 2 in. high, ⅓ in. thick, spongy, at length hollow, marked with little longitudinal pits, strigose at the base, the whole plant when cut white turning to a beautiful lilac. It is not, however, the milk which changes colour, on exposure to air, but the flesh itself. (Berk.)

Soft and fragile, somewhat insipid then slowly becoming acrid; smell weak. Milk white, usually changing to a lilac colour when exposed, rarely remaining white or changing to a dingy tan-colour. Pileus sometimes obsoletely zoned, indistinctly pellucidly striate when old; gills sometimes becoming yellowish. (Fries.)

### *** *Piperati.*

**Lactarius (Piper.) flexuosus.** Fr.

Pileus 3–5 in. across, fleshy; convex then expanded and depressed, somewhat wavy, margin at first, and for a long time incurved, at length patent, erect, at first almost glabrous and somewhat shining then becoming minutely broken up into squamules, opaque, lead or violet-grey, becoming pale, zoned or zoneless; flesh hard, white; gills adnate, somewhat horizontal, 1–1½ line broad, connected by branches, distant, thick, tinged yellowish, then becoming tinged with flesh-colour; stem 2–3 in. long, 1 in. and more thick above, stout or equally attenuated towards the base, not unfrequently excentric, and often lacunose, pallid grey, base tinged yellow, apex whitish; solid; milk very acrid, white, unchangeable; spores echinulate, 6–8 $\mu$ diameter.

*Lactarius flexuosus*, Fries, Epicr., p. 338; Cke., Hdbk., p. 309; Cke., Illustr., pl. 992.

In woods.

*Var.* roseozonatus, Fries, Hym. Eur., p. 427.

Pileus entirely rose-colour, and marked with darker zones.

In woods.

This variety has not yet been recorded for Britain.

**Lactarius (Piper.) pyrogalus.** Bull.

Pileus 2–3 in. across, flesh thickish, white; soon expanded and more or less depressed, glabrous, even, slightly zoned, rather moist, livid grey; gills slightly decurrent, thin, rather distant, ochraceous; stem about $1\frac{1}{2}$ in. long, up to $\frac{1}{2}$ in. thick, attenuated at the base, pallid, stuffed then hollow; milk white, unchangeable, very hot and acrid; spores globose, echinulate, 7–10 $\mu$.

*Lactarius pyrogalus*, Cke., Hdbk., p. 309; Cke., Illustr., pl. 993.

*Agaricus pyrogalus*, Bulliard, Champ. France, t. 529, f. 1.

In woods, pastures, &c.

Pileus sometimes brown. Fries mentions a form resembling *L. fuliginosus*, pileus clay-colour, not zoned, gills yellow.

Allied to *L. flexuosus*, but smaller, more slender, pileus grey, at length becoming dingy yellowish; milk abundant, white, very acrid. The stem is sometimes excentric, and in shady places the pileus is pallid and somewhat zoned. (Fries.)

**Lactarius (Piper.) squalidus.** Krombh.

Pileus 1–2 in. across, rather fleshy at the disc, margin thin, white, with scattered yellowish spots near the margin; convex then almost plane, umbilicate, dry, glabrous, not at all zoned, very pale greyish-olive or lurid; gills adnate or very slightly decurrent, not 1 line broad, white then pale yellow; stem about 2 in. long, 2–3 lines thick, equal, glabrous, pale brown, especially downwards, solid, firm; milk whitish, mild, spores echinulate, 6–10 $\mu$.

*Lactarius squalidus*, Krombh., t. 40, f. 23–25; Cke., Hdbk., p. 309; Cke., Illustr., pl. 1004A.

Among moss, &c.; in damp woods.

About the size of *L. pyrogalus*, but differs in the narrow yellow gills and mild milk.

**Lactarius (Piper.) capsicum.** Schulz.

Pileus 1½–3 in. across, flesh thick, firm, with a yellow tinge, and changing to pale brown when cut; convex, obtuse or slightly gibbous, dry, even, deep chestnut-colour; margin strongly incurved; gills slightly decurrent, about 1 line broad, rather crowded, pale tawny with a golden tinge; stem about 2 in. long, ½ in. thick or more, whitish, striate with tawny or rufous fibrils, solid, firm; milk white, acrid; spores globose, 6 $\mu$ diameter.

*Lactarius capsicum*, Schulzer in Fries, Hym. Eur., p. 428; Cke., Hdbk., p. 309; Cke., Illustr., pl. 977.

On the ground under birches, &c.

Readily distinguished by the deep chestnut-coloured pileus and the flesh becoming brownish when broken.

**Lactarius (Piper.) chrysorrheus.** Fr.

Pileus about 2 in. across, flesh thick at the centre, becoming thin towards the margin, firm, white, tinged yellow when broken; umbilicate then depressed or infundibuliform, pale yellowish flesh-colour, ornamented with darker indistinct zones or spots; gills decurrent, thin, crowded, dingy yellowish; stem about 1½ in. long, and ¼ in. thick, equal, even, white, stuffed then hollow; milk very acrid, white then golden-yellow; spores 6–7 $\mu$ diameter.

*Lactarius chrysorrheus*, Fries, Epicr., p. 342; Cke., Illustr., pl. 984; Cke., Hdbk., p. 310.

In woods.

Distinguished among the species having yellow milk by the deep golden-yellow colour of the milk, which in all others is pale primrose yellow, and the pale yellow pink or apricot-coloured pileus.

**Lactarius (Piper.) acris.** Fr.

Pileus about 3 in. across, flesh rather thick, firm, white, irregular, often excentric, or one side emarginate, at first convex then plane, at length obliquely infundibuliform, more moist than viscid, scarcely zoned, but usually spotted, sooty-grey, darker or paler; gills slightly decurrent, thin, rather

crowded, somewhat divided behind, pallid at first, then pinkish-yellow; stem 1½–2 in. long, 1 in. and more thick, attenuated downwards, often obliquely ascending or curved, pallid, becoming fragile, stuffed then hollow; milk acrid, white, soon becoming reddish; spores subglobose, echinulate, 8–9 × 6–8 μ.

*Lactarius acris*, Fries, Epicr., p. 342; Cke., Hdbk., p. 310; Cke., Illustr., pl. 1005.

In woods.

Stinking; acrid, milk white then reddish; spores 6 μ diameter. (Cooke.)

**Lactarius (Piper.) umbrinus.** Pers.

Pileus 2–3 in. across, fleshy, firm, not thick, convex then plane, the centre becoming slightly depressed, often wavy and excentric, absolutely dry, flocculoso-rivulose, more or less intense olivaceous-umber, paler and yellowish when old; flesh firm, white; milk white, acrid, forming grey spots when it has escaped; gills slightly decurrent, thin, crowded, forked behind, 1 line or a little more in breadth, pallid, dingy yellowish; stem solid, compact, stout, up to 1 in. long, about ½ in. thick, attenuated upwards, even, colour of the pileus or paler, apex white; spores globose, rough, 8 μ diam.

*Lactarius umbrinus*, Pers., Syn., p. 435; Fries, Epicr., p. 339; Cke., Hdbk., p. 310; Cke., Illustr., pl 1006.

In pine woods, &c.

Compact, but the pileus not thick, often flexuous, sometimes becoming pale. Stem scarcely 1 in. long; gills somewhat decurrent, forked behind. (Fries.)

**Lactarius (Piper.) pergamenus.** Fr.

White. Pileus 2–3 in. across, flesh rather thick at the disc, thin elsewhere; pliant, convex then plane and the centre depressed, often wavy, not zoned, glabrous, minutely wrinkled; gills adnate, very narrow, horizontal, very much crowded, branched, white at first, soon becoming straw-colour; milk white, unchangeable, acrid; spores broadly elliptical, echinulate, 7 × 5–6 μ; stem 3–4 in. long, ½–⅔ in. thick at the apex, usually more or less attenuated downwards, glabrous, becoming discoloured, stuffed.

*Lactarius pergamenus*, Fries, Epicr., p. 340; Cke., Hdbk., p. 310; Cke., Illustr., pl. 978.

In woods.

Entirely white; milk white, abundant, very acrid Closely allied to *L. piperatus*, but differing in the longer, stuffed stem attenuated downwards, thinner pileus, and the adnate, very much crowded and very narrow gills that soon become straw-colour.

The milk is very abundant in the flesh, scanty in the gills. (Fries.)

**Lactarius (Piper.) piperatus.** Fr.

White. Pileus 4–8 in. across, flesh thick, firm; umbilicate then infundibuliform and margin erect, glabrous, even, not zoned; gills decurrent, crowded, not more than 1 line broad, frequently forked; stem about $1\frac{1}{2}$ in. long and nearly as thick, smooth, solid; milk white, unchangeable, copious, very acrid; spores subglobose, minutely asperate, 8–9 $\mu$ diameter.

*Lactarius piperatus*, Fries, Epicr., p. 340; Cke., Hdbk., p. 310; Cke., Illustr., pl. 979.

In woods.

Compact, firm, dry, without smell, milk white, abundant, very acrid, unchangeable; stem solid, stout, 1–2 in. long, 1–2 in. thick, equal or obconic, even, very slightly mealy, white. Pileus fleshy, rigid, umbilicate when young, the marginal portion reflexed (margin at first involute), infundibuliform quite from the margin when adult, 4–9 in. broad, for the most part regular, even, glabrous, not zoned, white or tinged with yellow when old. Flesh white. Gills decurrent, crowded, narrow, scarcely a line broad, margin obtuse, forking, arcuate, then straight, white, not changing to straw-colour, but often spotted with yellow. Not becoming tinted with flesh-colour, as in *L. controversus*. (Fries.)

Pileus 3–7 in. broad, slightly rugulose, quite smooth, white, a little clouded with yellow or stained with umber where scratched or bruised, convex, more or less depressed, often quite infundibuliform more or less waved, fleshy, thick, firm, but brittle, margin involute at first; sometimes excentric. Milk white, hot. Gills generally very narrow, $\frac{1}{20}$ of an in. broad, but sometimes much broader, cream-coloured, repeatedly dichotomous, very close, "like the teeth

of an ivory comb," decurrent from the shape of the pileus, when bruised changing to umber. Stem 1–3 in. high, 1½–2 in. thick, often compressed, minutely pruinose, solid but spongy within, the substance breaking up into transverse cavities. (Berk.)

**Lactarius (Piper.) vellereus.** Fr.

White. Pileus 4–8 in. across, flesh thick, firm; convex then expanded and umbilicate, tomentose, not zoned; gills decurrent, 2 lines broad, distant, arcuate, not forked but connected by branches; stem 2–3 in. long, up to 1½ in. thick, downy, solid; spores very minutely asperate, 8–6 $\mu$; milk scanty, white unchangeable, acrid.

*Lactarius vellereus*, Fries, Epicr., p. 340; Cke., Hdbk., p. 311; Cke., Illustr., pl. 980.

In woods.

The pileus is sometimes very broadly umbilicate or cup-shaped, at others almost flat. Milk sometimes absent. Very closely resembling *Russula delica* but distinguished by the floccose or downy pileus and acrid taste.

Large, hard, rigid, milk very acrid, scanty, white. Stem stout, solid, equal, 2–3 in. long, 1–1½ in. thick, with delicate innate down on the surface. Pileus fleshy, compact, convex then flattened, margin for a long time bent down, 5–7 in. broad, innately downy, dry, zoneless, white, with suggestions of reddish tan. Gills arcuate, adnato-decurrent, thickish, margin acute, rather distant, 2 lines and more broad, connected by branches (but not dichotomous), pallid, watery white. Closely allied to *L. piperatus*, differing in certain points, more especially in the broader, arcuate, somewhat distant gills. The milk sometimes becomes pale sulphur-colour when the flesh is broken, but soon changes to white. (Fries.)

Pileus 4–7 in. broad more or less infundibuliform, the whole surface minutely but densely tomentose; white, firm, fleshy; margin at first involute. Milk white, acrid. Gills white, narrow (but occasionally broad and brittle, like *A. exsuccus*), distant, forked, connected by veins, at length slightly buff or yellowish, rufescent after being bruised, Stem 1 in. high, 2 in. thick, blunt, rather less downy than the pileus, solid. (Berk.)

**Lactarius (Piper.) scoticus.** B. & Br.

Pallid-white. Pileus 1–2 in. across, flesh about 1 line thick, firm; soon becoming almost plane, adpressedly tomentose, then smooth except the involute margin; gills very slightly decurrent, thin, about 1 line broad, scarcely branched; stem about 1 in. long, 3 lines thick, slightly curved, smooth, tinged flesh-colour, solid; milk white, unchangeable, very acrid; spores subglobose, with an apiculus, minutely echinulate, 7–8 $\mu$; smell pungent.

*Lactarius scoticus*, B. & Br., Ann. Nat. Hist., no. 1783; Cke., Hdbk., p. 311; Cke., Illustr., pl. 1004B.

Among moss.

Distinguished from *L. involutus*, the only other species with which it can be confounded, by the much broader gills, larger spores, and tinted stem.

**Lactarius (Piper.) involutus.** Soppitt.

Every part white or with a very slight ochraceous tinge. Pileus 1–2 in. across, flesh about $1\frac{1}{2}$ line thick, equal up to the margin, compact, rigid; convex soon becoming plane or slightly depressed, margin strongly and persistently involute, extreme edge minutely silky, remainder even and glabrous; gills very slightly decurrent, densely crowded, not $\frac{1}{2}$ a line broad, sometimes forked; stem $\frac{2}{3}$–1 in. long, 2–3 lines thick, equal, or slightly thickened at the base, glabrous, even, solid, very firm; milk white, unchangeable, not scanty, very hot; spores obliquely elliptical, smooth, $5 \times 3$ $\mu$.

*Lactarius involutus*, Soppitt, Cke., Hdbk., p. 380; Cke., Illustr., pl. 1194.

On the ground in woods.

Very firm and rigid, resembling in habit *L. vellereus* in miniature. Most nearly allied to *L. scoticus*, but known at once by the exceedingly narrow, densely crowded gills and the smooth, elliptical spores.

## II. DAPETES.

**Lactarius (Dap.) deliciosus.** Fr.

Every part becoming stained with dingy green when bruised or old. Every part abounding with a saffron-red

sweet scented, acrid milk. Pileus 3–5 in. across, flesh thick convex then expanded and depressed, viscid, glabrous, dingy orange-red, zoned, margin incurved; gills decurrent, narrow, saffron-colour becoming pale; stem 1–3 in. long, up to 1 in. thick, often narrowed at the base, expanding into the flesh of the pileus, smooth, usually paler than the pileus, stuffed then hollow; spores echinulate, 9–10 × 7–8 $\mu$.

*Lactarius deliciosus*, Fries, Epicr., p. 341; Cke., Hdbk., p. 311; Cke., Illustr., pl. 982.

Under firs, &c.

Edible. According to Fries the pileus is sometimes grey and not zoned. In *Comm. Crypt. Ital.*, iii. p. 174, a violet variety is mentioned.

Gregarious, sometimes subcaespitose. Pileus 4 in. or more broad, zoned, orange-rufous, dull as if it were the remains of a minute very closely pressed dirty white web, hemispherical when young, in which state the margin is decidedly involute and tomentose, at length expanded, depressed, fleshy. The whole plant abounding with orange milk and when bruised or old stained with green. Gills decurrent, from the first of the same colour as the pileus, forked at the base, rather broad and distant. Spores white, round. Stem 3 in. high, curved, stuffed, more or less hollow, scrobiculate, strigose at the base. Odour and taste agreeable, like that of Cantharellus cibarius, but slightly acrid. From the account given by M. Roques, it should seem that this Agaric, however delicious, is not always to be eaten with impunity. I have always found the milk acrid. (Berk.)

## III. RUSSULARIA.

### * *Viscidi.*

**Lactarius (Russ.) pallidus.** Fr.

Pileus 3–5 in. across, flesh thick, rather soft, pallid; convex then expanded, umbilicate, viscid, glabrous, margin broadly involute, pale ochraceous-tan, not zoned; gills slightly decurrent, crowded, about 1½ line broad, rather paler than the pileus, pruinose; stem 1½–2 in. long, up to

$\frac{3}{4}$ in. thick, equal, smooth, coloured like the pileus or paler, firm, stuffed but soon hollow; milk white, unchangeable, mild; spores 9–10 × 7–8 $\mu$.

*Lactarius pallidus*, Fries, Epicr., p. 343; Cke., Illustr., pl. 1007; Cke., Hdbk., p. 312.

In woods, especially beech.

Large, texture loose, size of *L. deliciosus*, but pallid tan-colour, taste almost sweet. Stem somewhat equal, stuffed then hollow, 2 in. and more long, about $\frac{3}{4}$ in. thick, even, glabrous; pileus fleshy, convex, umbilicate, depressed, obtuse, margin broadly and for a long time involute, 3–6 in. across, glabrous, viscid, not zoned and like the stem pallid flesh or clay-colour; flesh pallid, milk white, unchangeable. Gills somewhat decurrent, arcuate, $1\frac{1}{2}$–2 lines broad, rather thin, crowded, somewhat branched, whitish then the colour of the pileus. There is a form with the pileus becoming tinged with fuscous. (Fries.)

**Lactarius (Russ.) quietus.** Fr.

Pileus 2–3 in. across, flesh soft, rather thick, white at first, but soon becoming reddish, as does also that of the stem; obtuse, depressed, often more or less waved or irregular, viscid at first then dry and somewhat silky, dark reddish cinnamon, becoming pale, indistinctly zoned, opaque; gills slightly decurrent, somewhat forked, white then pale brick-red; stem about 2–3 in. long and $\frac{1}{2}$ in. thick, glabrous, reddish-cinnamon, base darker as a rule, stuffed; milk white, unchangeable, mild; spores echinulate, 8–10 × 6–7 $\mu$.

*Lactarius quietus*, Fries, Epicr., p. 343; Cke., Hdbk., p. 312; Cke., Illustr., pl. 983.

In woods, &c.

Showy, soft, large, not truly stout and fleshy as in *L. pallidus*, from which it is very distinct. Stem stuffed, spongy, 2–3 in. long, $\frac{1}{2}$ in. and more thick, glabrous, becoming rufescent and at length pretty rubiginous; pileus fleshy, depressed, obtuse, margin deflexed, 3 in. broad, glabrous, at first viscid, cinnamon flesh-colour, disc darker, slightly zoned, soon dry, opaque, becoming pale like the gills in colour; flesh white, becoming tinged rufescent, milk white, sweet, unchangeable. Gills adnato-decurrent, some-

what forked behind, 1½–2 lines broad, white, soon brick-red with a rufous tinge. (Fries.)

Margin of pileus delicately downy; stem bearing strong pressure without breaking, when old less firm. Odour oily, and somewhat like that of bugs. (Berk.)

Pileus 2 in. or more broad, opaque, rufescent, often slightly zoned, at first deep liver-coloured, obtuse, at length depressed, smooth, the margin incurved and delicately downy. Flesh thick, firm; milk white, but sometimes of a decided but pale yellow, the plant differing in no other respect. Gills pale rufescent, gradually becoming darker, decurrent, forked at the base, rather numerous, and narrow. Spores white, round. Stem 2 in. long, ¼–½ in. thick, thickest upwards, of the same texture and colour as the pileus; flesh firm, bearing a strong pressure without breaking, when old less firm but not hollow, mild; odour oily and sometimes like that of bugs. (Berk.)

**Lactarius (Russ.) aurantiacus.** Fr.

Pileus 1–2½ in. across, convex then plane or depressed, even, glabrous, rather viscid when moist, not zoned, golden orange, not changing colour; flesh pallid; gills distinctly decurrent; thin, crowded, yellowish then ochraceous; stem stuffed up to 3 in. long and ½ in. thick, equal, even, glabrous, coloured like the pileus; milk white, acrid; spores subglobose, echinulate, about 9 $\mu$ diameter.

*Lactarius aurantiacus*, Fries, Epicr., p. 343; Cke., Illustr., pl. 1099.

In woods among moss, &c.

Remarkable for the very decurrent gills. *L. volemus* differs from the present species in being much larger and more robust, mealy stem, very slightly decurrent gills and rivulose pileus. *L. mitissimus* differs in the milk being sweet, and the very slightly adnate gills. *L. theogalus* differs in the milk becoming yellow.

**Lactarius (Russ.) thejogalus.** Bull.

Pileus 1½–2½ in. across, convex when young, then depressed, the centre at length infundibuliform, the thin margin more or less bent down, even, glabrous, viscid,

shining when dry, not zoned, tawny-rufous; flesh whitish; gills adnato-decurrent, about 1 line broad, thin, crowded, pale then rufescent; stem stuffed then hollow, equal, 1–2 in. long, 2–4 lines thick, even, colour of the pileus; spores echinulate, subglobose, 7–8 $\mu$ diameter; milk white then sulphur-colour, at length rather acrid.

*Agaricus thejogalus*, Bulliard, t. 567, fig. 2.

*Lactarius thejogalus*, Cke., Hdbk., p. 313.

In pine and other woods.

Inodorous. Fries mentions a form growing in pine woods having the pileus dry and zoneless, and the gills deep yellow. Agrees with *L. chrysorrheus* and *L. capsicum* in the yellow milk, but differs from both in the tawny-rufous stem.

Pileus 1–3 in. broad, buff, sometimes slightly tinged with tawny, at first hemispherical, dimpled, at length depressed more or less zoned; margin wavy, involute and minutely downy when young; flesh firm, crisp. Gills very slightly decurrent, connected by veins, distant, by no means rigid, salmon-coloured, slightly forked, about as broad as the flesh of the pileus. Milk white, rather acrid, with a peculiar taste, changing instantly on exposure to air to a delicate but beautiful yellow, as does the whole plant when cut. Stem $1\frac{1}{2}$ in. high, $\frac{1}{3}$–1 in. thick, at first nearly white, obese, paler than the pileus, downy at the base, more or less hollow. (Berk.)

**Lactarius (Russ.) cremor.** Fr.

Pileus rather fleshy, $1\frac{1}{2}$–$2\frac{1}{2}$ in. across, glabrous, viscid, opaque, tawny, not zoned, remarkable for having the surface minutely punctulate, convex then plane, somewhat obtuse, often unequal and excentric; margin almost membranaceous, at first inflexed, then striate, resembling a *Russula;* flesh thin, coloured like the pileus or paler; gills adnate, rather distant, 3 lines broad, fragile, pruinose, white then flesh-colour; stem about $1\frac{1}{2}$ in. long, 3–4 lines thick, equal, even, obsoletely silky above under a lens, coloured like the pileus, or darker; milk whitish, almost mild, often watery; spores globose, echinulate, 9–10 $\mu$.

*Lactarius cremor*, Fries, Epicr., p. 343; Cke., Hdbk., p. 313.

In woods, especially beech.

Thin, fragile.

*Var.* **pauper**, Karsten, Symb., x. 58; Cke., Illustr., pl. 1008.

Pileus up to 3 in. across, fleshy, soft, nearly plane, smooth, zoneless, yellowish flesh-colour, ochraceous when dry, margin membranaceous, at length sulcate; gills adnate, rather distant, thin, soft, colour of the pileus; stem about 1 in. long, up to $\frac{2}{3}$ in. thick, equal, naked, smooth, paler than the pileus; spores globose, echinulate, 10 $\mu$ diameter; flesh juiceless, slowly becoming acrid, white.

Under larches, &c.

**Lactarius (Russ.) vietus.** Fr.

Pileus $1\frac{1}{2}$–$2\frac{1}{2}$ in. across, plane and somewhat papillate, then somewhat infundibuliform, margin rather bent down, even, glabrous, at first viscid, opaque, flesh-colour or livid-greyish, rather silky when dry, becoming pale; flesh whitish; gills adnato-decurrent, thin, somewhat crowded, rather flaccid, scarcely a line broad, whitish, yellowish with age; stem attenuated upwards or almost equal, stuffed then hollow, 2–3 lines thick, even, glabrous, dry, coloured like the pileus; milk white then becoming greyish, slightly acrid; spores 7–8 $\mu$.

*Lactarius vietus*, Fries, Epicr., p. 344; Cke., Hdbk., p. 313; Cke., Illustr., pl. 1009.

In woods.

Small, slender, soft, fragile. Pileus sometimes flexuous, always truly slender. (Fries.)

**Lactarius (Russ.) cyathula.** Fr.

Pileus 1–2 in. across, flesh thin, convex then plane, umbonate, then plane and depressed, umbo often disappearing, viscid in moist weather, soon dry, always very opaque, even, when growing rufous brick-red or flesh-colour, slightly zoned, becoming pale when dry, then livid or pinkish-buff, hoary-tan, &c., minutely cracked and rivulose; flesh white with a pink tinge; gills decurrent, very much crowded, thin, scarcely 1 line broad, pinky-white, then yellowish; stem about 2 in. long, 1–5 lines thick, equal, round, even, glabrous, becoming pale and at length whitish, stuffed; spores globose, 6–8 $\mu$; milk white, unchangeable, acrid.

*Lactarius cyathula*, Fries, Epicr., p. 344; Cke., Hdbk., p. 313; Cke., Illustr., pl. 1009B, and 1085.

On damp ground under birches, &c,

Growing in troops, generally very slender and small, but mixed with larger, firmer, and darker specimens. Allied to *L. vietus*, but distinguished by its size and slender build; milk white and unchangeable when the gills are wounded; smell at first scarcely evident; but strong and like bugs when half dry. (Fries.)

** *Impoliti.*

**Lactarius (Russ.) rufus.** Scop.

Pileus 3–4 in. across, flesh rather thin, pallid; umbonate when young, soon depressed and at length infundibuliform, the umbo persistent at base of the depression, entirely zoneless, dry, floccosely silky at first but soon polished, glabrous, rather polished and shining, rufous-bay, rufous-cinnamon when old; margin incurved and covered with whitish down when young; gills adnately decurrent, crowded, about 1½ line broad, scarcely branched, ochraceous then pale rufous; stem 2–3 in. long, about ½ in. thick, equal, rufescent, but paler than the pileus, base with white down, indistinctly pruinose or quite glabrous, stuffed, rather fragile; milk white, unchangeable, intensely acrid; spores echinulate, 9 × 7 $\mu$.

*Lactarius rufus*, Scopoli, Carn., ii. 451; Cke., Hdbk., p. 314; Cke., Illustr,, pl. 985.

In dry pine woods.

Differs from every other species included in the section Russulares in the margin being clothed with whitish down and incurved when young. The pileus although minutely flocculose at first, is soon glabrous and shining. A small form of the present species often very much resembles *L. subdulcis*, from which it is distinguished by the very acrid taste.

**Lactarius (Russ.) helvus.** Fr.

Pileus 2–4 in. across, fleshy, fragile, convex then expanded, somewhat umbonate, the entire surface broken up into granule-like floccose squamules, brick-red with a yellow tinge, becoming pale; gills decurrent, crowded, often forking, 1–1½ line broad, fragile, whitish at first then tinged

flesh-colour, at length yellowish; stem 2–3 in. long, ½ in. thick or more, equal, brick-red then pallid, everywhere slightly pruinose, base downy, stuffed then hollow, firm; spores subglobose, echinulate, 8–9 μ; milk white, scanty, usually sweet.

*Lactarius helvus*, Fries, Epicr., p. 347; Cke., Hdbk., p. 314; Cke., Illustr., p. 994.

Damp mossy places in woods.

Frequently in swamps, the milk is then watery and not coloured (like water), but in the typical form the milk is white and scanty; smell weak, rather sweet, taste usually sweet. (Fries.)

*L. tomentosus* differs in the naked stem.

**Lactarius (Russ.) tomentosus.** Otto.

Pileus 3 in. and more across, flesh thick, white then tinged brown; umbonate at first then depressed or infundibuliform, downy, dingy flesh-colour, rufescent, or brownish; gills slightly decurrent, yellowish with a tinge of red, 1½–2 lines broad; stem 2 in. long, ½ in. and more thick, erect, stuffed, then hollow, pallid, naked, smooth; milk whitish, mild; spores 8–9 μ. diameter.

*Lactarius tomentosus*, Otto, in Krombh., Schwamme, vi. p. 7; Cke., Illustr., pl. 1010; Cke., Hdbk., p. 314.

On the ground in swamps, &c.

Pileus woolly, milk white, slightly acrid. (Cooke.)

**Lactarius (Russ.) mammosus.** Fr.

Pileus 2–3 in. across, flesh rather thick, acutely umbonate, becoming depressed, dry, pale greenish-grey, not zoned, covered with interwoven grey down; gills adnate, crowded, narrow, white, then tinged with brown; stem 2–3 in. long, ½ in. and more thick, downy, pallid, often with a tinge of pink, stuffed then hollow; milk persistently white, slowly becoming acrid; spores 8–9 μ.

*Lactarius mammosus*, Fries, Epicr., p. 347; Cke., Hdbk., p. 314; Cke., Illustr., pl. 995.

In woods.

Firm, inodorous. Stem pallid white, short, stout. Pileus convex at first, acutely umbonate, umbo at length disappearing, depressed, covered everywhere with depressed down, about 2 in. across, greyish-fuscous, margin at first incurved

and covered with white down. Gills decurrent, narrow (1–2 lines) whitish, then pale ferruginous. (Fries.)

**Lactarius (Russ.) glyciosmus.** Fr.

Strong scented. Pileus 1½–2½ in. across, flesh up to 1 line thick; convex then plane, umbonate, dry, lurid, greyish, or brownish, opaque, squamulose; gills somewhat decurrent, crowded, about 1 line broad, yellowish then pale ochraceous; stem about 1 in. long, 3–4 lines thick, downy, pallid, stuffed; milk white, unchangeable, mild at first, becoming slightly acrid; spores subglobose, size variable, 6–10 $\mu$.

*Lactarius glyciosmus*, Fries, Epicr., p. 348; Cke., Hdbk., p. 315.

In woods, especially pine.

*Var.* **flexuosus**, Fries, Hym. Eur., p. 434; Cke., Illustr., pl. 1011.

Pileus even, silky at first, umbilicate or depressed, flexuous, more or less zoned; stem imperfectly hollow, often elongated; rest as in typical form.

Smell pungent, like spirit-of-wine; rigid, fragile, small; stem almost equal, 1–2 in. long, 2–4 lines thick, even, pubescent, yellowish, becoming tawny when bruised, sometimes almost silvery-white, especially at the apex. Pileus convex then almost plane, papillate, then depressed and the papilla disappearing, 1–2 in. broad, slightly innately squamulose or unpolished, opaque, greyish brick-red, brownish, often with a faint violet tinge, not zoned; flesh white; gills arcuate or almost plane, adnato-decurrent, ½–1½ line broad, thin, often connected by branches, straw-colour then ochraceous; milk white, sometimes unchangeable, sometimes with a slight yellowish green tinge, but not discolouring the gills.

The stem is sometimes elongated, pileus at first silky, even, also umbilicate, wavy, zoned.

A very distinct species, approaching *L. vietus* in habit, but quite distinct in the absolutely dry pileus, very crowded, ochrey straw-coloured gills not becoming spotted when bruised, smell, &c. (Fries.)

**Lactarius (Russ.) fuliginosus.** Fr.

Pileus 2–4 in. across, flesh thick in the centre and gradu-

ally becoming thinner towards the margin, rather compact, then soft, flattened, rather wavy, often irregular, margin inflexed at first, then [spreading and wavy, at first even, whitish-tan, zoneless, powdered with innate, sooty down, rather velvety to the touch, hardish, somewhat shiny when moist, at length naked, with a pellicle, here and there slightly rugulose, livid-yellowish or fawn-colour with a brick-red tinge, disc sometimes changing to brownish; gills at first rounded behind and adnexed, soon decurrent, 1–3 lines broad, rather thin, somewhat distant, white then yellowish-ochre, branched and connected by veins; stem about 3 in. long 3–5 lines thick, about equal, stuffed, even or at length very slightly rugulose, glabrous, white, then dingy, tan-colour, almost brick-red, or sooty; spores pale ochraceous, subglobose, minutely echinulate, 8–9 $\mu$ diameter; milk white, changing to saffron, mild at first, soon slightly acrid.

*Lactarius fuliginosus*, Fries, Epicr., p. 348; Cke., Hdbk., p. 315; Cke., Illustr., pl. 996.

In woods.

Rather firm, somewhat elastic; the broken flesh with the milk ranges from white, through rose-colour, to saffron; taste mild at first, soon becoming acrid, but after a time, and in adult specimens, sweet and pleasant. Milk sometimes persistently white, and at others thin and watery. (Fries.)

**Lactarius (Russ.) picinus.** Fr.

Pileus about 3 in. across, flesh rather thin, firm, pallid, convex then flattened, umbonate, orbicular, zoneless, dry, even, everywhere downy or somewhat velvety at first, down innate, not depressed or silky, then the disc becomes glabrous and the surface quite unbroken (not rivulosely flocculose nor squamulose), umber or blackish-umber; gills adnate, very much crowded, very thin, straight, plane, ochraceous; stem 2–3 in. long, up to $\frac{1}{2}$ in. thick, equal, even, glabrous, paler than the pileus; spores subglobose, pale ochraceous, minutely echinulate, 9–10 $\mu$ diam.; milk acrid, white, unchangeable.

*Lactarius picinus*, Fries, Epicr., p. 348; Cke., Illustr., pl. 997.

In dried up turfy swamps under pines, &c.

Rigid, regular in form, milk acrid, white, unchangeable. (Fries.)

Readily distinguished amongst the species with a dark, minutely velvety pileus, by the acrid, persistently white milk.

**Lactarius (Russ.) ligniotus.** Fr.

Pileus 2–3 in. across, flesh thinner than the breadth of the gills, and like that of the stem, changing slowly when broken from white through ochraceous to saffron or rust-colour; convex then expanded, and subdepressed margin at first incurved then arched and drooping, umbonate, marked with radial folds or wrinkles, pruinosely velvety then almost glabrous, zoneless, remarkably dry, very opaque, sooty-umber; gills at first rounded behind and adnexed, then somewhat decurrent, 1 line and more broad, thin, rather crowded, almost snow-white when young, then whitish ochre, reddish when wounded; stem 3–5 in. long, somewhat ventricose up to $\frac{3}{4}$ in. thick at the centre, $\frac{1}{4}$ at the apex, stuffed, corticated, apex constructed and plicate, pruinosely velvety, coloured like the pileus, but the base whitish; spores pale ochraceous, subglobose, minutely echinulate, 9–10 $\mu$ diameter; milk scanty, sweet, pleasant, changing, like the flesh, through reddish, to saffron.

*Lactarius ligniotus*, Fries, Monogr., ii. p. 177.

Among moss in damp places under fir trees, &c.

Smell almost none. Allied to *L. fuliginosus*, but distinguished by the stem being distinctly pruinosely velvety, whereas in the last-named species it is glabrous, and also by the persistently velvety, smoky-umber, radially wrinkled pileus.

**Lactarius (Russ.) retisporus.** Mass.

Pileus 2–3$\frac{1}{2}$ in. across, convex then plane and with the disc depressed, dark smoky-brown, minutely velvety, radially rugulose from disc to margin; flesh nearly $\frac{1}{4}$ in. thick at the centre, only slightly thinner towards the margin; gills subdistant, $\frac{1}{4}$ in. broad, deeply sinuate and slightly adnexed, intermediate ones numerous, pale ochraceous with darker spots; stem 1$\frac{1}{2}$–2 in. long, $\frac{2}{3}$ in. thick, equal, solid,

even, glabrous, rather paler than the pileus, flesh like that of pileus dingy yellow, becoming reddish brown when cut; spores colourless, globose, with raised bands forming a network, 10 $\mu$ diameter; milk white then brown, sweet, becoming very thick and tenacious.

On the ground under beech-trees. Fairmead, Epping Forest, Oct. 1888.

The present species is allied to, and superficially resembles *Lactarius picinus*, *L. fuliginosus*, and *L. ligniotus*. All are about the same size and have the pileus of a smoky-brown colour. The following analysis indicates their most pronounced distinctive features.

A. *Pileus velvety.*

*L. retisporus.* Pileus radially rugulose; gills rather distant; milk sweet, white then brownish; spores with a network of raised lines.

*L. ligniotus.* Pileus radially rugulose; milk sweet, white then saffron-colour; spores minutely echinulate.

*L. picinus.* Pileus even; gills much crowded; milk acrid, persistently white; spores minutely warted.

B. *Pileus not velvety.*

*L. fuliginosus.*

**Lactarius (Russ.) lilacinus.** Lasch.

Pileus 1–2 in. across, flesh rather thick, convex then depressed, sometimes with a central small papillose umbo, rosy-lilac, not zoned, granulose, floccose when dry; gills adnate or slightly decurrent, rather distant, about 1 line broad, pallid with a tinge of pink; milk acrid, white, unchangeable, spores subglobose with an apiculus, echinulate, 7 $\mu$ diam.; stem about 1 in. long, 2 lines thick, pallid, sprinkled with a white bloom, stuffed then hollow.

*Lactarius lilacinus*, Lasch, Linnaea, iii. n. 78; Cke., Hdbk., p. 315; Cke., Illustr., pl. 998A.

In damp woods.

Fragile; milk copious.

**Lactarius (Russ.) spinulosus.** Quel.

Pileus about 1½ in. across, flesh rather thin, depressed, umbo acute; clad, especially towards the margin with minute erect spines, often zoned and spotted, flesh-colour, brick-red, or rosy-lilac; gills decurrent, narrow, thin, yellow flesh-colour, at length yellowish; stem 1–1½ in. long, 2–3 lines thick, flexuous, rugose, granulated. fragile, shining, coloured like the pileus, then paler, hollow; milk white, peppery.

*Lactarius spinulosus*, Quelet, Champ. Norm., t. 8, f. 10; Cke., Hdbk., p. 316.

On the ground.

*Var.* **violaceus**, Cke., Hdbk., p. 316; Cke., Illustr., pl. 998B.

Pileus rosy-violet, margin incurved; stem pale, almost smooth, stuffed.

On the ground. The typical form has not occurred in this country.

*** *Glabrati.*

**Lactarius (Russ.) volemus.** Fr.

Pileus 3–5 in. across, flesh thick, white, often tinged with brown under the cuticle, rigid; plane or more or less depressed, obtuse, dry, golden-tawny, at length becoming minutely broken up with cracks; gills decurrent, crowded, 2–3 lines broad, white then yellowish; stem 2–3 in. long, up to 1 in. thick at the apex, even, coloured like the pileus and slightly pruinose, solid; milk copious, white, unchangeable, mild; spores 5–6 $\mu$ diameter.

*Lactarius volemus*, Fries, Epicr., p. 344; Cke., Hdbk., p. 316; Cke., Illustr., pl. 999.

In woods.

Allied to *L. quietus*, but distinguished by the brighter colour of pileus and stem, and white flesh.

Stem stout, hard, solid, nearly equal or attenuated upward, 2–2½ in. long, ¾–1¼ in. thick, even, pruinose. Pileus compact, rigid, obtuse, plano-convex, margin at first incurved, at length depressed, 3 in. and more broad, even, becoming rimosely rivulose, dry, and like the stem, rufous-tawny

with a golden sheen, zoneless, becoming pale. Gills adnato-decurrent, 1–2 lines broad, thin, crowded, yellowish-white. Large and very robust, and in this respect approaching *Russula*. Very delicious, also pleasant when raw, celebrated as an edible fungus from ancient times. (Fries.)

Pileus 4 in. broad, flesh thickish, moderately firm, obtuse, minutely umbonate, though the umbo at length vanishes, subdepressed, sometimes very faintly zoned, with a few minute wrinkles towards the margin, dry at length cracked, of a rich orange brown darker in the centre, the whole rather dull than shining, margin not the least involute, though when young the edge of the pileus is regularly incurved. Milk white, abundant, not acrid, quite mild. Gills pale ochraceous, becoming fuscous on being touched, not very close, scarcely decurrent, even in depressed specimens, sometimes slightly forked. Spores white, round. Stem $2\frac{1}{2}$–$3\frac{1}{2}$ in. high, above 1 in. thick, obese, minutely attenuated downwards, sculptured longitudinally, paler than the centre of the pileus; it bears a strong compression without giving way, but it is spongy in the centre, outer flesh reddish. (Berk.)

**Lacterius (Russ.) ichoratus.** Batsch.

Pileus 3–4 in. across, flesh thin; rigid then soft, obtuse, plane or depressed, often unequal, excentric, sometimes wavy, even (not pruinose), very dry, opaque, tawny-brick-red, disc often brown, zoned with brick-red. Flesh pallid; gills adnate, with a decurrent tooth, scarcely crowded, white then ochraceous, never spotted; stem $1\frac{1}{2}$–3 in. long, 3–5 lines thick, even, glabrous, at first tawny then rufescent, solid, equal or fusiform; spores 8–10 × 6–7 $\mu$; milk white, sweet, unchangeable.

*Lactarius ichoratus*, Batsch, fig. 60; Cke., Hdbk., p. 316; Cke., Illustr., pl. 1000.

In woods.

Allied to *L. volemus*, but more slender; very close to *L. tithymalinus* (not British), very compact when young, then softer, with an evident smell. (Fries.)

**Lactarius (Russ.) serifluus.** Fr.

Pileus 1–2 in. across, rather fleshy, plane then depressed, often waved, dry, glabrous, tawny-brown, margin incurved;

gills slightly decurrent, crowded, yellowish, 1–1½ line broad; stem 1–1⅔ in. long, 2–3 lines thick, rather curved near the base, coloured like the pileus or paler, solid; milk scanty, rather insipid, the colour of serum or whey; spores subglobose, echinulate, 7–8 $\mu$.

*Lactarius serifluus*, Fries, Epicr., p. 345; Cke., Hdbk., p. 317; Cke., Illustr., 1012.

In damp places on the ground.

Allied to *L. subdulcis*, but is altogether smaller and more slender, stem solid, and smaller spores. Fries states that the milk is dilute and watery when growing in damp places.

**Lactarius (Russ.) mitissimus.** Fr.

Pileus 1–3 in. across, flesh thin, rather rigid; convex and papillate then depressed, and the papilla usually disappearing, glabrous, rather glutinous when moist, not zoned, bright tawny-orange, shining; flesh pallid; gills slightly decurrent, slightly arcuate then straight, 1–1½ line broad, thin, crowded, a little paler than the pileus, often stained with small brownish spots; stem 1–3 in. long, ⅓–½ in. thick, even, glabrous, coloured like the pileus, stuffed then hollow; spores 6–8 × 5–6 $\mu$; milk white, unchangeable, mild.

*Lactarius mitissimus*, Fries, Epicr., p. 345; Cke., Hdbk., p. 317; Cke., Illustr., pl. 1001.

In woods, &c.

Slender; closely allied to *L. subdulcis*, distinguished by the copious white milk, sweet, then slightly acrid, and especially by the bright, shining, golden-tawny colour of the pileus and stem. (Fries.)

*L. aurantiacus* differs in having acrid milk.

**Lactarius (Russ.) subdulcis.** Fr.

Pileus ½–2½ in. across, flesh thin, papillate, at length depressed, even, glabrous, zoneless, rufous-cinnamon or bay when dry; gills adnate, paler than the pileus, crowded, about 1½–2 lines broad; stem more or less rufous, 1½–2 in. long, stuffed then hollow, minutely pruinose; milk white, not changing colour, at first sweet, then with a trace of acridity; spores globose, rough, 10 $\mu$ diameter.

*Lactarius subdulcis*, Fries, Epicr., p. 345; Cke., Hdbk p. 317; Cke., Illustr., pl. 1002.

In woods.

Pileus bay, rufous, cinnamon, &c., not becoming pale. Gills sometimes dark rusty-rufous, sometimes pale. Flesh with a rufous tinge, compact, thin. (Fries.)

Variable. All the forms agree in being slender, stem equal, even, glabrous; pileus even, glabrous, dry, zoneless, rufescent; gills rather rigid, crowded, somewhat rufescent; taste almost mild: milk white, unchangeable.

*Typical form.* In woods. Stem stuffed then hollow, 1–2 in. long, 2–4 lines thick, somewhat pruinose and papillose; pileus papillose, convex then depressed, 2–3 in. across, even, glabrous, polished, rufous-cinnamon; gills fragile, pallid, somewhat rufous. Taste sweet, then a little acrid and bitter.

*Var.* **concavus**, Fries, Monogr., ii. p. 181.

Colours exactly those of *Lactarius rufus*, rufous-bay, gills sometimes a little darker; stem short, 1–1½ in. long, 2–4 lines thick, stuffed, spongy, glabrous; pileus thin, flesh scarcely as thick as breadth of gills, 1–2 in. across, papillate, concave-depressed, marginal limb narrow, thin, inflexed, even, glabrous, opaque; gills decurrent, slightly ventricose and arcuate, 1 line and more broad, thin, crowded, at first pale brick-red, then the colour of the pileus, dark, very pruinose. Taste mild.

Swamps and damp places in fields, &c.

*Var.* **sphagneti**, Fries, Monogr., ii. p. 181.

Remarkable. Pretty. Stem hollow, very glabrous. Pileus obtuse, depressed, very glabrous, shining as if varnished, red-bay, margin inflexed, elegantly crenate. Gills pallid. (Fries.)

**Lactarius (Russ.) camphoratus.** Fr.

Pileus 1–2 in. across, flesh thin, tinged brown, as is also that of the stem; more or less depressed, sometimes with a slight umbo, dry, glabrous, brown with a brick-red tinge, indistinctly zoned; gills adnate or with a suggestion of being decurrent; about 1½ line broad, crowded, pale brick-red with a yellow tinge; stem about 1 in. long and 2 lines thick, slightly curved, coloured like the pileus, stuffed; milk persistently white, mild; spores subglobose, 8–9 $\mu$; smell strong and fragrant, especially when dry.

*Lactarius camphoratus*, Fries, Epicr., p. 346; Cke., Hdbk., p. 317; Cke., Illustr., pl. 1013A.

In woods.

Clearly distinguished from allied species by the strong fragrant smell resembling melilot, which develops during drying, and persists for a long time in the dried specimen.

*Var.* **terrei**, B. & Br., Ann. Nat. Hist., no. 1673; Cke., Hdbk., p. 317.

Pileus about ½ in. across, bay-brown, corrugated, depressed; stem hollow, thickened at the base, of the same colour as the pileus, clad with orange down; gills decurrent, pallid.

On the ground.

Caespitose, smell sweet.

**Lactarius (Russ.) cimicarius.** Batsch.

Pileus 1–2 in. across, flesh rather thick, tinged with brown, as is also that of the stem; plane then depressed or infundibuliform, margin usually waved and lobed, smooth, even, dark bay-brown; gills slightly decurrent, 1½ line broad, dingy ochraceous with a red tinge; stem about 1 in. long, 2 lines thick, smooth, paler than the pileus, more or less hollow; milk persistently white, acrid; spores 7–8 $\mu$; smell strong and unpleasant.

*Lactarius cimicarius*, Batsch, fig. 69; Cke., Hdbk., p. 318; Cke., Illustr., pl. 1013.

In woods.

The smell is strong, heavy, and oily, and is said to resemble bugs. When dried the smell soon disappears. Distinguished from *L. camphoratus* by the acrid milk and the strong unpleasant smell when fresh. The last character also separates the present species from *L. subdulcis*.

**Lactarius (Russ.) subumbonatus.** Lindgr.

Pileus about 1 in. across, flesh rather thick at the disc, very thin elsewhere, grey then yellowish; convex, with a small umbo, becoming depressed, often undulate and wavy, rugose, pitted, dark cinnamon-colour; gills adnate, not 1 line broad, rufous flesh-colour; stem up to 1 in. long, 1½ line thick, base thinner, smooth, even, coloured like the pileus, stuffed; spore subglobose, 5–6 $\mu$; milk persistently white, mild.

*Lactarius subumbonatus*, Lindgr., Bot. Not., 1845; Cke., Hdbk., p. 318; Cke., Illustr., pl. 986A.

On the ground.

Stem usually thinner at the base, curved, sometimes excentric. (Fries.)

Odourless when fresh, but with a strong unpleasant smell when dry. *L. camphoratus* differs in having a pleasant smell like melilot when dry, also scentless when fresh. *L. cimicarius* differs in the absence of an umbo, in having an unpleasant smell resembling bugs when fresh, but without smell when dried.

**Lactarius (Russ.) obnubilus.** Lasch.

Pileus about 1 in. across, rather fleshy; convex and usually papillate at first then rather broadly umbilicate, glabrous slightly striate, zoneless, sooty-brown; margin slightly arched; gills narrowed behind, adnexed, rather crowded, becoming yellowish at maturity; stem 1–1½ in. long, 2–3 lines thick, slightly thickened at the base, smooth, even, stuffed then hollow, paler than the pileus; spore globose, echinulate, 8 $\mu$; milk persistently white, slightly acrid.

*Lactarius obnubilus*, Lasch, Linn., n. 71; Cke., Hdbk., p. 318; Cke., Illustr., pl. 1014A.

In woods.

Differs from *L. fuliginosus* in the milk remaining persistently white; from *L. picinus* in the pileus not being velvety; and from *L. retisporus* in the spores not being reticulated. The present is also much smaller than either of the above.

*Var.* **crenatus**, Massee.

Pileus 1–2 in. across, convex then depressed, sooty-brown, coarsely and regularly sulcate, which causes the margin to be crenate; flesh thin; gills rather close, yellowish, broadly adnate with a tendency to become decurrent; stem about 1 in. long, ¼ in. thick, equal, solid at first, becoming imperfectly hollow, smooth, even, paler than the pileus, usually incurved at the base; spores globose, minutely warted, 7–8 $\mu$ diam., cystidia absent; milk persistently white, very slightly acrid.

On the ground in fir woods.

Possessing many points in common with *L. obnubilus*, but very distinct at least as a variety in the coarsely sulcate

margin, besides being altogether a larger and more robust form.

**Lactarius (Russ.) minimus.** W. G. Sm.

Pileus about $\frac{1}{2}$ in. across, fleshy at the disc; convex and somewhat umbonate, excentric, smooth, even, margin incurved, pallid tan or pallid; gills slightly decurrent, distant, arcuate, pallid; stem up to $\frac{1}{4}$ in. long, 1 line thick, coloured like the pileus, solid; spores globose, echinulate, 3–4 $\mu$; milk copious, white, mild.

*Lactarius minimus*, W. G. Smith, Journ. Bot. 1873, p, 205; Cke., Illustr., pl. 986B.; Cke., Hdbk., p. 318.

In pastures and woods.

Distinguished by its small size.

## IV. PLEUROPUS.

**Lactarius (Pleur.) obliquus.** Fr.

Pileus about 2 in. across, flesh rather thick at the disc, margin thin; plane then depressed, oblique, lobed, silky, white then yellowish, more or less zoned with grey, even; gills very slightly decurrent, crowded, about $1\frac{1}{2}$ line broad, white; stem about 1 in. long, rather excentric, curved, 2 lines thick, even, coloured like the pileus; spores globose, echinulate, 6 $\mu$; milk white.

*Lactarius obliquus*, Fries, Epicr., p. 348; Cke., Hdbk., p. 319; Cke., Illustr., pl. 1014B.

On trunks, banks, &c.

Caespitose, slender, fragile, smell strong, pileus deformed. (Fries.)

In Cooke's figure the gills are dingy yellow, and the pileus without zones.

## RUSSULA. Fries. (figs. 1, 2, 3, p. 3.)

Pileus regular, rigid, usually becoming more or less depressed; gills rigid, fragile owing to the trama being composed of large spherical cells, edge thin and acute; stem central, stout, rigid; veil entirely absent; spores subglobose, minutely verruculose or echinulate, white or yellow.

*Russula*, Fries, Epicr., p. 349; Cke., Hdbk., p. 319.

A very distinct genus, closely allied to *Lactarius*, but distinguished by the absence of milk. As in *Lactarius*, the flesh and gills of species included in the present genus are replete with anastomosing laticiferous cells, the free ends of which often project as cystidia between the other elements of the hymenium; the dense, granular latex does not flow from the cells when broken, hence the absence of milk.

The flesh (due to the latex) is very acrid or hot in some species, mild in others, and as this character is constant when developed under normal conditions, has been utilised in the following grouping of species. In a few species the taste is mild at first, but becomes slightly acrid after remaining in the mouth for a short time; in others the acridity is realised at once!

The species included in the present genus are by many considered as passing all understanding, but I consider the white species of *Clitocybe* much more difficult in that respect.

The sections proposed by Fries overlap to such an extent as to render them almost useless; hence I have ventured on a new distribution of species. It may be urged against this scheme that allied species are widely separated; possibly so, but I consider the primary use of a purely systematic work is to enable the student to identify species correctly; and as affinities cannot possibly be indicated in serial order on a plane surface, the loss is not great.

## *ANALYSIS OF THE SPECIES.*

*Sect.* I. Taste Mild. (Or in some species mild at first, and becoming slowly acrid when kept in the mouth for some time.)

* Gills ochraceous.

** Gills pale or bright yellow; without an ochraceous tinge.

*** Gills white or creamy-white; never yellow nor ochraceous, but sometimes becoming blackish with age.

† Pileus white or cream-colour at first; becoming blackish or brownish-black with age.

†† Pileus clear yellow.

††† Pileus green or olive.

†††† Pileus red of various shades, purple, brownish-orange; sometimes with more or less green intermixed.

*Sect.* II. Taste Acrid. Always so from the first.

* Gills yellow or ochraceous.

† Pileus yellowish or ochraceous.

†† Pileus red or purplish.

** Gills white or creamy-white; never with a distinct yellow or ochraceous tinge.

† Pileus ochraceous or umber.

†† Pileus red or purplish.

## *Sect.* I. TASTE MILD.

### * *Gills ochraceous.*

**Russula alutacea.** Fr.

Mild. Pileus 2–4 in. across, flesh rather thin, snow-white; campanulate then convex, at length expanded and somewhat umbilicate, even, with a distinct viscid pellicle, usually deep blood-red, sometimes blackish-purple, but becoming pale, especially at the disc; gills at first free, thick, very broad, connected by veins, all equal, rather distant, at first pale yellow, then deep ochraceous, not pulverulent; stem solid, stout, equal, 2 in. long, even, white, often variegated with red; sometimes purple; spores, 7–9 $\mu$; taste mild.

*Russula alutacea*, Fries, Epicr., p. 362; Cke., Hdbk., p. 336; Cke., Illustr., pl. 1096 and 1097.

In woods, especially beech.

Large, usually showy, taste mild and pleasant; at length truly soft and very fragile. Known from *R. integra* by the gills not being powdery with the spores. (Fries.)

Gills very broad, up to $\frac{3}{4}$ in., deep ochraceous tan when fully developed; never powdery with the spores, a character which at once separates the present species from *R. integra*, the only one with which it can be confounded. Pileus very variable in colour; deep blood-red, clear rose-colour, dark-purple, greenish, olive, &c.

Pileus 3 in. broad, fleshy, smooth, viscid when moist, depressed, margin at first even, more or less furrowed and tubercled when old; pink, livid, olive, &c. Gills broad, equal, sometimes slightly forked, ventricose, free, connected by veins. Spores yellow. Stem $1\frac{1}{2}$ in. long, 1 in. thick, blunt, surface longitudinally wrinkled or grooved, solid, spongy within, smooth, white, sometimes yellow. Taste mild, pleasant, acrid when old. (Berk.)

**Russula integra.** Fr.

Mild. Pileus 4–5 in. across, flesh rather thin, white; convex then expanded and depressed; cuticle separable, viscid; margin thin, at length coarsely striate and tuberculose; colour variable, of various shades of red or green; gills almost free, very broad, up to $\frac{3}{4}$ in., equal, rather distant; white then pale yellow, powdery with the ochraceous spores; stem about 2 in. long, up to 1 in. thick, nearly even, often more or less swollen in the middle, or ventricose, white, stuffed; spores pale ochraceous, echinulate, 9–10 $\mu$ diameter; cystidia absent.

*Russula integra*, Fries, Epicr., p. 360; Cke., Hdbk., p. 334; Cke., Illustr., pl. 1034 and 1093.

In woods.

Agreeing in many points with *R. alutacea*, but distinguished by the much paler yellow gills being powdered with the spores at maturity.

Taste mild, but often astringent. The most variable of all species especially in the colour of the pileus, which is typically red, but also verging on bluish, bay, olive, &c. The essential points are as follows. Stem spongily-stuffed, usually stout, at first short, conical, then clavate or ventricose, about 3 in. long, clear white. Pileus fleshy, campanu-

lately convex then expanded and depressed, fragile when adult, with a viscid pellicle, losing its colour, margin at length sulcate and somewhat tuberculose; flesh white, sometimes yellowish upwards. Gills almost free, very broad, equal or bifid near the base, rather distant, connected by veins, pallid white then yellow; pulverulent with the somewhat ochraceous spores, a character by which the present species is readily known. Gills sometimes quite sterile, and hence remaining persistently white. (Fries.)

*Var.* **alba**, Cke., Hdbk., p. 335; Cke., Illustr., pl. 1094.

Whole fungus except the gills of a creamy white.

In woods.

**Russula nauseosa.** Fr.

Smell strong, unpleasant. Taste mild. Pileus about 1½ in. across, flesh thin, expanded and slightly gibbous, then depressed or infundibuliform, viscid, colour variable, usually dingy purple or lilac, disc darker, sometimes tinged dingy yellow; margin very thin, coarsely striate; gills slightly adnexed, ventricose, rather distant, yellow then dingy ochraceous; stem 1–1½ in. long, 3–5 lines thick, slightly wrinkled longitudinally, white, stuffed; spores 8–9 $\mu$ diameter.

*Russula nauseosa*, Fries, Epicr., p. 363; Cke., Hdbk., p. 338; Cke., Illustr., pl. 1147; 1063B.

In woods.

Agrees with *R. nitida* in the strong smell, but distinguished by the rather distant, dingy ochraceous gills and spores.

In woods, especially pine. Taste mild but the smell nauseous. Stem spongy, stuffed, short, about 1 in. long, 4 lines thick, slightly striate, white. Pileus thin, at first plane-gibbous, then depressed, viscid in moist weather, margin sulcate and tuberculose. Colour variable, disc typically purplish, then livid, but becoming pale and often whitish. Flesh soft, white. Gills adnexed, ventricose, rather distant, with shorter intermediate ones, yellow, then dingy ochraceous. (Fries.)

*Var.* **flavida**, Cke., Illustr., pl. 1102A.

Pileus pale clear primrose-yellow, stem hollow; strong-scented.

On the ground.

*Var.* **pulchralis**, Cke., Hdbk., p. 336; Cke., Illustr., pl. 1095A.

*Russula pulchralis*, Britzel., Sudb., f. 13.

Pileus viscid, ochraceous, disc spotted with red or purple, the thin margin coarsely striate or tuberculated.

On the ground.

**Russula vitellina.** Fr.

Strong-scented. Mild. Pileus $\frac{3}{4}$–$1\frac{1}{2}$ in. across, the small disc slightly fleshy, remainder very thin; convex, soon plane, margin tuberculosely striate, rather dry, yellow, becoming pale; gills slightly adnexed, soon separating from the stem and becoming free, distant, rather thick, connected by veins, saffron-colour; stem about 1 in. long, and 2 lines thick, equal, white; spores 7–8 $\mu$ diameter.

*Russula vitellina*, Fries, Epicr., p. 263; Cke., Hdbk., p. 338.

In woods.

Differs from *R. lutea* in the strong smell and the striate and tuberculose margin of the pileus.

*Var.* **major**, Cke., Illustr., pl. 1102B.

Pileus 2–3 in. across; gills 3 lines broad; stem $1\frac{1}{2}$ in. long, 3–4 lines thick, becoming hollow.

In woods.

Agreeing with the typical form except in size.

**Russula ochracea.** Fr.

Mild. Pileus about 3 in. across, flesh rather thick at the centre becoming thin towards the margin, pale ochraceous, soft; convex then expanded and depressed, margin coarsely striate, pellicle thin, viscid, ochraceous with a tinge of yellow, disc usually becoming darker; gills slightly adnexed, broad, scarcely crowded, ochraceous; stem about $1\frac{1}{2}$ in. long, 5–7 lines thick, slightly wrinkled longitudinally, ochraceous, stuffed, soft; spores globose, echinulate, ochraceous, 10–12 $\mu$ diameter.

*Russula ochracea*, Fries, Epicr., p. 362; Cke., Hdbk., p. 338; Cke., Illustr., pl. 1050.

In pine and mixed woods.

The mild taste, and ochraceous colour of every part, including the flesh, separate the present from every other species.

Commonly confounded with *Russula fellea*, but known at once by its mild taste. Agreeing most nearly with *R. lutea* in colour, but differing in the softer flesh, which becomes ochraceous upwards; sulcate margin of the pileus, and broader, less crowded gills. Pileus persistently ochraceous, disc usually darker. Stem sometimes yellow, sometimes white. (Fries.)

**Russula lutea.** Fr. (figs. 2, 3, p. 3.)

Mild. Pileus 1–2 in. across, flesh thin, white; soon convexo-plane or plano-depressed, viscid when moist, margin even, or indistinctly striate when old, always a pretty primrose-yellow when young, becoming pale or almost white with age; gills almost free, connected by veins, crowded, narrow, equal, bright ochraceous-yellow; stem about $1\frac{1}{2}$ in. long, 3–4 lines thick, equal, even, white, never tinged with red; spores echinulate, pale yellow, 8–10 × 7–8 $\mu$.

*Russula lutea*, Fries, Epicr., p. 363; Cke., Hdbk., p. 338; Cke., Illustr., pl. 1082.

In woods.

The form with broader, less crowded gills, mentioned by Fries, has been found in Epping Forest.

Allied to *R. vitellina*, but known by the even margin of the pileus and the absence of smell.

**Russula elegans.** Bresad.

Mild at first, becoming acrid with age. Pileus 2–3 in. across, flesh rather thick; convex then depressed; margin tuberculose and striate when old, viscid, bright rosy flesh-colour, soon ochraceous at the circumference, everywhere densely granulated; gills adnexed or slightly rounded, narrow behind, very much crowded, equal, rarely forked, whitish, becoming either entirely or here and there ochraceous orange; stem $1\frac{1}{2}$–2 in. long, 5–7 lines thick, a little thickened at the base, rather rugulose, white, base ochraceous; flesh white, turning ochraceous and acrid when old; spores 8–10 $\mu$ diameter.

*Russula elegans*, Bresadola, Fungi Trident., t. 25; Cke., Hdbk., p. 330; Cke., Illustr., pl. 1027.

In damp woods.

Allied to *R. vesca*. Known by the bright rose-coloured,

densely granular pileus and tuberculose margin. When old the pileus is almost entirely ochraceous.

**Russula armeniaca.** Cooke.

Mild. Very fragile. Pileus 1–1½ in. across, flesh thin, convex then depressed, smooth, even, peach-colour, margin paler, even; gills adnexed, rounded behind, 1½–2 lines broad, somewhat distant, bright ochre or almost egg-yellow; stem about 2 in. long, 3 lines thick at the base, slightly attenuated upwards, smooth, white, hollow; spores echinulate, broadly elliptical, pale ochraceous, 10 × 8 $\mu$.

*Russula armeniaca*, Cke., Hdbk., p. 336; Cke., Illustr., pl. 1064.

Among grass under trees.

Readily distinguished among the small species with ochraceous gills and spores by the colour of the pileus, which is exactly that of a ripe peach.

*** Gills yellow, without an ochraceous tinge.*

**Russula coerulea.** Fr.

Mild. Pileus 2–3 in. across, flesh thickish at the disc, margin thin; convex then expanded or even slightly depressed, sometimes slightly umbonate, polished, margin even, bluish, bluish-purple, disc sometimes brownish; gills adnate, almost all equal, 2 lines broad, pale yellow, acute in front; stem 2 in. long, 4–5 lines thick, equal, firm, white, spongy inside; spores globose, verruculose, 11–12 $\mu$ diameter.

*Russula coerulea*, Fries, Epicr., p. 353; Cke., Hdbk., p. 323; Cke., Illustr., pl. 1052.

In woods.

The blue colour is usually most conspicuous near the margin, the centre purplish. In Mrs. Price's figure, no. 164, the pileus is altogether pure deep sky-blue, but there may possibly be a little allowance made for the colouring.

Habit very much that of *R. cyanoxantha*, taste mild, but the gills are crowded and yellow. Pileus sometimes sky-blue, sometimes purple-lilac; margin even. (Fries.)

**Russula nitida.** Fr.

Smell unpleasant. Pileus about 2 in. across, flesh white, rather thin, rigid, convex then plane or slightly depressed, pellicle viscid in moist weather, colour various, but usually purplish bay, disc darker, shining; margin striate, somewhat tuberculose; gills adnexed, receding, crowded, pallid, then sulphur-coloured, not powdered; stem 2–3 in. long, $\frac{1}{3}$ in. thick, spongily stuffed, almost equal or attenuated below, even, white then pallid; spores minutely echinulate, 8–10 × 6–8 $\mu$; taste mild at first, slowly becoming acrid.

*Russula nitida*, Fries, Epicr., p. 361; Cke., Hdbk., p. 336; Cke., Illustr., pl. 1063A.

In woods.

Distinguished from every other species by the bright lemon-yellow, shining gills, that never become dusted with ochraceous powder. (Fries.)

*R. nauseosa* agrees with the present species in the disagreeable smell, but differs in the distant, dingy ochraceous, powdered spores.

*Var.* **cuprea**, Cke., Illustr., pl. 1095B.

Pileus copper-colour with a tinge of purple, otherwise as in the typical form.

In woods.

**Russula aurata.** Fr.

Mild. Pileus 2–3 in. across, flesh rather thick, firm, white, citron-yellow below the cuticle, fragile; hemispherical then plane, pellicle thin, adnate, viscid in damp weather, colour variable, citron-yellow, orange, or red, disc darker, but not depressed; margin even but slightly striate or wrinkled when old; gills rounded behind and almost free, connected by veins, broad, equal, shining, never powdery, yellowish-white, margin bright citron-yellow; stem 2–3 in. long, solid, firm, but spongy within, cylindrical, indistinctly striate, white or citron-yellow; spores subglobose, echinulate, 9–10 or 8 × 10 $\mu$; taste mild at first, then becoming slightly acrid.

*Russula aurata*, Fr., Epicr., p. 360; Cke., Illustr., pl. 1080; Cke., Hdbk., p. 335.

*Agaricus auratus*, Withering, Arr. iv.

In woods, under pines, &c.

Distinguished by the almost free, broad, shining gills having the edge bright lemon-yellow.

**Russula decolorans.** Fr.

Mild. Pileus 3–4 in. across, flesh rather thick, white, but becoming somewhat greyish when broken, and variegated more or less with black spots when old; spherical, then expanded and depressed, remarkably regular, viscid when moist, orange-red at first, then yellow and becoming pale, margin thin at length, striate; gills adnexed, often in pairs, crowded, thin, fragile, white then yellowish; stem up to 4 in. long, cylindrical, often rugosely striate, white; then especially inside becoming grey; spores subglobose, minutely echinulate, tinged ochraceous, 7–9 $\mu$.

*Russula decolorans*, Fries, Epicr., p. 361; Cke., Hdbk., p. 335; Cke., Illustr., pl. 1079.

In pine and mixed woods.

Agrees with *R. depallens* in the stem becoming grey, but differs in the long stem, and in the gills becoming yellow.

Gills not dusted with ochraceous powder, and not clear shining yellow.

**Russula punctata.** Gillet.

Mild. Pileus $1\frac{1}{2}$–$2\frac{1}{2}$ in. across, flesh thin, white, reddish under the cuticle; convex then flattened, viscid, rosy, disc darkest, punctate with dark rufous point-like warts, pale when old; margin striate; gills slightly adnexed, 2 lines broad, white then yellowish, edge often reddish; stem about 1 in. long, 4–5 lines thick, attenuated and whitish at the base, remainder coloured like the pileus, stuffed; spores 8–9 $\mu$ diameter.

*Russula punctata*, Gillet, Tab. Analyt., p. 48; Cke., Hdbk., p. 334.

Among grass.

*Var.* **leucopus**, Cke., Illustr., pl. 1032.

Stem pure white; agreeing in other respects with the typical form.

A small species, readily distinguished by the deep rose-coloured pileus being rough with point-like projections. The typical form is not British.

**Russula olivacea.** Fr.

Mild. Pileus 3–4 in. across, flesh white, becoming yellowish, thickish at the disc, margin thin; convex then expanded and depressed, minutely squamulosely silky, margin straight, even, dingy purple with an olive tinge, or entirely brownish-olive; gills adnexed, broad, forked and mixed with shorter ones, yellow; stem 2–3 in. long, $\frac{2}{3}$ in thick, ventricose, pale rose-colour, spongily-stuffed; spores globose, minutely granular, yellow, 9–10 $\mu$ diameter.

*Russula olivacea*, Fries, Epicr., p. 356; Cke., Hdbk., p. 326; Cke., Illustr., pl. 1041.

In pine woods, &c.

A well-marked species, distinguished by the dark-coloured, minutely broken up surface of the pileus, rose-coloured stem, and yellow gills. Differs from *R. rubra* in the deeper yellow gills and the unpolished pileus. *R. alutacea* differs in the striate and tuberculose margin of the pileus: the same features along with the powdered gills separate *R. integra* from the present species.

**Russula Linnaei.** Fr.

Mild. Pileus 3–4 in. across, flesh everywhere thick, compactly spongy, white, rigid; plane then depressed, sometimes wavy, even, glabrous, polished, dry, without a separate pellicle, all one colour, deep blood-red or dark rose; margin spreading, obtuse, not striate; gills slightly decurrent, rather thick, not crowded, broad, fragile, sparingly connected by veins, somewhat anastomosing behind, and with shorter ones intermixed, white, yellow when dry; spores white, subglobose, minutely echinulate, 9–11 × 8–9 $\mu$; stem $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, 1 in. and more thick, slightly ventricose, indistinctly fibrillosely reticulated, deep blood-red, firm but soft and spongy within, and sometimes becoming hollow.

*Russula Linnaei*, Fries, Epicr., p. 356; Cke., Illustr., pl. 1026; Cke., Hdbk., p. 326.

In woods.

Distinguished among mild species by the even blood-red pileus and stem.

Habit exactly that of *R. emetica*. Substance truly floccose but very compact, firm, thick. Stem deep blood-red (but perhaps varies to white), indistinctly fibrillosely reticulate.

Pileus without a distinct pellicle, all one colour, dark purple, blood-red, &c., opaque, not becoming pale, 3–4 in. across; gills hardly crowded, rarely connected by veins, with but few short intermediate ones, distinctly anastomosing behind. (Fries.)

**Russula chamaeleontina.** Fr.

Mild. Pileus 1–2 in. across, plane or slightly depressed, pellicle separable, rather viscid; margin even at first then slightly striate, deep rose-red, purplish-lilac, the disc or every part soon becoming yellowish, or sometimes yellowish from the first; gills slightly adnexed or free, narrow, thin, closely crowded, or somewhat forked, yellow; stem 1–3 in. long, about 2 lines thick, white, indistinctly wrinkled, imperfectly hollow; spores globose, ochraceous, 7–8 $\mu$ diameter.

*Russula chamaeleontina*, Fries, Epicr., p. 363; Cke., Hdbk., p. 338; Cke., Illustr., pl. 1098.

In woods, especially pine.

Inodorous. Very fragile and slender; usually small, but Fries says that the pileus is sometimes 3 in. across. Known among the small species with ochraceous gills and spores by the deep rose-red or purplish pileus, and absence of smell.

In mixed woods, especially pine. Sweet, inodorous, very fragile, small. Stem somewhat hollow, up to 3 in. long, but thin, slightly striate, white. Pileus thin, soon expanded, 1–2 in. across, sometimes oblique, with a thin, viscid, separable pellicle, at first flesh-coloured, soon losing colour, the disc becoming yellowish, and at length entirely yellow. Gills more or less adnexed, thin, crowded, equal, narrow, ochraceous-yellow. (Fries.)

**Russula puellaris.** Fr.

Mild. Pileus 1–1½ in. across, flesh almost membranaceous except the disc; conico-convex then expanded, at first rather gibbous, then slightly depressed, scarcely viscid, colour peculiar, purplish-livid then yellowish, disc always darker and brownish; tuberculosely striate, often to the middle; gills adnate but very much narrowed behind, thin, crowded, white then pale yellow, not shining nor powdered with the spores; stem 1–1½ in. long, 2–4 lines thick, equal, soft,

fragile, rugulose under a lens, white or yellowish; stuffed, soon hollow; taste mild; spores subglobose, pale yellow, echinulate, 10 × 8–9 $\mu$.

*Russula puellaris*, Fries, Epicr., p. 361; Cke., Hdbk., p. 337; Cke., Illustr., pl. 1065.

In woods.

Among the most frequent and readily recognised of species, occurring in troops. Always small, thin, taste mild. Allied to *R. nitida*, but more slender, colour paler, and not shining. (Fries.)

Distinguished from *R. nitida* and *R. nauseosa* by the absence of smell.

*Var.* **intensior**, Cke., Hdbk., p. 337; Cke. Illustr., pl. 1066.

Nearly the same size as the typical form; pileus deep purple, nearly black at the disc.

In woods, &c.

The stem has a tendency to become thickened at the base, and turns yellowish when touched. Spores 10 × 8 $\mu$. (Cooke.)

*Var.* **roseipes**, Secrétan, Myc. Suis., no. 483; Cke., Hdbk., p. 337; Cke., Illustr., pl. 1081.

Pileus 1–1½ in. across, margin thin shortly tuberculately striate, convex then flattened and depressed, viscid, soon dry, rosy flesh-colour, rosy-orange, or rosy with a tinge of ochre, at first spotted with white, then becoming bleached; gills free, sometimes with a decurrent tooth, crowded, equal, forked behind, connected by veins; whitish then ochraceous egg-yellow; stem about 2 in. long, 4 lines thick at the base, slightly thinner upwards, white, sprinkled here and there with rosy meal, flesh white, lacunose; taste mild; spores globose, minutely echinulate, pale ochraceous, 8–10 $\mu$. diam.

In woods.

† *Pileus white or cream-colour.*

**Russula virginea.** Cke. & Mass.

Mild. Every part persistently pure white. Pileus about 2 in. across, flesh thick, firm; convex then more or less depressed, smooth, even, viscid when moist, polished when dry, margin even, arched; gills slightly decurrent, crowded, not

1 line broad, repeatedly forked, connected by veins, brittle; stem about 2 in. long, $\frac{3}{4}$ in. thick at the base, becoming thinner upwards, slightly wrinkled longitudinally, firm, brittle, solid; spore globose with a minute apiculus at the base, almost smooth, 4 $\mu$ diameter; cystidia absent.

*Russula virginea*, Cke. & Mass., in Grevillea, vol. xix. p. 41; Cke., Hdbk., p. 380; Cke., Illustr., pl. 1197.

In woods.

Care must be taken not to confound the present with bleached forms of other species. Distinguished by every part being persistently snow-white from the youngest stage, the very narrow, crowded gills, and the very small spores.

**Russula semicrema.** Fr.

Mild. Pileus about 3 in. across, flesh thick equally so up to the margin, persistently white, firm; convex then expanded and depressed, sometimes wavy, polished white, unchangeable; margin incurved, glabrous, even; gills rather decurrent, thin, crowded, $1\frac{1}{2}$–2 lines broad, persistently white; stem 1–3 in. long, up to 1 in. and even more thick, almost equal and even, white, flesh becoming blackish when broken; spores globose, verruculose, 8–9 $\mu$ diameter.

*Russula semicrema*, Fries, Epicr., p. 350; Cke., Hdbk., p. 320; Cke., Illustr., pl. 1067.

Among leaves.

Intermediate between *R. adusta* and *R. delica*, but readily distinguished from both. Stem fleshy, solid, firm, 2–3 in. long, white, but becoming greyish and at length blackish inside when broken. Pileus compactly fleshy, convex then plane, even, glabrous, dry; disc umbilicate, margin at first involute, always even; colour in every stage persistently white, flesh also, and juiceless; gills decurrent, crowded, thin, persistently white. Smell none, taste mild. (Fries.)

Differs from *R. adusta* and *R. densifolia* in the persistently white pileus (flesh also) and gills; and from *R. delica* in the flesh of the stem becoming blackish. The outside of the stem often becomes dark with age.

**Russula lactea.** Fr.

Mild. Pileus about 2 in. across, compact and everywhere fleshy, flesh white; campanulate then convex, often ex-

centric, without a separable pellicle, always dry, white at first, even, then creamy white, minutely cracked when dry, margin spreading, even; gills free, very broad, thick, distant, rigid, forked, white; stem 1½–2 in. long, up to 1½ in. thick, equal, even, always white, solid, very compact, but spongy, and soft within; spores subglobose, echinulate, 7–9 μ.

*Russula lactea*, Fries, Monogr., ii. p. 190; Cke., Hdbk., p. 324; Cke., Illustr., pl. 1070.

*Agaricus lacteus*, Pers., Syn., p. 439.

In woods.

Distinguished by being entirely white or cream-colour; very broad, thick gills at first free then adnate, and mild taste. Care must be taken not to confound this with bleached forms of other species.

*Var.* **incarnata**, Quelet, Assoc. Fr., 1882, p. 10; Cke., Hdbk., p. 324; Cke., Illustr., pl. 1071.

Size and habit of the typical form. Pileus convex; depressed, minutely mealy then cracked into areolae, white, tinged with rose, at length tan-colour, growing pale; flesh white, sweet; stem stuffed, firm, minutely mealy, white; gills adnate, broad, forked, rigid, white then tinged yellow; spores 9 μ diameter.

Under fir-trees, &c.

**Russula nigricans.** Fr.

Mild. Pileus 3–5 in. across, very fleshy, convex then expanded, umbilicately depressed, margin incurved at first; young specimens are slightly viscid when moist, even, without a separable pellicle, whitish at first, soon sooty-olive, at length becoming broken up into squamules and black; flesh firm, white, becoming reddish when broken; gills rounded behind, slightly adnexed, thick, distant, broad, brittle, unequal, the shorter intermediate ones sometimes very scanty, pallid, becoming reddish when bruised; stem 1½–2½ in. long, 1 in. or more thick, equal, pallid when young, then black, solid; spores subglobose, rough, 8–9 μ.

*Russula nigricans*, Fries, Epicr., p. 350; Cke., Hdbk., p. 319; Cke., Illustr., pl. 1015.

In woods, &c.

Compact, fleshy, inodorous, becoming entirely black with

age. Known from *R. adusta* by the flesh becoming reddish when broken, and by the much thicker, and more distant gills. *R. densifolia* agrees with the present species in becoming red when cut, but differs in the thin, rather crowded gills.

**Russula adusta.** Fr.

Mild. Pileus 3–4 in. across, flesh thick up to the margin, firm; soon expanded and more or less depressed, margin incurved at first then straight or upturned, even, glabrous, white then brownish, finally with a scorched appearance; gills adnate then slightly decurrent, thin, crowded, unequal, pallid; stem $1\frac{1}{2}$–2 in. long, up to $\frac{3}{4}$ in. thick, pallid then sooty-grey, solid; spores subglobose, almost smooth, 8–9 $\mu$; no cystidia.

*Russula adusta*, Fries, Epicr., p. 350; Cke., Hdbk., p. 320; Cke., Illustr., pl. 1051.

In woods.

Can only be confounded with *R. nigricans*, from which it is abundantly distinct; size usually smaller; flesh juiceless, not becoming reddish, pileus at length infundibuliform; gills decurrent, thinner, crowded. Colour pallid or whitish when young, appearing scorched and sooty-grey when old; gills white then dingy, not becoming red when bruised. (Fries.)

Fries mentions a variety which is scarcely different from the typical form, except in the flesh becoming blue when broken or cut. This is *R. adusta coerulescens* (Fr.), not yet recorded for Britain.

*R. densifolia*, a species not recognised by Fries, differs from the present species in the flesh and gills becoming red when wounded. *R. semicrema* agrees in the stem turning black, but the pileus is persistently white.

*Var.* **albo-nigra**; *Russula albo-nigra*, Fries, Hym. Eur., p. 440; *Russula nigricans*, var. *albo-nigra*, Cke., Hdbk., p. 320; Cke., Illustr., pl. 1016; *Agaricus albo-niger*, Krombh., p. 27, t. 70, f. 16–17.

Pileus about 2 in. across, flesh rather thick, firm, white, turning blackish when bruised; convex then expanded, at length infundibuliform, whitish or pallid, smoky at the incurved margin; gills slightly decurrent, thin,

crowded, unequal, whitish then tinged brown, stem 1–1½ in. long, 1–1½ in. thick, pallid then sooty-black, solid, flesh white, turning blackish when broken; spores 8 $\mu$ diameter.

Among grass under trees.

Form abnormal; stem short, very thick; pileus thin and small in proportion to the stem, rather wavy. Taste rather acrid, not pleasant. (Fries.)

**Russula delica.** Fr.

Mild. White. Pileus 4–6 in. across, flesh firm, white, thick to the margin; convex then expanded and umbilicate or depressed, even, shining, glabrous, but often with a white superficial silkiness, margin incurved; gills decurrent, thin, distant, brittle, unequal, white or with a slight tinge of green; stem 1–1½ in. long, up to 1 in. thick, equal, solid, firm; spores minutely echinulate, white, broadly elliptical, 8–10 × 6–7 $\mu$.

*Russula delica*, Fries, Epicr., p. 350; Cke., Hdbk., p. 320; Cke., Illustr., pl. 1068.

*Lactarius exsuccus*, Otto; Cke., Hdbk., p. 311; Cke., Illustr., pl. 981.

In woods.

Dr. Cooke considers that the present fungus and *Lactarius exsuccus* are distinct species. His reasons for this are given in detail in Grevillea, vol. xvi. p. 65.

Dry places in pine woods. Stature and colour unchangeable, entirely white as in *Lactarius vellereus* and *Lactarius piperatus*, but readily distinguished by the absence of milk in the gills. Stem solid, short (1–2 in.), ½ in. and more thick, even, glabrous, white. Pileus everywhere fleshy, firm, umbilicate then infundibuliform, regular, even everywhere, glabrous, but often with a white downiness, 3–5 in. broad; margin incurved, not striate. Flesh firm, juiceless, not very thick, white; gills decurrent, thin, but distant, very unequal, exuding drops of water in damp weather. (Fries.)

Pileus even broader than the last (*L. vellereus*), white, fleshy; flesh white without milk and not changing colour, Gills distant, white, with often a tinge of verdigris, very crisp and brittle, somewhat forked, ¼ in. broad; con-

nected by veins. Spores white, round. Stem obtuse, short, thick, surface like that of the pileus. (Berk.)

**Russula densifolia.** Secr.

Mild. Pileus 3–4 in. across, flesh thick, firm, white, becoming red when broken, at length blackish; convex then depressed, smooth, whitish when young, then dingy, brown or greyish, disc darker, margin arched, even; gills adnate, appearing to be slightly decurrent when the pileus is depressed, 2–3 lines broad, close, thin, white or with a tinge of pink; stem 1½–2 in. long up to ¾ in. thick, equal, even, slightly mealy, white then grey, at length blackish; spores 7–8 $\mu$ diameter.

*Russula densifolia*, Secrétan, Myc. Suis., i. p. 476; Cke., Hdbk., p. 320; Cke., Illustr., pl. 1017.

In woods, &c.

Allied to *R. adusta*, and about the same size and appearance, but distinguished by the flesh turning red on being broken. Smaller and with much thinner and more crowded gills than *R. nigricans*.

†† *Pileus clear yellow.*

**Russula citrina.** Gillet.

Mild. Pileus 2–3 in. across, slightly fleshy at the disc, margin thin; convex then more or less expanded and slightly depressed, rather viscid when moist, smooth, slightly wrinkled at the margin when old, bright lemon-yellow, colour usually uniform, sometimes paler at the margin, occasionally with a greenish tint, centre of pileus at length becoming pale ochraceous; pellicle separable; gills slightly decurrent, broadest a short distance from the margin, and gradually becoming narrower towards the base, forked at the base and also sometimes near the middle, white, 1½ line deep at broadest part; stem 2–3 in. long, about 4 lines thick, equal or slightly narrowed at the base, slightly wrinkled, straight or very slightly waved, solid; spores subglobose, echinulate, 8 $\mu$ diameter.

*Russula citrina*, Gillet, Hymen. Fr., Suppl. 6; Cke., Hdbk., p. 333; Cke., Illustr., pl. 1078.

In woods.

Known by the clear lemon-yellow or citron-coloured pileus and the persistently white gills and stem. The taste is mild at first, but becomes slightly acrid if kept in the mouth for a short time.

**Russula fingibilis.** Britz.

Mild. Pileus about 2 in. across, rather fleshy at the disc, margin thin, persistently even; convex then plane or depressed, viscid, pale clear yellow, disc darker; gills narrowed behind and almost free, rather crowded, unequal, about 2 lines broad at the middle, thin, white; stem 1–1½ in. long, 4 lines thick, equal, soft, white, spongy, at length hollow; spores broadly elliptical, minutely echinulate, 9 and 7 $\mu$.

*Russula fingibilis*, Britz., Hym. Sudb., pt. iv. f. 32; Cke., Hdbk., p. 332; Cke., Illustr., pl. 1048.

Among grass under trees.

Distinguished among species with a yellow pileus by being very viscid, persistently mild taste, white gills, and entire margin of pileus.

### ††† *Pileus green or olive.*

**Russula olivascens.** Fr.

Mild. Pileus 2–3 in. across, flesh thick up to the margin white; convex then expanded and umbilicate, olivaceous, the disc becoming yellowish, margin even; gills slightly adnexed, narrowed behind, crowded, 1½–2 lines broad in front, nearly equal, white then yellowish; stem 1–2 in. long and up to ¾ in. thick, firm, even, white, spongy inside; spores 10 $\mu$.

*Russula olivascens*, Fries, Vet. Ac. Förh., 1861, n. 34; Cke., Illustr., pl. 1035; Cke., Hdbk., p. 321.

Woods and among bushes, &c.

Stem firm but spongy inside, 1–2 in. long, almost 1 in. thick, usually becoming thinner upwards, even, white. Pileus convex then expanded umbilicate, truly fleshy up to the margin, 2-scarcely-3 in. across, olivaceous, becoming yellowish; gills slightly adnexed, broadest in front, almost equal and rarely forked, white then yellowish. Taste mild. Placed in the *Furcatae* on account of its habit, yet the gills

are rarely forked, and in this respect might be in the section *Fragiles;* in many other points it agrees with the *Compactae.* (Fries.)

**Russula heterophylla.** Fr.

Mild. Flesh thick, firm, white; convex then plane; usually becoming depressed, quite even and polished, pellicle very thin; margin thin, often more or less incurved, even or densely but slightly striate; colour variable, greenish, the disc becoming ochraceous, yellowish brown, &c.; gills almost free, very narrow, rarely 1 line broad, very much crowded, forked and with many shorter ones, white; stem about 1½ in. long, up to 1 in. thick, nearly equal, solid, firm, white; spores subglobose, echinulate, 7–8 $\mu$ diameter; no projecting cystidia.

*Russula heterophylla*, Fries, Epicr., p. 352; Cke., Hdbk., p. 328; Cke., Illustr., pl. 1044 and 1045.

In woods, &c.

A very distinct species, easily recognised by the even pileus, and very narrow, closely-crowded white gills. *R. cyanoxantha* differs in the broad gills furnished with numerous projecting cystidia.

Colour very variable. Taste always mild, as in *Russula cyanoxantha*, from which the present differs in its smaller size, thinner pileus, not rugulose, never reddish or purplish, the thin pellicle closely adnate, stem firm, solid, gills thin, exceedingly narrow, very much crowded, shining white, mixed with many shorter and forked ones. Among several forms the following is readily distinguished. (Fries.)

*Var.* **galochroa**, Fr., Mon., ii. p. 195; *Russula galochroa*, Cke., Hdbk., p. 328; Cke., Illustr., pl. 1089.

Stem solid, firm, 1–2 in. long, ½ in. thick, never tinged with red. Pileus almost plane, viscid in damp weather, usually dry, greenish-white, even, but often with scattered white floccose spots. Gills very thin, more or less forked and unequal; spores 5–6 $\mu$.

Especially in heathy birch woods.

**Russula azurea.** Bres.

Mild. Pileus about 2 in. across, convex, then expanded, and more or less depressed, dry, pale glaucous-green, or

rather dark olive-green, disc often darker, and frequently with a tinge of purple, covered everywhere at first with a dense, whitish bloom, margin very slightly striate; cuticle separable; flesh about 2 lines thick, becoming thinner at the extreme margin, firm, white; gills very narrow behind, and very slightly adnexed, broader in front, 2 lines broad, crowded, brittle, often forked behind, with a few shorter ones that reach nearly to the base, connected by veins, pale cream colour from the first, not becoming darker; basidia clavate, sterigmata elongate, spores subglobose, minutely warted, colourless, about 9 × 8 $\mu$ diameter; cystidia absent; stem $1\frac{1}{2}$ in. long, $\frac{1}{2}$ in. thick, nearly equal or slightly swollen at the base, very slightly longitudinally rugulose, solid but spongy inside, hence not firm when compressed.

*Russula azurea*, Bresadola, Fungi Trident., t. 24; Cke., Hdbk., p. 328; Cke., Illustr., pl. 1088.

Among grass under trees.

Allied to *R. cyanoxantha*, but smaller, and at once distinguished by the dense mealy layer, resembling bloom, on the pileus, the smooth spores, and absence of cystidia.

**Russula virescens.** Fr.

Mild. Pileus 3–5 in. across, flesh rather thick, white; globose then expanded, and at length depressed, often unequal, always dry, not furnished with a distinct pellicle, the flocculose cuticle becoming broken up into areolate warts; margin straight, obtuse, even, dingy opaque green, gills free, somewhat crowded, narrowest in front, equal or sometimes forked, a few short ones intermixed, white; stem solid, spongy within, firm, white; spores 8 × 10 $\mu$.

*Russula virescens* Fries, Epicr., p. 355; Cke., Hdbk., p. 324; Cke., Illustr., pl. 1039.

In woods.

Readily distinguished from every species by the green pileus without a pellicle, at first innately flocculose then rivulose, and broken up into areolate squamules. (Fries.)

**Russula furcata.** Fr.

Mild at first but soon bitter. Pileus 3–4 in. across, fleshy, compact, gibbous then plano-depressed, or infundibuliform, even, glabrous, but often frosted with a slight silkiness,

sometimes dark lurid green, sometimes greenish-umber; pellicle separable; margin thin, incurved at first then spreading, always even; flesh firm, somewhat cheesy, white; gills adnato-decurrent, rather thick, somewhat distant, broad, attenuated at each end, forked, white; stem solid, firm, 2–3 in. long, equal or narrowed at the base, even, white, firm, solid; spores 7–8 × 9 $\mu$.

*Russula furcata*, Fries, Epicr,, p. 352; Cke., Hdbk., p. 321; Cke., Illustr., pl. 1036.

In woods and in grass under trees.

Differs from *R. cyanoxantha* in the broad gills being narrowed at both ends. *R. olivascens* differs in the broad gills becoming yellowish at maturity, and the larger spores.

The leading points of the present species are the slightly decurrent, thickish, frequently-forked gills, and the even pileus with a very delicate silky bloom, and the separable, entire pellicle.

*Var.* **pictipes**, Cke., Hdbk., p. 321; Cke., Illustr., pl. 1086.

Mild. Pileus 4–6 in. across, flesh thick, white, dingy green, disc darker, even; margin even, or becoming slightly striate; gills adnate, rather distant, white, 2–3 lines broad; stem 4–5 in. long, 1 in. thick at the apex, becoming a little thinner downwards, whitish; rosy at the apex; tinged green below; spores 8 $\mu$ diameter.

In woods.

Cuticle of pileus separable, flesh rosy below.

*Var.* **ochroviridis**, Cke., Hdbk., p. 322; Cke., Illustr., pl. 1100.

Mild. Pileus 4–5 in. across, flattened then depressed, at first viscid, polished when dry, with a thin adnate pellicle, ochraceous towards the margin, disc olivaceous or sooty; margin spreading, even, acute; gills slightly adnexed, narrowed at both ends, 2 lines broad at the middle, lanceolate, crowded, many furcate, white, becoming slightly dingy when old; stem about 2 in. long and 1 in. thick, reticulately rugulose, white, rarely becoming pallid, stuffed and spongy within, flesh becoming sooty when cut; spores white, subglobose, faintly granular, 9 × 7 $\mu$.

On the ground.

Resembling *R. ochroleuca* in the rugose stem, but differs in not becoming grey, in the dark, dingy olive centre of the pileus, narrow gills, discoloration of the flesh and the mild taste. In habit it resembles *R. furcata*, but differs in the paler greenish-ochre pileus, narrower gills, rugose stem, and discoloured flesh. (Cooke.)

**Russula aeruginea.** Lindbl.

Mild. Pileus 3–4 in. across, flesh rather thick, white, fragile, convex then expanded, disc darker and depressed, glabrous, rather dry, verdigris-green, margin striate; gills narrowed behind and slightly adnexed, 3 lines and more broad in front, rather distant, distinct, clear white, sometimes spotted with brown; stem about 2 in. long and 1 in. thick, even, glabrous, equal, always clear white, firm, solid; spores subglobose, echinulate, 8–10 $\mu$.

*Russula aeruginea*, Lindblad, MS., in Fries, Monogr., ii. p. 198; Cke., Hdbk., p. 333; Cke., Illustr., pl. 1090.

In woods.

Distinguished from every other species in the section *Fragiles* by the mild and pleasant taste. (Fries.)

Distinguished among the green species by the verdigris-green colour of the pileus, with a distinctly striate margin; gills very broad in front, and persistently mild taste.

†††† *Pileus red, brownish, purple, sometimes with more or less green interspersed.*

**Russula lepida.** Fr.

Mild. Pileus 3–4 in. across, flesh almost equally thick everywhere, firm, cheesy; convex then expanded, scarcely depressed, obtuse, opaque, not polished, with a silky look, at length cracked into squamules; blood-red with a rosy tinge, becoming pale or whitish, especially at the disc; gills rounded behind, adnexed, rather thick, somewhat crowded, often forked, connected by veins, white; the edge near the front red, due to the colour of the pileus running for some distance down the margin of the gill; spores 8–10 × 6–8 $\mu$.

*Russula lepida*, Fries, Epicr., p. 355; Cke., Hdbk., p. 325; Cke., Illustr., pl. 1072, 1073.

In woods.

Pileus almost equally fleshy, blood-red with a rosy tinge, disc always becoming whitish. (Fries.)

*R. virescens* and *R. cutefracta* agree with the present species in having the cuticle of the pileus broken up; the former differs in the green colour, the latter also differs in never becoming pale at the disc.

**Russula xerampelina.** Fr.

Mild. Pileus 3–4 in. across, fleshy, flesh compact, white then yellowish; convex then expanded, at length depressed, without a distinct pellicle, always dry, opaque, even, but usually very minutely cracked when old, and under a lens the cuticle is seen to be broken up into minute granules, margin spreading, not striate; colour variable, usually rosy-purple, the disc becoming pale and yellowish-white, sometimes there is a tinge of olive; gills adnexed, rather crowded, broadest in front, forked behind, white then yellowish-tan; stem 2–3 in. long, 1 in. thick, base usually thickened, even, white or tinged red, firm, spongy within, sometimes becoming hollow; spores ochraceous, 8–10 × 6–7 $\mu$.

*Russula xerampelina*, Fries, Epicr., p. 356; Cke., Hdbk., p. 326; Cke., Illustr., pl. 1053 and 1074.

In woods.

Somewhat resembling *R. integra*, but distinguished by the narrower and more crowded gills not being powdered with the spores.

Differs from *R. ochroleuca* and *R. granulosa* in the mild taste and in the darker ochraceous gills.

**Russula cutefracta.** Cke.

Mild. Pileus 3–5 in. across, flesh thick, white, tinged purple under the cuticle, convex, becoming slightly depressed at the disc, cuticle cracking from the margin inwards into minute, firmly adnate areolae, otherwise even; variable in colour, purple, dull red, &c.; gills adnexed, somewhat crowded, narrowed behind and sometimes nearly free, forked, 2 lines broad, white; stem about 3 in. long, up to 1 in. thick, nearly equal or a little thinner above, smooth, white with a slight tinge of purple, solid, firm; spores globose, echinulate, 10 $\mu$ diameter.

*Russula cutefracta*, Cke., Grev., x. p. 46; Cke., Hdbk., p. 325; Cke., Illustr., pl. 1024 and 1040.

In woods.

Pileus 3–4 in. or more; stem 3 in. long, often 1 in. thick. Allied to *R. virescens*, which it resembles in the cracking of the cuticle, but differs in the purple tint beneath, even in the green specimens, and in the tinted stem, as well as in the colour of the pileus, which is of a darker and different shade of green, and sometimes of a deep bluish-purple, as well as of a madder-red. (Cooke.)

**Russula vesca.** Fr.

Mild. Pileus about 3 in. across, flesh rather thick, firm, white, convex then plane, at length depressed, viscid, marked with radiating, slightly raised wrinkles; flesh-red, disc darker; gills adnexed, rather narrow, thin, crowded, whitish; stem $1\frac{1}{2}$–2 in. long, about $\frac{3}{4}$ in. thick, rigid outside and with slight anastomosing wrinkles, white, solid, flesh white, becoming tinged with rust-colour when cut, and then having a crab-like smell; spores globose, echinulate, white, 9–10 $\mu$ diameter.

*Russula vesca*, Fries, Epicr, p. 352; Cke., Hdbk., p. 327; Cke., Illustr., pl. 1075.

In woods.

Firm, mild and sweet to the taste. Pileus with minute radiating wrinkles or streaks. Flesh white, that of the stem more especially becoming brownish when exposed to the air. The broken stem has a smell much resembling crab or lobster.

Stem solid, compact, rigid outside and with minute ridges anastomosing to form a network, base often attenuated, pure white. Pileus fleshy, rather firm, plano-depressed, rugulosely veined, with a viscid pellicle, flesh-red, disc darker, margin at length spreading. Flesh cheesy, firm, pure white. Gills adnate, crowded, thin, white, many shorter and forked ones intermixed, but scarcely connected by veins. Size medium. Taste mild, pleasant. (Fries.)

*Var.* **Duportii**; *Russula Duportii*, Phil., Grevillea, xiii. p. 49; Cke., Hdbk., p. 327; Cke., Illustr., pl. 1042A.

Pileus $1\frac{1}{2}$–$2\frac{3}{4}$ in. broad, the centre rufous, or flesh-red, margin bluish, compact, fleshy, firm, convexo-plane, de-

pressed, smooth, dry, margin even, obtuse. Stem 1 in. or more high, 5–8 lines thick, spongy, stuffed, minutely striate, glabrous, white; gills rounded behind, broad, distant, white; spores 10 $\mu$ diameter.

On the ground in woods.

The flesh turns reddish-brown when cut, and the odour is that of the common crab. (Phillips.)

*Var.* lilacea; *Russula lilacea*, Quelet, Bull. Bot. Soc. Fr., 1876, t. xi., f. 8; Cke., Hdbk., p. 327; Cke., Illustr., pl. 1054.

Mild. Pileus 2–3 in. across, flesh thickish, lilac under the cuticle; convex then depressed, viscid, violet or purple, the striate margin becoming pale; gills adnexed, distant, ventricose, white, connected by veins; stem $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, fragile, white, base more or less tinged with rose-colour, pruinose above, spongy, flesh white, becoming rusty when cut.

In woods.

*Var.* Barlae; *Russula Barlae*, Quelet, Assoc. Fr., 1883, t. vi. f. 12; Cke., Hdbk., p. 335; Cke., Illustr., pl. 1061.

Mild. Pileus 2–3 in. across, flesh rather thick; viscid then dry, even, peach-coloured, or yellow tinged with orange-red, sometimes cracking; flesh firm, sweet, white, smelling slightly of melilot; gills narrowed behind, almost free, 2 lines and more broad, white then becoming tinged ochraceous; stem 1–$1\frac{1}{2}$ in. long, up to $\frac{3}{4}$ in. thick, silkily pruinose, snow-white, spongy, firm, flesh white turning reddish-brown when cut; spores 10 × 12 $\mu$.

Among grass under trees.

The flesh of the stem turns reddish-brown when cut, and the odour is rather that of crab than of melilot. (Cooke.)

**Russula depallens.** Fr.

Mild. Pileus 3–4 in. across, flesh rather thick, white; convex then plane, rarely depressed, but often wavy and deformed, smooth, pellicle adnate, margin spreading, even, slightly striate when old, colour reddish or brownish at first, then whitish or yellowish, especially at the disc, opaque in every state; gills adnexed, broad, crowded, distinct, but

often forked at the base, and with shorter ones intermixed, whitish; stem about 1½ in. long, solid, firm, usually attenuate at the base, white, becoming grey when old; spores subglobose, echinulate, 7–8 $\mu$.

*Russula depallens*, Fries, Epicr., p. 353; Cke., Hdbk., p. 323; Cke., Illustr., pl. 1021.

In woods, &c.

Smell none, taste mild. Pileus sometimes deep crimson-lake at first, becoming white, especially at the disc; stem pure white at first, then grey. Differs from *R. decolorans* in the white gills.

**Russula cyanoxantha.** Schaeff.

Taste mild. Pileus 2–4 in. across, convex then plane, at length depressed or infundibuliform, sometimes even, at others rugulose or virgate, viscid, margin bent down, then expanded, remotely and slightly striate, colour very variable, in the typical form lilac or purplish to olive-green, disc usually becoming pale and often yellowish; margin generally bluish or livid-purplish; flesh firm, cheesy, white, usually reddish below the separable cuticle; gills somewhat rounded behind, connected by veins, slightly crowded, broad, mixed with forked and shorter ones, shining white; stem 2–3 in. long, up to 1 in. thick, equal, glabrous, even, white; spongily stuffed, but firm, often cavernous inside when old; spores 8–9 $\mu$; cystidia numerous, pointed.

*Agaricus cyanoxantha*, Schaffer.

*Russula cyanoxantha*, Fr., Monogr., ii. p. 194; Cke., Hdbk., p. 328; Cke., Illustr., pl., 1043, 1076, and 1077.

Taste mild, pleasant, and in this respect allied to *R. vesca*, but in the last named the colour of the pileus is constant, whereas in the present the colour is very variable; this, and other points of difference are constant. When old the pileus is sometimes pallid, greenish-white, but mixed with purple. (Fries.)

The broad, rather distant gills with numerous projecting, pointed cystidia, separate the present species from *R. heterophylla*. *R. vesca* differs distinctly in the reticulately rugulose stem. *R. furcata* differs in the adnato-decurrent, thickish gills, and in becoming slightly acrid in the mouth, although mild at first.

Cooke has figured a form (pl. 1077) having the pileus very pale rosy lilac or almost white, disc yellowish.

**Russula elephantina.** Fr.

Mild. Pileus 3–4 in. across; equally fleshy but not very thick; convex and umbilicate, glabrous, brownish-tan, margin paler, incurved, undulating, even; gills obtusely adnate, arcuate, rather crowded, thin, whitish, soon marked with yellowish spots; stem 2–3 in. long, 1 in. thick, hard, white, flesh firm, white.

*Russula elephantina*, Fries, Epicr., p. 350; Cke., Hdbk., p. 320.

In woods.

The absence of any tendency to turn black or red, brownish-tan pileus, and obtusely adnate, thin, crowded gills, separate this species from its allies. It is doubtful as to whether the present species occurs in Britain. The only evidence is the quotation of Bolton's fig. 28—with a note of interrogation—by Fries.

Habit that of *R. foetens* but without smell, and pileus firm and everywhere fleshy. Stem solid, stout, very hard, 2–3 in. long, 1 in. thick, even, glabrous, white both outside and inside. Pileus fleshy, convex and umbilicate at first, 3 in. broad; margin incurved, glabrous, undulate, thin, and exceeding the gills, but never striate, pellicle not separable; brownish-tan, paler towards the margin, not changing colour, flesh equal, compact, thin in proportion to the size of the fungus; gills obtusely or somewhat sinuately adnate, arcuate, rather crowded, thin, divided behind, unequal in front, white, reddish-yellow when bruised. Smell none. (Fries.)

**Russula mustelina.** Fr.

Mild. Pileus 2–3 in. across, equally fleshy, firm, convex then expanded, centre depressed, at length plane and often wavy, glabrous, even, margin inflexed; pellicle viscid in rainy weather, adnate, brownish or dingy yellowish, opaque; flesh white, unchangeable; gills slightly rounded behind and adnexed, broadest in front, many shorter ones intermixed, crowded, thin, connected by veins, white; stem fleshy, solid, about 2 in. long, equal, even, glabrous, white; spores 7–8 $\mu$ diameter.

*Russula mustelina*, Fries, Epicr., p. 351; Cke., Hdbk., p. 321; Cke., Illustr., pl. 1018.

In woods.

The only species belonging to the present section having a yellow or brownish pileus. There is no tendency to turn black in any part.

## *Sect.* II. TASTE ACRID.

### * *Gills yellow or ochraceous.*

### † *Pileus yellow or ochraceous.*

**Russula fellea.** Fr.

Acrid. Pileus 1–3 in. across, flesh thin, straw-colour; convex then plane, polished, glabrous, pale ochraceous or straw-colour, disc darker as a rule, margin even, slightly striate when old; pellicle of the pileus closely adnate, thin; gills adnate, crowded, thin, narrow, slightly connected by veins, mixed with a few shorter ones, bifid behind, straw-colour; stem about 2 in. long, $\frac{1}{2}$ in. thick, equal, even, white then straw-colour, spongy and stuffed then hollow; very acrid.

*Russula fellea*, Fries, Epicr., p. 354; Cke., Hdbk., p. 330; Cke., Illustr., pl. 1058.

In woods, especially beech.

Smell none. Readily distinguished by the pale ochraceous straw-colour of every part, and the intensely acrid taste. The gills sometimes exude drops of water in damp weather.

Superficially resembling *R. ochracea*, but readily distinguished by the very acrid taste.

**Russula claroflava.** Grove.

Acrid? Pileus 2–3 in. across, flesh rather thick, white, yellow beneath the cuticle; convex, at first bullate, then plane, slightly depressed in the centre, deep chrome-yellow, margin turned down, at length patent, even or slightly striate when old, often paler than the disc, but sometimes of a deeper colour, cuticle not easily separable; gills scarcely crowded, adnexed and narrowed behind, not united behind,

white, then altogether pale lemon-yellow, at length subochraceous; stem $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. thick, smooth, white, cylindrical, blunt at the base, spongy within, at length rugose and cinereous, or even blackish; spores globose, minutely waste, 9 $\mu$ diam.

*Russula claroflava*, Grove, Midl. Nat., 188, p. 265.

*Russula ochroleuca*, var. *claroflava*, Cke., Hdbk., p. 380; Cke., Illustr., pl. 1196.

Among grass in damp places.

Agreeing with *R. ochroleuca* in the white stem becoming grey, but differing in the clear deep chrome-yellow pileus, and in the white gills becoming pale lemon-yellow, then somewhat ochraceous.

The smooth, even, rigid pileus, at length cinereous stem, and coloured gills are its distinguishing features. (Grove.)

### †† *Pileus red or purple.*

**Russula rubra.** Fr.

Acrid. Pileus 3–4 in. across, flesh rather thick, firm, fragile, white, red under the cuticle; convex then expanded, becoming depressed, absolutely dry, without a distinct pellicle, polished, even, deep blood-red, sometimes with a shade of purple, disc darker, becoming tan-colour and minutely cracked with age; margin spreading, even, often wavy; gills obtusely adnate, broad, rather crowded, white then yellowish, mixed with forked and shorter ones; stem 2–3 in. long, about 1 in. thick, solid, even, sometimes variegated with red; spores 8–10 $\mu$; cystidia pointed, projecting very slightly.

*Russula rubra*, Fries, Epicr., p. 354; Cke., Hdbk., p. 325; Cke., Illustr., pl. 1025.

In woods.

A very showy species; taste very acrid; very hard and rigid; very distinct from all other species of this section in the even, polished pileus without a distinct pellicle, the somewhat grumous flesh, and exceedingly acrid taste. (Fries.)

*Var.* **sapida**, Cke., Hdbk., p. 326; Cke., Illustr., pl. 1087; *Russula atropurpurea*, Krombh., t. 64, f. 5, 6.

Resembling the typical form in habit, size, and colour; differing only in being persistently mild to the taste.

In woods.

**Russula drimeia.** Cke.

Very acrid. Pileus 2–4 in. across, flesh rather thick, firm, white; convex then expanded and more or less depressed, scarcely viscid when moist, opaque when dry, varying from bright purple to dark rose-colour; gills slightly adnexed, narrowed behind, not much crowded, about 2 lines broad, forked at the base, pale primrose-yellow at first, then deeper clear yellow; stem 2–4 in. long, cylindrical, nearly or quite equal, purple, but paler than the pileus, sometimes rather mealy, solid; spores very pale ochre in the mass, 7–9 $\mu$ diameter.

*Russula drimeia*, Cke., Grev., x. p. 46; Cke., Illustr., pl. 1023; Cke., Hdbk., p. 324.

*Russula expallens*, Gillet, Hym. Fr., pl. 49; Cke., Hdbk., p. 330; Cke., Illustr., pl. 1029.

In woods.

Readily distinguished by the purple pileus and stem, clear yellow gills, and very acrid, peppery taste.

Pileus 2–4 in. broad, stem 2–3 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. thick. So intensely peppery that after tasting a small fragment, the tongue tingled for more than half an hour. The colour and habit similar to *R. Queletii*, but distinguished by the yellow gills, ochraceous spores, and intensely peppery taste. (Cooke.)

**Russula veternosa.** Fr.

Acrid. Pileus about 2 in. across, flesh thin, soft, white; plane when adult, centre depressed, covered with a thin, adnate, rather viscid pellicle, rosy or flesh-colour, soon becoming pale, disc usually whitish or yellowish; margin even, scarcely membranaceous; gills adnate, crowded, narrow, broadest in front, shorter ones intermixed, white then straw-colour; stem 2–3 in. long, $\frac{1}{2}$ in. thick, soft, spongy then hollow, fragile, equal, even, white; spores subglobose, echinulate, 7–9 $\mu$.

*Russula veternosa*, Fries, Epicr., p. 254; Cke., Hdbk., p. 334; Cke., Illustr., pl. 1033 and 1092.

In woods.

Pileus 2–3 in. across, rosy or flesh-colour, soon becoming pale, disc whitish or yellowish. (Fries.)

Distinguished among species with pale yellow gills by the clear rosy or pinkish flesh-coloured, quite even pileus, and the even, white stem which soon becomes hollow.

**Russula maculata.** Quel.

Acrid. Pileus 2–3 in. across, flesh thin, white, firm; convex then plane or slightly depressed, viscid, reddish flesh-colour, then pallid or yellowish especially at the disc, irregularly blotched or spotted with purple or brown; margin often wavy, often cracked when old; gills adnate, narrowed behind, 2 lines broad, forked, pale sulphur then peach-colour; stem 1–1½ in. long, ½ in. or more thick, equal, with anastomosing wrinkles, white or tinged rose-colour, then spotted with ochre, solid; spores 10 $\mu$ diameter.

*Russula maculata*, Quel., Soc. Bot. France, 1877, t. 5, f. 8; Cke., Hdbk., p. 322; Cke., Illustr., pl. 1069.

In woods.

Somewhat resembling *R. depallens*, but smaller, acrid, stem not becoming grey.

**Russula serotina.** Quel.

Acrid. Pileus up to 1 in. across, flesh thin, white; globose then more or less expanded, purplish-brown or olivaceous, margin lilac, covered with a white bloom at first; gills almost free, about 1 line broad, not crowded, white, then with a yellow tinge, margin slightly broken; stem about 1 in. long, 1½ line thick, slightly wrinkled, white, rather mealy, stuffed; spores 8–9 $\mu$ diameter.

*Russula serotina*, Quelet, Soc. Bot. France, 1878, p. 289, t. 3, f. 11; Cke., Hdbk., p. 327; Cke., Illustr., pl. 1042B.

On the ground under beeches, &c.

Readily distinguished by its small size, the pileus rarely measuring 1 in. across.

** *Gills white.*

† *Pileus ochraceous or umber.*

**Russula ochroleuca.** Fr. (fig. 1, p. 3.)

Acrid. Pileus 3–4 in. across, flesh thick; convex then ex-

panded and depressed, polished, pellicle thin, closely adnate, dingy ochraceous-yellow, becoming pale, margin spreading, almost even; gills adnexed, rounded and connected behind, 3 lines broad, with few or no shorter ones, white then pallid; stem 2–3 in. long, $\frac{3}{4}$ in. thick, almost equal, spongy, reticulately wrinkled, white then grey, stuffed; spores subglobose, $8 \times 9\ \mu$; cystidia absent.

*Russula ochroleuca*, Fries, Epicr., p. 358; Cke., Hdbk., p. 332; Cke., Illustr., pl. 1049.

In fir woods, &c.

Distinguished by the dingy yellow pileus, broad white gills rounded behind, and the grey stem. The centre of the pileus is sometimes rather scurfy, owing to the breaking up of the cuticle.

*R. granulosa* differs in the stem not becoming grey; gills narrowed behind, and in the numerous, slightly projecting, pointed cystidia. *R. claroflava* differs in the chrome-yellow pileus, and in the white gills becoming pale lemon-yellow, then somewhat ochraceous,

Structure and size, also in the acrid taste, agreeing with *R. emetica;* differs distinctly in the stem being slightly reticulately rugulose, and white then becoming greyish; pellicle of pileus adnate, margin persistently even for a long time, gills rounded behind, becoming pallid; colour of pileus constantly yellow, becoming pale. Inodorous like *R. emetica.* (Fries.)

**Russula granulosa.** Cooke.

Acrid. Pileus 2–3½ in. across, flesh rather thick, firm, white; convex then expanded, becoming depressed or even infundibuliform, viscid at first, ochraceous, disc darker and becoming broken up into minute granules, owing to the cracking of the cuticle, margin even or faintly striate when old; gills nearly free, narrowed behind, rather crowded, equal, rarely forked, white; stem 2–3 in. long, nearly or quite equal, minutely granular or mealy throughout, granules snow-white at the apex, brownish below, internally white, spongy; spores rough, subglobose, white, apiculate, 11–12 $\mu$; cystidia pointed, only slightly projecting.

*Russula granulosa*, Cke., Hdbk., p. 332; Cke., Illustr., pl. 1038.

On the ground under trees.

Habit nearly that of *R. ochroleuca*, which it also resembles in colour, but differing in the darker and minutely granular disc, as well as the mealy stem, which is not at all grey; the cuticle of the pileus is continuous from the margin for some distance along the edge of the gills. (Cooke.)

The disc is often granular in *R. ochroleuca*, and the present species is best distinguished by the granular, persistently white stem, gills narrowed behind, and with projecting cystidia. *R. claroflava* differs in the stem turning grey and the gills yellow. Finally, *R. citrina* differs in the clear lemon-yellow pileus and mild taste.

**Russula foetens.** Fr.

Acrid. Smell fœtid. Pileus 3–6 in. across, flesh rather thin, rigid and fragile, pallid; subglobose then expanded and becoming depressed, pellicle adnate, not separable, viscid in damp weather, dingy ochraceous yellow, becoming pale; margin membranaceous, sulcate for a considerable distance from the edge, at length tuberculose, incurved at first; gills adnexed, crowded, connected by veins, with numerous forked and shorter ones, 2–3 lines broad, whitish, when young exuding drops of water; stem about 2 in. long, $\frac{1}{2}$–1 in. thick, whitish, stuffed then hollow; spores 8–10 $\mu$; cystidia absent.

*Russula foetens*, Fries, Epicr., p. 356; Cke., Hdbk., p. 329; Cke., Illustr., pl. 1046.

In woods.

Large, very rigid, easily known by the penetrating empyreumatic smell; pileus at length upturned and wavy. Gills (free at first) thin, becoming slightly tinged yellow, dingy when bruised. (Fries.)

Smell sometimes almost none, known by the rigid, dingy ochraceous pileus with a sulcate, tuberculose margin. Bursting through the ground like a ball, then expanding.

*Var.* **subfoetens**; *Russula subfoetens*, Smith, Journ. Bot., 1873, p. 337; Cke., Hdbk., p. 329; Cke., Illustr., pl. 1047.

Pileus bullate, rather viscid, disc fleshy, margin somewhat membranaceous; gills thick, distant and branched; stem not so stout as in *R. foetens;* smaller, colour somewhat disagreeable; taste slightly acrid; spores 10 × 8 $\mu$.

On the ground.

Gregarious. Pileus 4–5 in. broad, at first convex, the margin broadly folded inwards, convex, at length more or less depressed with the margin somewhat vaulted, fleshy in the centre, the margin thin, furrowed and tubercled, the striae appearing as if a glutinous membrane were stretched over them, dirty yellow, rather brittle. Gills forked, dirty white or yellowish, moderately broad, connected by veins. Stem 3–4 in. high, above 1 in. thick, obtuse, incrassated at the base, ruggedly hollow within, as if eaten by snails, white or with a dirty yellow tinge, depresso-tomentose, beneath the gills minutely pitted longitudinally, flesh rather yellow. Highly acrid, odour very strong, and penetrating, empyreumatic, somewhat resembling that of prussic acid, but exceedingly disagreeable. (Berk.)

**Russula consobrina.** Fr.

Acrid. Pileus about 3 in. across, flesh rather thin at the disc, becoming membranaceous at the margin, fragile, white, greyish below the thick, viscid, separable cuticle; campanulate then expanded, at length depressed, dark grey or olive-brown, margin spreading, even, although membranaceous; gills at first free, then appearing to be adnate owing to the expansion of the pileus, broad, crowded, clear white, forked, and with shorter intermediate ones; stem 2–3 in. long, almost an inch thick, equal, even, glabrous, clear white, at length becoming grey, solid but soft; spores nearly smooth, white 8–9 × 7 $\mu$.

*Russula consobrina*, Fries, Epicr., p. 359; Cke., Hdbk., p. 329; Cke., Illustr., pl. 1055.

In woods.

Very acrid; easily known by the even, umber or olive-brown pileus, which has usually more or less of a grey tinge. The cuticle often becomes more or less broken up at the margin.

*Var.* **sororia**, Fries, Hym. Eur., p. 447; Cke., Illustr., pl. 1057; Cke., Hdbk., p. 329.

Size, colour, and habit of the typical form; differing in the striate margin of the pileus; gills rather distant, with many intermediate shorter ones, but rarely forked, connected by veins.

In woods, &c.

*Var.* **intermedia,** Cke., Hdbk., p. 329; Cke., Illustr., pl. 1056.

Habit, size, and colour of typical form; pileus fleshy, depressed, viscid, margin thin, striate; stem usually attenuated downwards, becoming cinereous and striate; gills dirty white; spores 10 $\mu$ diameter.

On the ground under trees.

**Russula pectinata.** Fr.

Acrid. Pileus about 3 in. across, flesh compact, white, yellowish below the difficultly separable pellicle; convex then expanded and depressed or concavely infundibuliform, viscid and brownish-tan at first, then dry, paler tan, disc always darker; margin thin, tuberculosely sulcate, often deformed; gills narrowed behind and nearly free, broader towards the margin, rather narrow, somewhat crowded, equal, simple, white; stem about 2 in. long, $\frac{3}{4}$–1 in. thick, longitudinally striate, white, base often attenuated, spongy stuffed; smell weak but unpleasant; spores 8–9 $\mu$ diameter.

*Russula pectinata*, Fries, Epicr., p. 358; Cke., Hdbk., p. 332; Cke., Illustr., pl. 1101.

In woods.

Large, rigid, smell weak, but nauseous. (Fries.)

The dingy colour somewhat resembles *R. consobrina*, var. *sororia*, but is rather lighter, and also differs in the tuberculose margin of the pileus, and in the crowded gills not being connected by veins. Smell resembling that of *R. foetens*.

**Russula sardonia.** Fr.

Acrid. Pileus 2–3 in. across, fleshy, compact, convex then plane, rarely depressed but usually wavy, even, cuticle adnate, viscid in moist weather, soon becoming discoloured, and often spotted; colour very variable, sometimes pallid and spotted with yellow, or dingy yellow, sometimes reddish, opaque, margin even; flesh firm, cheesy, white; gills adnate, closely crowded, broad, somewhat forked, white, exuding drops of water in damp weather, hence spotted with yellow when dry; stem $1\frac{1}{2}$–2 in. long, up to 1 in. thick, firm, even, white or reddish, solid but becoming spongy inside; spores 9–10 $\mu$ diameter.

*Russula sardonia*, Fries, Epicr., p. 353; Cke., Hdbk., p. 323; Cke., Illustr., pl. 1037 ?

In woods, among grass, &c.

Robust, firm, but not large. Intermediate between *R. rosacea* and *R. expallens*, but distinct from both in the yellowish colour. (Fries.)

### †† *Pileus red or purplish.*

**Russula emetica.** Fr.

Acrid. Pileus 3–4 in. across, flesh rather thick, white, reddish under the separable cuticle; at first campanulate, then expanded and depressed, polished, at first rosy then blood-red, sometimes yellowish, at length becoming white; margin at length tuberculosely sulcate; gills almost free, broad, rather distant, and like the spores, clear white; stem 2–3 in. high, $\frac{3}{8}$ in. or more thick, elastic when young but fragile when old, even, white or tinged with red, solid but spongy within; spores 8 $\mu$ diameter.

*Russula emetica*, Fries, Epicr., p. 357; Cke., Hdbk., p. 331; Cke., Illustr., pl. 1030.

In damp woods, &c.

Large, showy, regular, firm, but fragile when adult, taste very acrid. Pileus tawny when old. (Fries.)

A distinct species, well marked by the clear white, free gills; deep rose or crimson-lake coloured pileus, which soon bleaches almost white; flesh red under the readily separable cuticle; and the very acrid taste.

Pileus 2–5 in. broad, glutinous when young, smooth, hemispherical, at length plane, depressed in the centre, margin thin, striato-sulcate, purple, rose-red, bluish, fuscous, yellow or even white. Gills rather distant, broad, rigid, thickish, connected by veins, equal, with a very few smaller interspersed, always white. Stem 2–3 in. high, longitudinally rugulose, firm, solid, white or tinged with the colour of the pileus, very acrid and poisonous, a very small piece producing bad effects. (Berk.)

*Var.* **Clusii**, Cke., Illustr., pl. 1031.

Acrid. Pileus 3–4 in. across, flesh white, soon becoming yellowish, thick up to the margin; convex then expanded and sometimes slightly depressed, smooth, even, deep rose-colour or blood-red, margin arched, even for a long time,

slightly striate when old; gills adnexed then adnate, rather narrowed behind, 2 lines broad in front, rather distant, pallid then pale yellow; stem 2–3 in. long, $\frac{3}{4}$ in. thick, equal, almost even, firm, white, spongily stuffed; spores globose, minutely echinulate, 9–10 $\mu$ diameter.

Considered by Fries as a variety of *R. emetica*, from which it differs entirely in those characters which more especially characterise the last-named—free, persistently pure white gills. The points of the present are: acrid taste, deep red pileus, and pale yellow, naked gills.

**Russula rosacea.** Fr.

Acrid. Pileus 2–4 in. across, flesh thick, firm, cheesy white; convex then expanded, obtuse, but never depressed, usually unequal, wavy, sometimes incised; pellicle viscid in moist weather, separable; margin even; rosy flesh-colour, varying in depth, often with darker spots, whitish in places where the cuticle has disappeared; gills adnate in every stage, thin, crowded, fragile, forked behind, shorter ones intermixed, always persistently white, broad; stem $1\frac{1}{2}$–2 in. long, up to $\frac{3}{4}$ in. thick, even, white with a tinge of rose-colour, spongy but solid; spores 8 $\mu$ diameter.

*Russula rosacea*, Fries, Epicr., p. 351; Cke., Hdbk., p. 322; Cke., Illustr., pl. 1020.

In woods.

Allied to *R. sanguinea*, but differs in being irregular, often excentric, pileus rather wavy, scarcely depressed; gills less crowded, broader, less divided, and hardly connected. Sometimes pale flesh-colour, becoming pale and marked with darker spots. (Fries.)

Distinguished from similarly coloured species by the thick flesh and persistently white adnate gills. Slowly becoming acrid.

**Russula sanguinea.** Fr.

Acrid. Pileus 2–4 in. across, flesh thick, cheesy, white; at first convex, obtuse, then depressed or infundibuliform, base of the depression usually gibbous, polished, even, moist in wet weather, blood-red, usually becoming pale at the even, spreading margin; gills truly decurrent, closely crowded, very narrow, connected by veins, fragile, somewhat forked, white; stem stout, spongily stuffed, apex at first

constricted, then equal, slightly striate, white then reddish; spores 9–10 $\mu$ diameter.

*Russula sanguinea*, Fries, Epicr., p. 351; Cke., Hdbk., p. 322; Cke. Illustr., pl. 1019.

Among grass in woods.

*R. rubra* agrees with the present species in colour, but differs in the very hard, rigid, somewhat grumous flesh of the pileus, and in the gills becoming yellowish. Known from all other species by the truly decurrent gills.

**Russula fragilis.** Fr.

Acrid. Pileus 1–1½ in. across, flesh very thin and very fragile; convex at first and often umbonate, then plane and depressed, pellicle thin, rather viscid in moist weather, becoming pale, colour variable, often opaque, typically flesh-colour, becoming almost or entirely white, often with reddish spots; margin very thin, tuberculosely striate; gills slightly adnexed, very thin, broad, crowded, ventricose, all equal, pure white; stem 1½–2 in. long, slender, often slightly striate, shining white, spongy within and soon hollow; spores minutely echinulate, 8–10 × 8 $\mu$.

*Russula fragilis*, Fries, Epicr., p. 359; Cke., Hdbk., p. 333; Cke., Illustr., pl. 1091.

In woods, &c.

Difficult to define from fragile forms of *R. emetica*, but the gills are much more crowded, ventricose, thinner, and the margin often eroded; pileus thinner, more lax; flesh entirely white—not red under the cuticle; margin tuberculose, and the entire fungus smaller and more fragile.

*Var*, **nivea**, Cke., Hdbk., p. 333; Cke., Illustr., pl. 1060B.

Size and habit of type form, but every part white from the earliest stage; spores 8 $\mu$ diameter.

*Var.* **violacea**, Quelet, Assoc. Fr., 1882, t. 11, f. 13; Cke., Hdbk., p. 334; Cke., Illustr., pl. 1060A.

Pileus about 1½ in. across, expanded and depressed, thin, viscid, striate, bright violet with a narrow whitish margin, sometimes spotted with yellow, green, or olive; flesh soft, white, peppery; stem about 1½ in. long, 2–3 lines thick, fragile, striate, pruinose, white, spongy then hollow; gills adnate, crowded, thin, white; spores 8–9 $\mu$, spinulose.

*Var.* **fallax**; *Russula emetica,* var. *fallax;* Cke., Hdbk., p. 331; Cke., Illustr., pl. 1059.

Size of the typical form, or slightly larger; acrid, fragile, dingy pale reddish or with a pale purple tinge, disc usually very dark; opaque, discoid; gills adnexed, distant, pallid; spores 8 $\mu$ diameter.

In woods.

**Russula Queletii.** Fr.

Acrid. Pileus 2–3 in. across, flesh thickish at the disc, margin thin, white, purplish under the cuticle; campanulate or convex then plane, even, viscid, dark violet or dusky, margin slightly striate, purplish lilac; gills almost free, narrowed behind, unequal, forked, $1\frac{1}{2}$ line broad, white, exuding drops of water; stem $1\frac{1}{2}$–2 in. long, 4–5 lines thick, purplish-violet, paler than the pileus, mealy, spongy within; spores, 8 $\mu$.

*Russula Queletii*, Fries, Hym. Eur., p. 448; Cke., Hdbk., p. 330; Cke., Illustr., pl. 1028.

In fir woods, &c.

Distinguished by the purple pileus and stem and the white gills. *R. drimeia* somewhat resembles the present species in general appearance, but differs in the yellow gills.

*Var.* **purpurea**; *Russula purpurea*, Gillet, Tab. Anal., p. 47; Cke., Hdbk., p. 323; Cke., Illustr., pl. 1022.

Differs from the typical form in the whitish stem tinged with rose-colour at the middle part, and the yellowish gills.

## MYCENA. Fries.

Pileus regular, thin, usually striate, more or less campanulate, rarely umbilicate or depressed, conico-cylindrical at first, with the margin straight and closely embracing the slender, hollow, central stem; gills adnate or adnexed, never truly decurrent, but often more or less sinuate behind, and with a more or less evident decurrent tooth (= uncinate), white, greyish, or tinged with pale reddish-pink (= flesh-colour); spores white.

*Mycena*, Fries, Syst. Myc., i. p. 140; Cke., Hdbk., p. 75 (as a subgenus of *Agaricus*).

The species are as a rule small and slender, colours usually bright and clear, but often very variable in the same species. Several species are strong-scented. Most grow on wood, branches, or twigs, although some grow in the ground and have a long rooting base to the stem, others root among heaps of dead leaves, and some of the minute species grow upon dead leaves.

The edge of the gills is often very minutely fringed or denticulate under a lens, more especially in the section *Calodontes*. This is due to the presence of numerous inflated cells or cystidia of varying length. The same structure also occurs in other genera.

Our information is very scanty respecting nearly all the smaller species, and as little or no information can be derived from dried specimens, even if you are quite certain that the correct species is at your disposal, consequently there remains much to be done yet in the way of spore form and size, presence or absence of cystidia, &c.

*Collybia* differs from the present genus in the margin of the pileus being incurved at first, *Omphalia* and *Clitocybe* differ in having decurrent gills.

## *ANALYSIS OF THE SPECIES.*

### I. Insititiae.

Minute species; stem very slender, not rooting, nor furnished with a disc, nor downy at the base, but abruptly piercing the substratum, dry; gills adnate, uncinate with a decurrent tooth. Very delicate and soon flaccid after being touched. *M. rorida* agrees with the present section except in having a very viscid stem, and is therefore placed in the section *Glutinipedes*.

### II. Basipedes.

Stem dry, not rooting, but attached by a flattened disc or small strigose bulb at the base. Slender, solitary, soon flaccid.

### III. Glutinipedes.

Stem juiceless, distinctly viscid or glutinous. Gills at length with a decurrent tooth. (Some species in the following section are viscid in wet weather, but are distinguished by having juice in the stem.)

### IV. Lactipedes.

Gills and rooting stem dry (not viscid) but giving out juice or milk when broken.

### V. Filipedes.

Stem slender, scarcely a line thick, never more, flaccid, rather tough, rooting, not viscid, juiceless, usually very long in proportion to the size of the pileus; gills becoming slightly coloured, greyish, &c., margin paler, distinct. Very slender, straight; not caespitose nor hygrophanous.

Allied to the section *Rigidipedes*, but smaller, stem flaccid and with a very small cavity up the centre, and gills hardly connected by veins, but as species with a long slender stem occur elsewhere, all the characters must be taken into consideration.

### VI. Fragilipedes.

Stem fragile, dry, juiceless, base fibrillose, scarcely rooting, not truly dilated at the base, not ending abruptly as in Section I. Gills discoloured, at length slightly connected by veins.

Slender, fragile, often soft, usually with a distinct smell, normally simple and growing on the ground, a few of the strong-scented ones growing on wood and tufted.

### VII. Rigidipedes.

Stem firm, rigid, rather tough, juiceless, base more or less strigosely rooting. Gills discoloured, grey or reddish, at length usually connected by veins; pileus not hygrophanous.

Tough, persistent, inodorous, normally growing on wood

and much tufted, but individuals of the same species occur solitary and on the ground.

### VIII. Adonideae.

Stem without juice and not discoid at the base; gills all one colour, margin not darker, colour not changing. Colour pure, bright, not brownish nor greyish.

Scattered or solitary, terrestrial.

### IX. Calodontes.

Stem juiceless, not expanded at the base; gills having the edge distinctly darker than the rest, and minutely denticulate, a feature that sharply separates the present section from every other.

In *M. sanguinolenta* the gills agree with those of the present section in having a dark edge, but the stem contains coloured juice or milk, and consequently is placed in section *Lactipedes*.

## I. INSITITIAE.

**Mycena juncicola.** Fr.

Pileus up to 1 line across, often less, very delicate, convex, striate, glabrous, rufescent or with a rosy tinge; gills adnate, distant, white; stem $\frac{1}{2}$–$\frac{3}{4}$ in. long, very slender, glabrous, brown, or with a rosy tinge.

*Agaricus* (*Mycena*) *juncicola*, Fries, Syst. Myc., i. p. 160; Cke., Hdbk., p. 91; Cke., Illustr., pl. 193c.

On dead rushes, twigs, &c.

Pileus 1 line broad, of a deep blood-red, inclining to tawny; stem 1 in. high, brown, paler above, smooth; gills forming a collar round the stem. (Berk.)

Distinguished from *M. pterigena* by the absence of a disc at the base of the stem.

**Mycena capillaris.** Fr.

White. Pileus about 1 line high and broad, very thin, campanulate and obtuse, then umbilicate, slightly striate when moist, even when dry; gills adnate, ascending, few, all entire and of equal length; stem about 1 in. long, but

often 2–3 in. when growing among leaves, hair-like, weak, wavy, glabrous, base rarely surrounded by radiating fibrils, fistulose; spores elliptical, 7–8 × 4 $\mu$.

*Agaricus* (*Mycena*) *capillaris*, Fries, Epicr., p. 119; Cke., Hdbk., p. 91; Cke., Illustr., pl. 193B.

On heaps of fallen leaves, especially beech.

Very delicate, but rather tough, white and striate when moist, shining white and even when dry.

Pileus $\frac{1}{2}$–1 line broad, at first conic, like the head of a very small pin, grey, the stem dark above and minutely pulverulent. (Berk.)

**Mycena setosa.** Sow.

White; very delicate. Pileus about $\frac{1}{2}$ line across, hemispherical, obtuse, smooth; gills almost free, narrow, distant; stem $\frac{1}{2}$–1 in. long, very slender, covered with delicate spreading hairs.

*Agaricus setosus*, Sowerby, Fung., t. 302; Cke., Hdbk., p. 91; Cke., Illustr., pl. 193A.

On dead leaves in woods.

Distinguished by the smooth pileus and slender stem covered with delicate spreading hairs.

**Mycena codoniceps.** Cooke.

Pileus about 2 lines high and 1 line broad, flesh thick in proportion to the size of the pileus, pale umber; campanulate, scarcely expanding, sulcate, sprinkled with somewhat erect short hairs, wholly umber; gills adnate, narrow, not crowded, white; stem 2–4 lines high, thin, becoming slightly thinner downwards, umber below, whitish above; spores elliptical, 5 × 2·5–3 $\mu$.

*Agaricus* (*Mycena*) *codoniceps*, Cke., Grev., xvi. p. 102; Cke., Hdbk., p. 370; Cke., Illustr., pl. 952B.

On tree-fern trunks.

Gregarious. Known by its minute size, and dingy umber pileus. Probably introduced.

**Mycena hiemalis.** Osbeck.

Pileus up to $\frac{1}{4}$ in. across, very thin; campanulate, slightly umbonate, margin striate, flesh-colour, rufescent, or white, often pruinose; gills uncinately adnate, narrow, linear,

whitish; stem $\frac{1}{2}$–1 in. long, slender, curved, downy below; spores 7–8 × 3 $\mu$; cystidia absent.

*Agaricus hiemalis*, Osbeck, in Retz., Suppl., ii. p. 19; Cke., Hdbk., p. 91; Cke., Illustr., pl. 164B.

On trunks of trees.

Closely resembling *M. corticola*, but clearly differing in the narrow, linear gills, absence of cystidia, and larger spores.

Difficult to distinguish from *M. corticola* and growing in the same localities, but much more scattered; stem longer, erect or ascending, scarcely incurved, pubescent below; pileus campanulate, obtusely umbonate, margin striate; gills narrower, linear; colour constantly paler, whitish, rufous flesh-colour, &c., scarcely ever bluish-black or brown. (Fries.)

**Mycena corticola.** Fr.

Pileus 2–4 lines across, very thin, hemispherical, obtuse, at length slightly umbilicate, deeply striate, glabrous or flocculosely pruinose; colour very variable, blackish, bluish, brown, or grey; gills adnate, with a slight decurrent tooth, broad, somewhat ovate, paler than the pileus; stem about $\frac{1}{2}$ in. long, very slender, glabrous or minutely scurfy, paler than the pileus, incurved, minutely fistulose; spores elliptical, 5–6 × 3 $\mu$; cystidia obtusely fusiform, 50–60 × 8–10 $\mu$.

*Agaricus* (*Mycena*) *corticola*, Fries, Syst. Myc., i. p. 159; Cke., Hdbk., p. 90; Cke., Illustr., pl. 164A.

On bark of living trees, among moss, lichens, &c.

Allied to *M. hiemalis*, but distinguished by the presence of cystidia in the broad, ovate gills.

## II. BASIPEDES.

**Mycena pterigena.** Fr.

Pale rose-colour. Pileus about 1 line broad; very delicate, and thin; campanulate, obtuse, almost even; gills adnate, broad, distant, entire; stem 2–4 lines long, very thin, wavy, smooth, disc radiately strigose.

*Agaricus* (*Mycena*) *pterigenus*, Fries, Syst. Myc., i. p. 160; Cke., Hdbk., p. 90; Cke., Illustr., pl. 192c.

On dead fern stems, veins of dead leaves, &c.

Distinguished from the other rose-coloured species by its smaller size, and by the disc at the base of the stem. In Fries' Icones, t. 85, f. 4, the stem is in some instances 1 in. long, and very slender; pileus striate.

**Mycena discopoda.** Lév.

White. Pileus 1–2 lines high, very thin; conical, obtuse, covered with whitish meal; gills adnate, few, very distant, narrow; stem about 2 lines long, very slender, mealy, expanding at the base into a minute downy discoid bulb.

*Agaricus discopus*, Lév., Ann. Sci. Nat., 1841, p. 239; t. 14, f. 4; Cke., Hdbk., p. 90; Cke., Illustr., pl. 192B.

On sticks, &c.

Distinguished by the persistently conical pileus and adnate gills.

**Mycena saccharifera.** B. & Br.

Whitish. Pileus about 2 lines across, very thin; gills arcuately decurrent, very few (8–9), very distant, rather thick, sprinkled with shining globose white granules; stem 2 lines high, filiform, base with a minute, indistinct disc, fixed by a few white fibrils.

*Agaricus (Mycena) sacchariferus*, B. & Br., Ann. Nat. Hist., no. 1216; Cke., Hdbk., p. 90; Cke., Illustr., pl. 192A.

On bramble and nettle stems.

Distinguished among the species in the present section by the rudimentary disc, and by the sparkling particles dusted over the gills, these are globose, colourless, and measure 20–28 $\mu$ diameter.

*Var.* **electica**, Bucknall, Trans. Bristol Soc.; Cke., Illustr., pl. 249C.

White. Pileus hemispherical, at length sulcate, clothed, as well as the stem and gills, with sparkling granular pubescence; stem filiform, slightly dilated and hairy at the base; gills adnate (4–9), broad, white.

On dead furze, &c.

**Mycena tenerrima.** Berk.

White; very delicate. Pileus 1–1½ line broad, convex, powdered with white scurfy granules; gills free, ventricose; stem up to 1 in. high, slender, minutely hairy, fixed by a minute downy disc; spores subglobose, 3–4 $\mu$ diameter.

*Agaricus* (*Mycena*) *tenerrimus*, Berk., Outl., t. 6. f. 6; Cke., Hdbk., p. 89; Cke., Illustr., pl. 249B.

On fir-cones, sticks, &c.

Gregarious, pure white. Pileus 1–1½ lines broad, very delicate, frosted with minute granules. Stem 1 in. high, scarce ½ line thick, adhering by a minute pubescent disc, which is not the least striate. (Berk.)

Distinguished from *M. saccharifera* and its variety by the free gills and minutely pilose stem. *M. stylobates* differs in the striate disc.

Gregarious, pure white. Pileus 1–1½ line broad, very delicate, tender and easily injured, not pilose but frosted minute granules. Gills distant unequal. Sporules white, round. Stem 1 in. high. Scarce ⅓ of a line thick, flexuous fistulose, adhering by a minute but distant pubescent disc which is not the least striate. (Berk.)

**Mycena stylobates.** Pers.

White. Pileus 2–3 lines across, very thin; campanulate, obtuse, striate, minutely hairy; gills free, distinct, ventricose; stem 1–2 in. high, slender, equal, smooth, disc orbicular, plane, downy, radiately striate, rather large; spores 4 × 2 $\mu$.

*Agaricus stylobates*, Persoon, Syn., t. v. f. 4; Cke., Hdbk., p. 89; Cke., Illustr., pl. 249A.

On fern stems, twigs, &c.

Distinguished by the smooth stem and large, flat, orbicular, radiately striate disc.

Pure white. Pileus 2 lines or more broad; stem 1–2 in. high, ½ line thick, rather thicker at the base, adhering by a broad membranaceous, tomentose, radiato-striate disc. (Berk.)

Pure white. Pileus 2 lines or more broad, campanulate or hemispherical, sometimes broadly and obtusely umbonate, striate, with a round mark (in thinner specimens), in the centre caused by the insertion of the stem, minutely pilose, not granulose. Gills unequal, rounded, free. Stem 1–2 in. high, ½ a line thick, rather thicker at the base, flexuous, fistulose, downy or minutely pilose, though sometimes as the pileus becomes quite smooth, fragile, adhering by a broad, membranous, tomentose, radiato-striate disc. (Berk.)

## III. GLUTINIPEDES.

**Mycena rorida.** Fr.

Pileus 4–7 lines broad, very thin; convex, slightly umbilicate, coarsely striate, dry, ochraceous-white; gills slightly decurrent, not sinuate, narrow, distant, white; stem 1–1½ in. long, very slender, whitish, very glutinous.

*Agaricus* (*Mycena*) *roridus*, Fries, Syst. Myc., i. p. 156; Cke., Hdbk., p. 89; Cke., Illustr., pl. 248c.

On dead bramble twigs, &c.

Distinguished from every other species by the decurrent gills, and the very glutinous stem, the gluten usually accumulating in sufficient quantity near the base to hang in drops.

Pileus ½ in. broad or more, dirty ochraceous; stem 1½ in. or more high, at first tinged with violet above, at length dirty ochre, clothed with abundant white pellucid gluten, which almost drips from it; sometimes the whole plant is nearly white. (Berk.)

**Mycena plicato-crenata.** Fr.

Pileus about ½ in. across, flesh very thin; conical, somewhat umbonate, coarsely sulcate, margin crenate, yellowish-white; gills much narrowed behind, adnate with a decurrent tooth, distant, white; stem 1½–2 in. long, slender, equal, glabrous, viscid, whitish more or less tinged with red or brown, indistinctly hollow, yellowish inside.

*Agaricus* (*Mycena*) *plicato-crenatus*, Fries, Monogr., ii. p. 294; Cke., Hdbk., p. 89; Cke., Illustr., pl. 248B.

Among moss, heath, in larch woods, &c.

Distinguished by the plicately sulcate pileus with a crenate margin and without a pellicle, and the sticky stem. *M. epipterygius* differs in the viscid, separable cuticle, and in the larger size.

**Mycena citrinella.** Pers.

Pileus 2–4 lines broad, quite membranaceous, campanulate or hemispherical then expanded, not depressed, striate, scarcely viscid, lemon-yellow, often darker at the disc, becoming pale; gills adnexed with a decurrent tooth, alternately long and short, distant, broad, clear white; stem

about 1 in. long, very slender, glabrous, viscid in moist weather, lemon-yellow, base downy but scarcely rooting; spores obliquely elliptical, 6–8 × 4–5 $\mu$.

*Agaricus citrinellus*, Pers., Ic. Descr., t. ii. f. 3; Cke., Hdbk., p. 89; Cke., Illustr., pl. 248A.

Pine woods, &c., among moss.

Allied to *M. vulgaris*, but smaller, less viscid, and pileus not umbilicately depressed.

*Var.* **candida.** Whitish when fresh, becoming sulphur-yellow when dry.

**Mycena vulgaris.** Pers.

Pileus about $\frac{1}{4}$ in. across, almost membranaceous, convex then depressed and with a central papilla, viscid, pale brown or greyish with darker lines resembling striae; gills slightly decurrent, thin, rather broad, white; stem $\frac{3}{4}$–$1\frac{1}{2}$ in. long, slender, equal, tough, viscid, pale, fibrillosely rooting; spores pip-shaped, 5 × 2·5 $\mu$.

*Agaricus vulgaris*, Persoon, Icon. Pict., t. xix. f. 3; Cke., Hdbk., p. 88; Cke., Illustr., pl. 191B.

Among pine leaves and on twigs, &c.

Distinguished at once among the small species by the viscid pileus and stem, pileus depressed and with a minute papillate umbo. Sometimes rufous, or whitish with a dark papilla.

**Mycena pelliculosa.** Fr.

Pileus $\frac{2}{3}$–1 in. across, flesh very thin; campanulate then convex, obtuse, finely striate, with a viscid separable pellicle, greyish or brownish; gills slightly decurrent, joined behind, otherwise simple and distinct, somewhat like folds, distant, glaucous; stem 1–$1\frac{1}{2}$ in long, glabrous, viscid, livid, not quite straight as a rule.

*Agaricus* (*Mycena*) *pelliculosa*, Fries, Epicr., p. 116; Cke., Hdbk., p. 88; Cke., Illustr., pl. 191A.

On the ground among heather, &c.

Larger than *M. vulgaris*, and known by the viscid, separable cuticle.

Stem slightly thickened at the apex, at length brownish, fragile. (Fries.)

**Mycena clavicularis.** Fr.

Pileus $\frac{1}{2}$–$\frac{2}{3}$ in. across, membranaceous; convex then expanded, somewhat umbonate at first, striate, dry, without a distinct pellicle, disc at length depressed, whitish, yellowish or brownish; gills adnate, narrow, white; stem about 2 in. long, slender, tough, glabrous, viscid, whitish base fibrillose, not rooting.

*Agaricus* (*Mycena*) *clavicularis*, Fries, Syst. Myc., i. p. 158; Cke., Hdbk., p. 88; Cke., Illustr., pl. 208B.

On the ground in woods.

Allied to *M. epipterygia*, but distinguished by the perfectly dry pileus. *M. vulgaris* and *M. rorida* are distinguished by the viscid pileus.

**Mycena epipterygia.** Scop.

Pileus $\frac{1}{2}$–1 in. across, membranaceous; campanulate, obtuse, becoming more or less expanded, never truly depressed, striate, covered with a pellicle that is very viscid in wet weather, and easily separable in every condition, colour variable, usually grey, often pale yellowish-green near the margin; margin often minutely notched when young; gills adnate with a decurrent tooth, thin, whitish or tinged grey; stem 2–4 in. long, about 1 line thick, hollow, tough, often wavy, base rooting and fibrillose, even, viscid, usually yellowish, but sometimes grey, pallid, or whitish; spores elliptical, 8–10 × 4–5 $\mu$.

*Agaricus epipterygius*, Scop., Carn., p. 453; Cke., Hdbk., p. 88; Cke., Illustr., pl. 208A.

On branches, twigs, among moss, &c.

Solitary or clustered. Colour variable, but readily known by the viscid pileus, both being furnished with a separable pellicle. Often resembling *M. alcalina* in the greenish-yellow colour of the pileus, but distinguished by the absence of smell.

Pileus an inch or more broad and high, obtuse, sometimes umbilicate, cinerous-yellow, but also occasionally, according to Fries, white, bluish, or rufous, submembranaceous, the margin striate and toothed; epidermis viscid; when moist easily tearing off. Gills arcuato-adnate, subdecurrent, partaking of the colour of the pileus. Stem 3–4 inches high, about 1 line thick, full yellow, viscid, smooth, tomentose at the base. (Berk.)

## IV. LACTIPEDES.

**Mycena leucogala.** Cooke.

Pileus ½–⅔ in. high and broad, flesh thin, dingy; campanulate, umbonate, sulcate to the middle, purple-brown, margin paler, umbo blackish; gills adnate with a slight decurrent tooth, rather distant, grey, about 1 line broad; stem 2–3 in. long, about 1 line thick at the base, slightly thinner upwards, hollow, coloured like the pileus, with whitish down at the base, containing a large quantity of white milk that escapes in drops when the stem is broken.

*Agaricus* (*Mycena*) *leucogalus*, Cke., Grev., xi. p. 41; Cke., Hdbk., p. 88; Cke., Illustr., pl. 653.

On rotten stumps, &c.

Pileus ½ in. high and broad, not exceeding 1 in. Stem 3 in. long; forming dense caespitose tufts. Very similar in general appearance to *M. pullata*, Berk. & Cke. (Cooke.)

Closely allied to dark forms of *M. galopoda*, but the latter differs in the pileus not being so coarsely striate, and in the nearly white gills. *M. pullata* differs in the absence of milk in the stem, and in the slight alkaline smell.

*M. atrocyaneus* also resembles the present species, but differs in the absence of milk in the stem.

**Mycena galopoda.** Fr.

Pileus 3–7 lines broad, membranaceous, conical then campanulate, more or less umbonate, striate, naked or pruinose, at first blackish then grey, but sometimes white with a blackish or brownish umbo; gills narrowed behind and adnexed, broad towards the margin, white or with a faint greenish tinge; stem 2–3 in. long, 1 line thick, rather fragile, even, glabrous or pruinose, greyish-black, apex paler, base rather thickened, downy and rooting, giving out a large quantity of white milk when wounded; spores elliptical, 9–10 × 5 μ.

*Agaricus* (*Mycena*) *galopus*, Epicr., p. 115; Cke., Illustr., pl. 207B; Cke., Hdbk., p. 87.

Among moss, on trunks, &c.

*M. leucogala* resembles the darker forms of the present species, but differs in the gills being grey and connected by veins.

Pileus ½–1 in. broad, campanulate or convex, ochraceous, the centre blackish (varying somewhat in colour), pellucid, striate. Gills white, arcuato-adnate or even decurrent. Stem 2–3 inches high, about 1 line thick, pale umber, the base somewhat rooting, fibrilloso-tomentose or even strigose, fistulose, not brittle. Milk mild. Taste like that of radishes. Subject to some variation in size and form and colour, but known by its white milk. (Berk.)

**Mycena chelidonia.** Sow.

Pileus about 5–7 lines across, flesh very thin; campanulate then convex, obtuse, nearly even; gills adnate, rather distant, distinct, narrow, white then tinged yellow; stem up to 2 in. long, thin, equal, smooth, rooting, with a small quantity of yellow juice, often compressed; spores 9–10 × 5 $\mu$.

*Agaricus chelidonius*, Sowerby, t. 385; Cke., Hdbk., p. 87; Cke., Illustr., pl. 207A (after Sowerby).

On beech stumps.

Distinguished by the yellow juice present in small quantity in the stem.

On dead beech trunks, somewhat caespitose; with the habit of the yellowish form of *M. alcalina*, to which it is allied. Stem hollow, 1½–2 in. long, about 1 line thick, rather firm, even, glabrous, yellowish, containing a small quantity of yellowish milk, the rooting base downy. Pileus almost membranaceous, campanulate then convex, obtuse ½–1 in. broad, glabrous, pellucidly striate when moist, even and opaque when dry, flesh-colour with a yellow tinge, edge quite entire; gills adnate, rather distant, distinct, whitish or yellowish-white. (Fries.)

**Mycena crocata.** Fr.

Pileus ½–1 in. across, almost membranaceous, conical then campanulate, disc even, umbonate, reddish, olive, greyish, or whitish towards the striate margin, edge quite entire; gills narrow behind and adnexed, rather distant, broadest in front, somewhat ventricose, white; stem 3–5 in. long, hollow, slightly attenuated from the base, glabrous, saffron-red, due to the copious amount of milk of this colour which pours out when the stem is wounded, especially at the downy rooting portion.

*Agaricus* (*Mycena*) *crocatus*, Fries, Epicr., p. 115; Cke., Hdbk., p. 87; Cke., Illustr., pl. 163B.

Among fallen beech leaves, &c.

Inodorous. Distinguished from *M. chelidonia* by the large amount of deep saffron-red juice in the stem, especially in the rooting portion, and the absence of smell.

**Mycena sanguinolenta.** A. & S.

Pileus up to ½ in. across, very thin, campanulate then convex, striate, reddish-brown; gills adnexed, rather narrow, reddish, margin dark purplish-red; stem 1½–2 in. long, slender, base downy, containing a pale reddish juice.

*Agaricus sanguinolentus*, Alb. & Schw., p. 196; Cke., Hdbk., p. 87; Cke., Illustr., p. 163A.

Among damp leaves, moss, &c.

Our only species with red juice in the stem that has a dark edge to the gills.

**Mycena cruenta.** Fr.

Pileus up to ½ in. across, very thin; conico-campanulate, striate, margin quite entire, reddish-brown, becoming pale; gills adnate, narrow, whitish, margin not darker; stem 2–3 in. long, slender, equal, straight, glabrous, with a downy rooting base, containing a dark red juice.

*Agaricus cruentus*, Fries, Syst. Myc., i. p. 149; Cke., Hdbk., p. 87; Cke., Illustr., pl. 162B.

In fir woods, on cones, &c.; also on the ground.

Fries says this species grows singly, Cooke's figure represents it as tufted.

Intermediate between *M. haematopa* and *M. sanguinolenta*. Stem fistulose, 2–3 in. long, not a line thick but rather firm, straight, even, glabrous, never downy, paler than the pileus, with a downy rooting base, exuding a dark red liquid when broken. Pileus submembranaceous, conical then campanulate, obtuse, striate, glabrous, 3–5 lines broad, bay or reddish-brown, margin quite entire; gills entirely adnate, crowded, linear, whitish, margin quite entire, the same colour as the rest of the gill. (Fries.)

On fir-cones. Pileus conic, obtuse, striate; margin inflexed, entire; substance at first rather thick in proportion. Stem rigid, smooth, full of red juice, strigose at the base

Gills obtuse in front, shortly adnate, white, margin of the same colour. (B. & Br.)

Differs from *M. haematopa* in the margin of the pileus being quite entire, and not slightly toothed, and from *M. sanguinolenta* in the margin of the gills not being darker than the remainder.

**Mycena haematopa.** Pers.

Tufted. Pileus about 1 in. across, flesh rather thin; campanulate, obtuse, striate (Fries says pileus even), margin minutely toothed; reddish disc darker and with a purple tinge; gills adnate, about $\frac{3}{4}$–1 line broad, entirely whitish; stem about 2 in. long, 1 line thick, rather thicker at the base, paler than the pileus, covered with white pulverulent down, containing dark blood-red juice.

*Agaricus haematopus*, Pers., Syn., p. 379; Cke., Hdbk., p. 86; Cke., Illustr., p. 162A.

On trunks and stumps.

The denticulate margin of the pileus and entirely white gills readily distinguish the present among species containing a red juice.

Tufted. Pileus moist, campanulate, then expanded, reddish, with a tinge of purple, $\frac{1}{2}$–1 in. or more across, striate, very minutely rivulose; stem pale rufous flesh-colour, at first thickened at the base, then nearly equal, farinaceous; gills distant, adnato-decurrent, white; edge red; interstices even. Everywhere distilling, when broken, a dark-red juice. Far larger than any form of *M. sanguinolenta* or *M. cruenta*. (B. & Br.)

## V. FILIPEDES.

**Mycena acicula.** Schaeff.

Pileus 1–2 lines across, membranaceous; campanulately convex, glabrous, orange-red, margin striate; gills adnexed, rounded behind, ventricose, distant, yellow, margin whitish; stem up to $1\frac{1}{2}$ in. long, very slender, tough, shining, yellowish, continued as a long, fibrillose rooting base.

*Agaricus acicola*, Schaeffer, Fung., t. 222; Cke., Hdbk., p. 86; Cke., Illustr., pl. 190c.

Among fallen twigs, also on wood.

Very slender, but tough, persistent. Stem slightly fistu-

lose, rooting, about 1½ in. long, slender as a hair, very glabrous (except the rooting base), shining, deep yellow; pileus membranaceous, campanulate then convex, with a very minute slightly fleshy umbo, 1–2 lines broad, striate, glabrous, shining, vermilion-orange. Gills adnexed and rounded behind, almost free, broad in proportion, ventricose, somewhat ovate, distant, alternate ones shorter, yellow, margin white, or altogether white. (Fries.)

Distinguished among the minute red species by the yellow gills and the tough, rooting stem.

**Mycena tenella.** Fr.

Caespitose. Pileus up to ½ in. across, membranaceous, campanulately convex, obtuse, sometimes expanding, pellucid, margin slightly striate, white or with a pink tinge; gills uncinate, crowded, very thin and narrow, white then tinged pink; stem about 1 in. long, very slender, glabrous, soft, white, base downy.

*Agaricus* (*Mycena*) *tenellus*, Fries, Epicr., p. 111; Cke., Illustr., pl. 190B; Cke., Hdbk., p. 86.

On old trunks.

Very delicate and tender. Known from *M. tenuis* and *M. gypsea* by the smaller size, very narrow, crowded, thin gills, and very slightly striate pileus.

**Mycena speirea.** Fr.

Pileus 2–6 lines across, membranaceous, conico-convex then plane, at length depressed in the centre, umbilicus darker, brown, often with a small papillate umbo, remainder greyish-white, variegated with brown lines, glabrous, sometimes pruinose; gills at first adnate, then decurrent owing to the depression of the pileus, distant, alternate ones shorter, white; stem about 1½–2 in. long, hollow, very tough, equal, glabrous, shining, white, base brownish and with root-like fibrils of mycelium.

*Agaricus speirea*, Fries, Syst. Myc., i. p. 158; Cke., Hdbk., p. 86; Cke., Illustr., pl. 190A.

On mossy trunks.

Densely gregarious; but not caespitose.

Stem minutely fistulose, very tough, filiform, about 2 in. long, equal, glabrous, shining, white, base brownish, with a

thin, fibrillose root. Pileus membranaceous, conico-convex when young, then plane, centre depressed, umbo brown, rest pallid or whitish, variegated with brown lines, 2–4 lines broad, glabrous, sometimes pruinose. Gills adnate at first, then deeply decurrent owing to the depression of the pileus, distant, alternate ones shorter, clear white. More closely allied to the Filopedes section of Mycena than to Omphalia, although from the deeply decurrent gills might be placed in *Omphalia*. (Fries.)

**Mycena collariata.** Fr.

Pileus $\frac{1}{2}$–$\frac{2}{3}$ in. across, membranaceous; campanulate then convex, somewhat umbonate, striate, brownish or greyish-white with a brownish disc, becoming pale, glabrous; gills adnate to a collar round the stem, narrow, crowded, distinct, whitish or with a tinge of flesh-colour; stem about $1\frac{1}{2}$ in. long, $\frac{1}{2}$ line and more thick, tough, glabrous, shining, pale.

*Agaricus* (*Mycena*) *collariatus*, Fries, Obs., ii. p. 164; Cke., Hdbk., p. 86; Cke., Illustr., pl. 189c.

Among grass in woods, &c.

Distinguished by the gills separating from the stem and attached to each other behind as if by a collar.

Stem about 1 in. long and nearly 1 line thick, slightly striate under a lens. Pileus $\frac{1}{2}$ in. and more broad, typically fuscous, but often greyish-white with a brownish disc; gills rather distant when the pileus expands. Allied to *Mycena stanneus*, which differs in the firmer stem. The collar is not free, as in *Marasmius rotula*, but the gills are joined behind, and cohere to the stem, and at length secede. (Fries.)

**Mycena vitilis.** Fr.

Pileus 3–4 lines across, membranaceous; conical then expanded, papillate, deeply striate when moist, brownish or greyish-white, becoming pale; gills narrowed behind and adnate, rather distant, greyish-white; stem 3–6 in. long, very slender, equal, slightly bending under the weight of the pileus, glabrous, juiceless, shining, rooting.

*Agaricus* (*Mycena*) *vitilis*, Fries, Epicr., p. 113; Cke., Hdbk., p. 85; Cke., Illustr., pl. 189b.

Among leaves in damp places.

Distinguished by the very long, slender, weak stem and deeply striate pileus.

Stem very slender, 3–6 in. long. Pileus 3–4 lines broad, somewhat shining, livid-fuscous, whitish-grey, &c., the slightly fleshy papilla often absent, almost even when dry. Gills ascending, distinct, decurrent tooth obsolete; margin whitish. (Fries.)

**Mycena debilis.** Fr.

Pileus about $\frac{1}{4}$ in. across, membranaceous; campanulate then convex, obtuse, striate, almost even when dry, rugulose, becoming brownish, opaque; gills broadly adnate, narrow, distinct, whitish; stem 1–2 in. long, very slender, equal, flaccid and not quite straight, whitish, base not rooting, fibrillose.

*Agaricus* (*Mycena*) *debilis*, Fries, Epicr., p. 112; Cke., Hdbk., p. 85; Cke., Illustr., pl. 189A.

On the ground among moss, &c.

*M. collariata* somewhat resembles the present species, but differs in having the gills attached to a collar round the stem.

Becoming dry within an hour in fine weather, but persisting for a long time in damp places among leaves. About the size of *M. sanguinolenta*. Colour whitish, flesh-colour, livid, &c., becoming brownish. Umbo obtuse when present. (Fries.)

**Mycena amicta.** Fr.

Pileus 3–5 lines across, membranaceous, conically campanulate, striate up to the middle, dry, glabrous, sometimes pruinose, greenish, grey, livid, &c.; gills free, crowded, linear, grey, margin paler; stem 3–4 in. long, very slender, equal, tough, covered with pulverulent down, root tapering, twisted, glabrous.

*Agaricus* (*Mycena*) *amictus*, Fries, Syst. Myc., i. p. 141; Cke., Hdbk., p. 85; Cke., Illustr., pl. 283.

On the ground among moss.

Readily distinguished among allied forms by the long, slender, tough, pulverulent stem, and the grey gills.

**Mycena mirabilis.** Cke. & Quel.

Pileus about $\frac{1}{2}$ in. high and across, flesh very thin, campanulate, finely striate, umbonate, pale bluish-grey, umbo darker at first, then tan-colour; gills slightly adnexed, distant,

white, edges darkened with minute particles; stem 1½–2 in. long, slender, equal, greyish, minutely floccose, slightly rooting and tomentose at the base, hollow.

*Agaricus* (*Mycena*) *mirabilis*, Cke. and Quelet, Clavis, p. 39; Cke., Hdbk., p. 85; Cke., Illustr., pl. 951A.

*Agaricus marginellus*, Fries, Hym. Eur., p. 131 (not of Persoon).

On fir trunks, among moss.

Somewhat resembling *M. iris*, but distinguished by the umbonate pileus and dark-edged gills.

Pileus 3 lines across, conical, striate, pallid grey, darker in the centre, minutely rivulose; margin subcrenulate; stem short, slightly curved, shining, quite smooth, minutely fistulose; gills distant, slightly adnexed, white, with a purple margin. Under a high magnifying power, the pileus (especially the edge) and stem appear clothed with minute glandular particles similar to those which colour the edge of the gills. (B. & Br.)

**Mycena iris.** Berk.

Pileus ½–⅔ in. across, very thin; hemispherical then more or less expanded, obtuse, striate, slightly viscid, blue when young, then brownish and ornamented with blue and adglutinated fibrils; gills almost free, narrow, tinged grey; stem 1½–3 in. long, slender, equal, bluish below and tinged with brown above, with fascicles of down here and there.

*Agaricus* (*Mycena*) *iris*, Berk., Outl., t. 6, f. 2; Cke., Hdbk., p. 85; Cke., Illustr., pl. 161B.

On fir stumps.

Fasciculate or scattered, brittle, when young the pileus and stem are bright sky-blue and beautifully tomentose. Pileus ⅜–⅝ of an in. broad, membranaceous, hemispherical, obtuse, striate, umber, clothed with blue fibrillae which are glued down to the epidermis, scattered in the centre, thicker and more free on the margin, which is slightly denticulate. Gills free or slightly adnexed, linear, pale cinereous, the margin sometimes denticulate. Stem 1½–3½ in. high, not 1 line broad, not rooting, blue below, above subrufescent, the tomentum below depressed and blue, above nearly white, minutely but distinctly fasciculato-pilose: in very elongated specimens obsolete. Another form has the

pileus much longer, subcampanulate rufescent, varied with yellow-green towards the margin and blue nearer to the centre; sometimes the whole rufescent except the extreme margin, which is deep blue. The gills paler, but not always so, and more denticulate, their edges milky. Smell strong. A most elegant though small species. (Berk.)

**Mycena filopes.** Bull.

Pileus about ½ in. across, membranaceous; conical then campanulate, at length expanded, obtuse, striate, brownish-grey or livid-grey, rarely whitish; gills free or slightly adnexed, narrow, ventricose, crowded, white; stem 3–4 in. long, very slender, equal, rather fragile, flaccid, glabrous, whitish; base rooting, fibrillose.

*Agaricus filopes*, Bulliard, t. 320; Cke., Hdbk., p. 84; Illustr., pl. 161A.

In woods among leaves, &c.

Fragile. Distinguished among the small species by the long filiform stem ending in a fibrillose, rooting base.

Stem fistulose, 3 in. and more long, equal, altogether filiform, straight, flaccid but not very tough, even, glabrous, with a long, downy, rooting base, livid or with a fuscous tinge, filled with a watery juice when growing. Pileus remarkably membranaceous, conical then campanulate, obtuse, striate, dry, glabrous, about ½ in. broad, livid-fuscous, rarely whitish. Gills free or touching the stem, lanceolate, ventricose, crowded, white. (Fries.)

## VI. FRAGILIPEDES.

**Mycena atroalba.** Bolton.

Pileus about 1 in. across, flesh very thin; parabolic-campanulate, obtuse, disc even, blackish, becoming whitish towards the pellucidly striate margin; not hygrophanous; gills free, ventricose, crowded, white then glaucous; stem 3–4 in. long, almost 2 lines thick, even, pallid, apex darker, base swollen, strigose.

*Agaricus atroalbus*, Bolton, t. 137; Cke., Hdbk., p. 81.

On the ground.

Solitary or gregarious, not caespitose. Firm but not

rigid; not fusiformly rooting, distinguished from allies by the tumid, inflated, hairy base of the stem. (Fries.)

**Mycena dissiliens.** Fr.

Strong-scented. Pileus about 1 in. across, almost membranaceous, acorn-shaped then conico-campanulate, not becoming flattened, but the margin becomes upturned, sulcate to the middle, dry, greyish-fuscous, becoming whitish at the margin; gills rounded behind, seceding and becoming almost free, broadest in front, apex very obtuse, soft, watery, whitish base, tinged grey, the shorter ones crisped; stem short, 2 in. long, 1–2 lines thick, attenuated from the strigose base, glabrous or slightly pruinose, juiceless, finely striate under a lens, grey, splitting into flaps that curve outwards when compressed or bent.

*Agaricus* (*Mycena*) *dissiliens*, Fries, Epicr., p. 138; Cke., Illustr., pl. 285A; Cke., Hdbk., p. 81.

On trunks, subcaespitose, or on the ground among fallen branches, &c.

Very fragile, smell unpleasant. In shady places the pileus is generally covered with a spidery silkiness. Distinguished by the greyish-brown sulcate pileus, and by the split portions of the stem curling outwards.

**Mycena plicosa.** Fr.

Fragile, pileus very thin, campanulate then expanded, margin sulcate, greyish-brown when moist, opaque and buff when dry; gills distant, thick, broadest in front, adnate, connected by veins, grey; stem smooth, even, shining, hollow, often rather flexuous, 1½–2 in. high, slender, equal, pale, minutely strigose at base; spores irregularly globose, 4–5 $\mu$ diameter.

*Agaricus plicosus*, Fries, Hym. Eur., p. 142; Cke., Hdbk., p. 82; Cke., Illust., t 285B; not good, sulcate margin not shown.

Among grass, &c.

Stem rather rigid (not soft as in *M. metata*), rather fragile, straight, equal, even, glabrous, 1 in. long, grey or brownish, base abrupt, not rooting, furnished with white down. Pileus membranaceous, campanulate then expanded, umbo rather fleshy, even; the remainder deeply lineato-sulcate, grooves distant almost like folds, often splitting, 1 in. across,

brownish-grey, opaque when dry. Gills adnate without a decurrent tooth, thick, distant, connected by veins, grey, at length whitish pruinose. Appears to be nearest to *M. metata*, which differs in the soft, lax stem and almost even pileus. (Fries.)

**Mycena paupercula.** Berk.

Strong-scented. Pileus 1–2 lines across, flesh thin; obtusely conical or hemispherical, very minutely innately fibrillose, ochraceous-white; gills free then adnexed, whitish; stem $\frac{1}{2}$ in. and more long, slender, equal, whitish, rooting and downy at the base.

*Agaricus (Mycena) pauperculus*, Berk., Outl., p. 125; Cke., Hdbk., p. 82; Cke., Illustr., pl. 236A.

Inside decayed stumps.

Minute, ochraceous-white. Pileus 1 line broad, pale ochraceous-white, in age almost tawny. When moist the gills shine through, giving a striate appearance, but not always. (Berk.)

Distinguished among the minute species by the rather strong, sweet scent, and rooting stem.

*M. psammicola* differs in the wholly whitish-pulverulent stem, and in having particles sprinkled over the pileus.

Pileus 1 line broad, fleshy, for the size of the plant firm, scarcely membranaceous, obtusely conic or hemispherical, most minutely but decidedly innato-fibrillose, pale ochraceous-white, in age almost tawny, probably stained by the wood on which it grows. When moist the gills shine through, giving it a striate appearance, but not always. Gills white, adnexed by reason of the growth of the pileus; in youth they are really free. Sporules white, round. Stem $\frac{1}{2}$–1 in. high, $\frac{1}{2}$ a line thick, white, curved, rooting, the root villous, minutely stuffed, smooth, even, under a high magnifying power, powdered at the top with the sporules, generally thicker below. Odour farinaceous. Allied to *A. alcalinus*, but I think distinct from all its small varieties. For it is much more fleshy, and seems to have no tendency to be coloured like that species. (Berk.)

**Mycena atrocyanea.** Batsch.

Pileus up to $\frac{1}{2}$ in. across, flesh thin, grey; fragile, inodorous, campanulately convex, umbonate, sulcate, brownish, then

dark bluish-grey, covered with a white evanescent bloom; gills narrow behind, united by a collar behind and slightly adnexed, distant, whitish; stem $1\frac{1}{2}$–3 in. long, straight, slender, equal, extreme base slightly thickened, glabrous, blackish-blue.

*Agaricus* (*Mycena*) *atrocyanea*, Batsch, f. 87; Cke., Hdbk., p. 82; Cke., Illustr., pl. 236B.

On the ground, on pine leaves, &c.

Usually gregarious, sometimes clustered. Distinguished from allied forms by the whitish gills and absence of milk in the stem.

Umbo obtuse, often deformed.

**Mycena pullata.** Berk. & Cke.

Smell slight, nitrous. Pileus $\frac{1}{2}$–$\frac{3}{4}$ in. across, flesh very thin; campanulate, obtusely umbonate, coarsely striate to the middle, dark brown, disc nearly black; gills adnexed, white, scarcely crowded, about 1 line broad; stem about 3 in. long, about 1 line thick at the base, slightly thinner upwards, coloured like the pileus, with whitish down at the base, hollow, sometimes rooting; spores elliptical, $6 \times 3$ $\mu$.

*Agaricus* (*Mycena*) *pullatus*, Berk. & Cke., Grev., xi. p. 69; Cke., Hdbk., p. 82; Cke., Illustr., pl. 237.

On the ground among dead leaves.

Stem 3 in. long, 1 line thick. Pileus $\frac{3}{4}$ in. broad, at first dark brown with a tinge of purple, almost black, growing a little paler with age, sometimes with a glaucous bloom. (Cooke.)

Closely resembling *M. leucogala*, but distinguished by the absence of milk in the stem; this character also separates the dark form of *M. galopoda*. *M. atrocyanea* differs in the dark blue tinge of pileus and stem.

**Mycena leptocephala.** Pers.

Smell strong, alkaline. Solitary; entirely grey. Pileus up to 1 in. across, flesh very thin, fragile, campanulate then expanded, umbonate, coarsely striate, margin often wavy, pruinose or slightly silky, opaque; gills emarginate, rather broad, margin whitish; stem up to 2 in. long, 1 line thick, slightly striate, opaque, dry, equal.

*Agaricus leptocephalus*, Persoon, Icon. et Descr., t. ii. f. 4; Cke., Illustr., pl. 187A; Cke., Hdbk., p. 83.

On trunks and on the ground.

Stem 1 in. and more long, 1½–2 lines thick, base smooth; gills almost 2 lines broad, shining, dark grey, margin whitish; pileus 1 in. broad, expanded, plano-convex, rather wavy, grooves broad, distinct, opaque, substance very thin, pellucid, appearing to be slightly downy, but really glabrous. Taste unpleasant; smell like sweet nitre. (Persoon.)

*M. alcalina* differs in the sticky stem. In Cooke's figure the gills are represented as slightly sinuate and with a minute decurrent tooth.

Agreeing with *M. alcalina* in the nitrous smell; differing in not being caespitose, the slightly striate stem; sulcate, pruinose pileus, and emarginate gills. (Fries.)

**Mycena alcalina.** Fr.

Smell strong, nitrous. Pileus up to 1 in. across, flesh thin; campanulate, obtuse, margin at length spreading or sometimes upturned, deeply striate when moist, shining when dry, colour various, pallid, or with a tinge of pale yellowish-green, disc darker; gills adnate, narrowed behind, rather distant, whitish then glaucous or greyish; stem 2–3 in. long, 1 line thick, equal, pale, sometimes yellow, shining, slightly viscid, base downy, hollow; spores 8 × 5 $\mu$.

*Agaricus* (*Mycena*) *alcalinus*, Fries, Syst. Myc., i. p. 142; Cke., Hdbk., p. 83; Cke., Illustr., pl. 187B, 225.

On trunks and stumps, among leaves, &c.

On trunks (somewhat tufted), leaves, &c., not truly terrestrial, as in *M. ammoniaca*. Smell strong, nitrous. Pileus without a viscid, separable pellicle; stem not truly viscid. Very variable in size and colour. Stem yellow, grey, &c.; gills rather thick, slightly connected by veins, often dark grey, edge paler, yellowish-glaucous, &c., rigid but fragile. (Fries.)

*M. ammoniaca* has the same smell as the present species, but differs in growing on the ground; slightly striate, umbonate pileus; stem without a yellow tinge.

Solitary or densely caespitose. Pileus ½–2 in. broad, subcarnose, umbonate, subumbonate or quite obtuse, even, with or without imbedded fibrillae, at first conico-papillate, rugose, cinereous or tinged with olive, substriate, when old expanded or depressed but little changed in colour, though occasionally

with a pink or yellow hue. Gills adnate with a tooth, distant, when old slightly ventricose, at first pale then glaucous pinkish or yellowish, more or less connected by veins. Stem 3 in. high, 1–2 lines thick, fistulose, subfibrilloso-striate, attenuated upwards, downy at the base, the down sometimes rather tawny, sometimes firm and tenacious, sometimes very brittle, grey above, yellowish or reddish beneath when young, but when old sometimes changing above to a bright yellow. Odour pungent, like that of fermented or putrid walnuts. A very variable species; often passing away into a loathsome mass before it fully expands, sometimes becoming dry and tough, but still with the same peculiar odour and a taste similar to it. (Berk.)

**Mycena ammoniaca.** Fr.

Strong-scented. Pileus $\frac{1}{2}$–$\frac{3}{4}$ in. across, flesh very thin; conical then expanded, umbonate, naked, discoid, opaque, dark brown, sometimes greyish, margin paler and striate; gills adnate, linear, narrow, distinct, whitish; stem about 2 in. long and $\frac{1}{2}$ line thick, rather firm, even, dry, whitish, rooting.

*Agaricus* (*Mycena*) *ammoniacus*, Fries, Hym. Eur., p. 142; Cke., Hdbk., p. 83; Cke., Illustr., pl. 238A.

On the ground.

Smell like that of *M. alcalina*, from which the present species differs in growing singly on the ground; stem perfectly dry, and without a yellow tinge. *M. metata* differs in the soft substance of every part, pileus hygrophanous and soon becoming whitish.

**Mycena metata.** Fr.

Pileus $\frac{1}{2}$–$\frac{2}{3}$ in. across, flesh very thin, hemispherical, then campanulate, obtuse, soft, very hygrophanous, grey and slightly striate when moist; even, opaque, and whitish when dry, and looks somewhat silky, at least under a lens; gills adnate, narrow, linear, rather distant, distinct, whitish; stem 2–3 in. long, slender, soft and flaccid, even, glabrous, greyish-white, base fibrillose, but not truly rooting; spores elliptical, 8–10 × 4–6 $\mu$.

*Agaricus metatus*, Fries, Syst. Myc., i. p. 141; Cke., Hdbk., p. 83; Cke., Illustr., pl. 238B.

Among moss in pine woods, &c.

Smell alkaline, weak or entirely absent; pileus usually grey when moist, sometimes reddish-pink, pallid, &c.

Among moss in pastures, also in pine woods; gregarious but never caespitose. Smell weak, alkaline, often entirely absent. In other respects differing widely from *M. ammoniaca*, *M. alcalina*, and *M. leptocephala* in the soft and flaccid substance, and in the hygrophanous pileus readily becoming pale and discoloured. (Fries.)

**Mycena peltata.** Fr.

Pileus about $\frac{3}{4}$ in. across; the broad disc rather fleshy, remainder thin; convex when young, soon quite plane, closely and distinctly striate at the margin, blackish-brown when moist, grey when dry; when dry the edge is upturned and blackish, forming a shallow saucer-like depression; gills adnate with a decurrent tooth, crowded at first, ventricose, becoming rather distant as the pileus expands, distinct, grey, margin paler; stem $1\frac{1}{2}$–2 in. long, about 1 line thick, equal, rigid, rather fragile, often wavy, even, glabrous, naked, livid, base elongated and downy when growing among moss, but not truly rooting.

*Agaricus peltatus*, Fries, Epicr., p. 110; Cke., Hdbk., p. 83.

In pastures, among moss.

Closely gregarious. Inodorous. More or less resembling *M. aetites*, but distinguished by the absence of a viscid, separable pellicle.

**Mycena consimilis.** Cooke.

Gregarious. Pileus about 1 in. across, flesh very thin, conically campanulate, umbonate, margin soon upturned and at length splitting, striate to the middle, smooth, opaque, grey, the umbo darker; gills adnexed or nearly free, scarcely crowded, not 1 line broad, grey; stem about $1\frac{1}{2}$ in. long, rather thinner upwards, often compressed below, rather rigid, dry, smooth, paler than the pileus, hollow.

*Agaricus* (*Mycena*) *consimilis*, Cke., Grevillea, xix. p. 41; Cke., Hdbk., p. 383; Cke., Illustr., pl. 1186.

Among grass.

More or less resembling the following species. *M. leptocephala* differs in the striate stem and strong nitrous smell. *M. metata* also differs in the strong smell. *M. peltata* differs

in the orbicular, plane pileus; finally *M. rugosa* differs in the pileus being wrinkled near the apex and the margin even.

**Mycena aetites.** Fr.

Pileus about $\frac{3}{4}$ in. across, flesh very thin, campanulate then convex, glabrous, coarsely striate, with a broad, obtuse, prominent umbo, hygrophanous, brownish; gills slightly sinuate, uncinate, thin, connected by veins, whitish; stem about 2 in. long, $\frac{2}{3}$ line thick, becoming thinner upwards, glabrous, shining, more or less compressed, whitish, base tinged brownish.

*Agaricus* (*Mycena*) *aetites*, Fries, Epicr. p. 110; Cke., Hdbk., p. 84; Cke., Illustr., pl. 188A.

Among damp moss.

Gregarious. Distinguished by the broad promineut umbo, sulcate pileus, and gills connected by veins.

Stem 2 in. long, whitish, becoming tinged with fuscous below; pileus sometimes becoming fuscous, margin at length blackish. Gills linear, rather distant, cohering behind at first, greyish at the sides. (Fries.)

**Mycena stanneus.** Fr.

Pileus $\frac{2}{3}$–$1\frac{1}{4}$ in. across, flesh very thin; campanulate then expanded, glabrous, indistinctly striate, hygrophanous, grey; tin-colour with a silky sheen and even when dry; gills adnate with a decurrent tooth $\frac{1}{2}$ line broad, connected by veins, greyish-white; stem 2–$3\frac{1}{2}$ in. long, up to 1 line thick, equal, even, shining, pallid, becoming compressed, often not quite straight.

*Agaricus* (*Mycena*) *stanneus*, Fries, Epicr., p. 111; Cke., Hdbk., p. 84; Cke. Illustr., pl. 188B.

Among grass in woods.

Allied to *M. vitrea*, differing in the decurrent tooth to the gills.

Inodorous. Stem 2–3 in. long, 1 line thick. Pileus up to $1\frac{1}{4}$ in. broad, slightly pellucidly striate and umbonate from the protruding apex of the stem, grey, colour of tin when dry. Gills hardly crowded. (Fries.)

**Mycena vitrea.** Fr.

Pileus up to 1 in. across, very brittle, membranaceous,

campanulate, finely striate almost or quite up to the slightly umbonate disc, which is not at all fleshy, livid-brown, margin naked; gills adnate, narrow, linear, distinct, whitish; stem 3–4 in. long, not 1 line thick, slightly striate, shining, coloured like the pileus or paler, hollow, base fibrillose.

*Agaricus* (*Mycena*) *vitreus*, Fries, Syst. Myc., i. p. 146; Cke., Hdbk., p. 84; Cke., Illustr., pl. 160A.

In damp pine woods, &c.

Very fragile. Allied to M. *aetites* and *M. stannea*, but distinguished from both by the narrow, linear (not arcuate or ventricose, but with the edge straight) gills which are not at all sinuate behind, without a trace of a decurrent tooth, and not connected by veins.

**Mycena tenuis.** Bolton.

Pure white. Pileus about $\frac{1}{2}$ in. across, very brittle, membranaceous; campanulate, then convex, obtuse, striate for more than half way up to the disc, margin crenulate; gills adnate, ascending, distant, thin, watery; stem about 2–3 in. long, thin, equal, glabrous, pellucid, straight, minutely fistulose.

*Agaricus tenuis*, Bolton, t. 37; Cke., Hdbk., p. 84; Cke., Illustr., pl. 160B.

In damp woods.

Fasciculate; pure white, very fragile and watery; somewhat resembling *M. gypsea*, which differs in the strigose base of the stem; gills with a slight decurrent tooth, and yellowish disc.

## VII. RIGIDIPEDES.

**Mycena prolifera.** Sow.

Pileus about $\frac{3}{4}$ in. across; flesh thin; campanulate, then expanded, more or less umbonate, margin at length coarsely striate, yellowish or brownish tan; gills adnexed, 1 line broad, whitish then pallid; stem about 3 in. long, firm, rigid, glabrous, shining, slightly striate, rooting, brownish below, pallid upwards.

*Agaricus proliferus*, Sowerby, t. 169; Cke., Hdbk., p. 79; Cke., Illustr., pl. 235.

On rotten wood and on the ground.

Densely caespitose; stem frequently proliferous. Stem

pallid above, but below tawny or bay; pileus pallid, disc darker and obtusely umbonate; margin somewhat striate, and at length cracked. (Cooke.)

**Mycena Berkeleyi.** Mass.

Pileus 1½–3 in. across, flesh up to ½ line thick in large specimens; campanulate then more or less expanded, slightly umbonate, slightly and distantly striate up to the umbo, hygrophanous, dingy brown, umbo darker, paler when dry; gills broadly sinuate behind and adnate with a decurrent tooth, rather distant, ventricose, 2–3 lines broad, thin, tinged purplish or flesh-colour; stem 3½–5 in. long, 3–4 lines thick, almost equal or slightly thickened below, dingy brown with a purple tinge, more or less striate, hollow, flesh tinged purple, ending in a long, tapering, rooting base; spores broadly elliptical, with an oblique basal apiculus, 5 × 3·5 $\mu$; no cystidia seen.

*Agaricus* (*Mycena*) *excisus*, Lasch; Cke., Illustr., p. 143 (pileus brighter in colour than in Berkeley's original drawing).

On trunks. (Hothorpe.)

This is certainly not the *Agaricus excisus* of Lasch, neither does it agree with any other described species.

Pileus 3 in. across, stem 4 in. high, root 2 in. long. Solitary or subcaespitose; gills purplish, strongly cut out behind. The fig. Bull., t. 518I, is more characteristic of the specimens than that in Fries' Icones, taken from smaller and probably more superficial specimens. (B. & Br.)

**Mycena cohaerens.** Fr.

Pileus about 1 in. across, flesh rather thin; campanulate, obtuse, even, glabrous, but soft to the touch and looking as if it was rather velvety, cinnamon or tawny-umber, becoming pale; margin straight and pressed to the stem at first; gills almost free, rounded behind, distant, very broad, usually connected by veins, white then pallid; stem 4–5 in. long, 2 in. thick, equal, even, glabrous, shining, bay upwards, the extreme apex often whitish, chestnut below, hollow, very rigid, almost horny, fasciculately tufted at the base and grown together with white down; spores 10 × 7–8 $\mu$.

*Agaricus* (*Mycena*) *cohaerens*, Fries, Epicr., p. 105; Cke.,

Hdbk., p 351; Cke., Illustr., pl. 1128B (as *Marasmius cohaerens*).

On trunks or on the ground among leaves.

Amongst pine leaves in great perfection. It has much affinity with *A. balaminus*, B.; but that has the margin of the gills purple. They have, however, the same fulvous bristles on the surface. (B. & Br.)

In woods among leaves, also on wood. I have found it growing in tufts on fir trunks. With the habit of *Marasmius*, but allied to *M. galericulata* in the gills.

**Mycena excisa.** Lasch.

Pileus convex, somewhat umbonate, rugulose, brownish; gills somewhat cut out behind and almost free, ventricose, thick, hoary; stem even almost glabrous, base rooting.

*Agaricus excisus*, Lasch; Linnea, vol. iv. (1829), p. 534, (No. 538.)

Most nearly allied to *Agaricus polygrammus*. Pileus campanulate then convex, very obtuse or umbonate, about 1 in. across; disc slightly fleshy, pallid-fuscous or greyish-fuscous. Gills in series of four, somewhat distant, connected by veins, paler in colour than the pileus, very broad and ventricose in front, very much narrowed behind, scarcely adnexed. Stem $1\frac{1}{2}$ in. long, $1\frac{1}{2}$–2 lines thick, grey. Tough; almost tasteless.

Gregarious. On trunks, especially pine. Sept., Nov.

The whole of the above is a translation of Lasch's original description in Linnea, l.c.

Fries' description of what he considers to be *M. excisa* differs in some respects from the above, as admitted by him (Icon., p. 88), and he there also says that his fungus may be distinct from that of Lasch.

Scotch specimens in the Berkeley herbarium are the only ones collected in Britain so far as I know, and these presumably agreed with the Friesian idea of the species; hence, whether the two are identical, or if not, which species these specimens represent is at present uncertain.

**Mycena psammicola.** B. & Br.

Smell strong, but not nitrous. Pileus about $\frac{1}{4}$ in. across, flesh thin, almost hemispherical, hygrophanous, brown,

paler towards the striate margin; sprinkled with minute particles; gills adnexed, sinuate behind, about $\frac{1}{4}$ line broad, white; stem up to $\frac{3}{4}$ in. long, slender, equal, whitish above, umber below, wholly whitish-pulverulent, solid.

*Agaricus* (*Mycena*) *psammicola*, B. & Br., Ann. Nat. Hist., no. 1518; Cke., Hdbk., p. 79; Cke., Illustr., pl. 186A.

On a sandbank, among moss.

Very much resembling *M. paupercula*, differing in the pulverulent stem and in having particles sprinkled on the pileus.

**Mycena rugosa.** Fr.

Pileus 1–2 in. across, rather fleshy; campanulate then expanded, more or less umbonate, tough, dry, irregularly wrinkled with raised ribs, grey becoming pale; gills adnexed with a minute decurrent tooth, slightly sinuate, rather distant, connected by veins, greyish-white; stem about 2 in. long, $1\frac{1}{2}$ line thick, straight, often compressed, firm, tough, even, glabrous, pallid, with a short, oblique, strigose rooting base.

*Agaricus* (*Mycena*) *rugosus*, Fries, Epicr., p. 106; Cke., Hdbk., p. 80; Cke., Illustr., pl. 186B.

On or near stumps, trunks, &c.

Often growing singly, and then large.

Stem short, rather thick, straight, at length compressed. Pileus somewhat obtuse. Gills ventricose, entire or the similarly coloured margin minutely serrulate. (Fries.)

Much tougher than *M. galericulata*, the latter also differs in being tufted in habit, pileus not irregularly wrinkled but striate up to the umbo, and gills with a slight pink tinge. *M. excisa* has the pileus rugose, as in the present species, but differs in the brownish stem and in the gills being very much narrowed behind.

Pileus at first campanulate, then convex, sulcate up to the umbo, cinereous, as well as the short, compressed stem, which is glabrous above; gills distant, cinereous, uncinato-adnate, connected by veins. (B. & Br.)

**Mycena sudora.** Fr.

White. Pileus $\frac{3}{4}$–$1\frac{1}{2}$ in. across, flesh very thin, except the umbo; convex, umbonate, striate, viscid, often irregular; gills obtusely adnate without trace of a decurrent tooth,

rather thick, somewhat distant, $1\frac{1}{2}$ line broad, white, becoming tinged flesh-colour; stem 3–5 in. long, 1–$1\frac{1}{2}$ line thick, equal, firm, even, dry, almost glabrous, rooting but ending abruptly.

*Agaricus* (*Mycena*) *sudorus*, Fries, Syst. Myc., i. p. 156; Cke., Hdbk., p. 80; Cke., Illustr., pl. 206.

On beech trunks.

Distinguished by the entirely white colour and viscid pileus.

Usually solitary, large, entirely white. Stem very long, root long, ending abruptly, glabrous (perhaps not always?) Pileus 1 in. broad, diaphanous, often irregular, not rugose. Gills broad. (Fries.)

**Mycena galericulata.** Scop.

Pileus $\frac{3}{4}$–2 in. across, flesh thin, conical, then campanulate, at length expanded, umbonate, dry, glabrous, striate up to the umbo, livid-brownish, greyish, pallid, &c.; gills adnate with a decurrent tooth, about 1 line broad, connected by veins, whitish then tinged with pink; stem 2–4 in. long, 1–$1\frac{1}{2}$ line thick, equal, rigid, even, polished, pallid, base tapering, rooting, hollow; spores 6–7 × 4 $\mu$.

*Agaricus galericulatus*, Scopoli, Carn., 445; Cke., Hdbk., p. 80; Cke., Illustr., pl. 222.

On trunks and stumps.

*M. rugosa* is most nearly allied to the present species, but differs in growing singly, shorter stem, grey gills, and tougher substance. A form of *M. galericulata* sometimes grows on the ground among leaves.

Common on trunks, exceedingly variable, tufts often densely crowded. Not tough and flexible, like *M. rugosa*. Stems somewhat ascending, base downy, rooting, white, tawny, bay, &c. (Fries.)

Solitary or densely cæspitose. Pileus 3–9 lines broad, sometimes, however, much larger, campanulate or conical, often subumbonate, at length depressed, innato-fibrillose, striate, brownish-white, with sometimes tints of blue or yellow. Gills rather distant, not so broadly adnate as the last (*A. alcalinus*), sometimes nearly free, often pinkish. Stem very various in length, rigid, smooth, except at the base, which is densely strigose. Inodorous, insipid. (Berk.)

*Var.* **calopus,** Fries, Hym. Eur., p. 139; Cke., Illustr., pl. 223A.

Stems chestnut-colour, united at the base into a common, fusiform rooting stem.

On stumps.

**Mycena polygramma.** Bull.

Pileus thin, elastic, conico-campanulate, often becoming expanded; dark grey with brown tinge when moist, paler when dry, margin coarsely striate; gills broadest in front, thick, distant, pale grey, often with a suggestion of pink, then whitish; stem 3–4 in. long, equal, tough, shining, distinctly striate throughout its length, pale grey, base strigose, rooting; spores elliptic-oblong, obliquely apiculate, 11–12 × 6 $\mu$.

*Agaricus* (*Mycena*) *polygrammus,* Bull., Champ., t. 395; Cke., Illustr., t. 223B.

On trunks, stumps, &c.

Separated from *M. plicata* by the tougher substance and striate stem.

Pileus 1–1½ in. broad, at first cinereous, umber towards the margin, glandiform, pruinose, then livid brown, conico-campanulate, submembranaceous, rugose with innate fibres, margin striate. Gills rather distant, at first dirty-white, then pinkish, ventricose though sometimes almost linear, all but free, margin subserrulate. Stem 3 in. high, 1 line or more thick, regularly and deeply striate, the interstices fibrillose, but occasionally the striae are obsolete, silvery, rooting, fistulose, nearly the colour of the pileus, but paler, twisted, brittle. Inodorous, insipid. (Berk.)

**Mycena parabolica.** Fr.

Pileus 1–1½ in. high and broad, flesh quite thin; at first erect and oval then parabolic, obtuse, moist, somewhat shining, glabrous, even, disc blackish with a violet tinge, remainder pallid becoming whitish towards the striate margin; gills adnexed, ascending, rather distant, slightly connected by veins, margin quite entire, white, base greyish; stem 2–3 in. long, about 2 lines thick at the coarsely hispid base, thinner upwards, blackish-violet above, base paler, covered with white meal when young, even, glabrous, dry, fistulose, not very rigid; spores elliptical, 11–12 × 6 $\mu$.

*Agaricus* (*Mycena*) *parabolicus*, Fries, Epicr., p. 107; Cke., Hdbk., p. 81; Cke., Illustr., pl. 224A.

On rotten trunks, especially pine.

Gregarious or caespitose. Allied to *M. galericulata*, but differs in the absence of a decurrent tooth to the gills, and also absence of pink tinge of gills when drying.

**Mycena tintinabulum.** Fr.

Pileus about 1 in. across, flesh quite thin, very tough, campanulately convex, almost plane when adult, scarcely umbonate, altogether even and not rugulose, rather viscid when moist, variable in colour, usually bay, yellowish brown or pallid, becoming pale; gills adnate with a decurrent tooth, horizontal, very thin, crowded, narrow, pallid, then tinged pink; stem about 1 in. long, about 1 line thick, always even, glabrous, pallid, very tough, base with short white down; spores 7–8 × 5 $\mu$.

*Agaricus* (*Mycena*) *tintinabulum*, Fries, Epicr., p. 107; Cke., Hdbk., p. 81; Cke., Illustr., pl. 224B.

On fallen trunks, &c.

Allied to *M. galericulata*, but known by the shorter stem and the perfectly even pileus. Usually gregarious, rarely caespitose. Tough, not rugulose, colour very variable, bluish, yellowish-brown, whitish, usually bay. Gills pallid having a pink tinge when dry.

## VIII. ADONIDEAE.

**Mycena lactea.** Pers.

White. Pileus about $\frac{1}{2}$ in. across, very thin; campanulate and slightly umbonate, sometimes becoming expanded, striate when moist, even when dry; gills adnate, ascending, narrow, crowded; stem $1\frac{1}{2}$–3 in. long, very slender, equal, rather tough, not quite straight, glabrous; spores 7–8 × 3–4 $\mu$.

*Agaricus lacteus*, Persoon, Syn., p. 394; Cke., Hdbk., p. 79; Cke., Illustr., pl. 159c.

On the ground in pine woods.

The disc of the pileus often with a yellow tinge. Distinguished from *M. gypsea* and *M. tenuis* by the scattered habit.

In pine woods on the ground, on pine leaves, &c.; always scattered, never caespitose, entirely white. *A.* Stem fistulose, 3 in. long, equal, almost filiform, flexile, even, glabrous, base fibrillosely rooting; pileus membranaceous, campanulate, somewhat umbonate, ½ in. and more across, striate when moist, even when dry; gills adnate, ascending, crowded, narrow, distinct, alternate; among grass and moss in pine woods. *B.* Stem 1 in. and more, flaccid, base downy; pileus thin, papillate, indistinctly striate, even when dry, 3–5 lines broad; gills scarcely ½ line broad; abundantly on pine leaves. *C.* Entirely milk-white, base minutely bulbous, coarsely downy; stem not rooting, short, scarcely 1 in., pulverulent; pileus convex then almost plane, somewhat umbonate, striate, rugulose, glabrous, 3–5 lines broad; gills adnate, distant, rather broad, distinct. (Fries.)

**Mycena gypsea.** Fr.

Pileus ½–1 in. across, membranaceous, conical then campanulate, striate up to the not very prominent umbo, remainder whitish; gills adnate, not decurrent, very broad in front, equally narrowed from the margin to the stem, the short ones broadest in front, pure white, unchangeable; stem about 3 in. long, ½–1 line thick, equal, very straight and fragile, even, glabrous, white, base downy, but not rooting; spores 8–9 × 4 $\mu$.

*Agaricus* (*Mycena*) *gypseus*, Fries, Epicr., p. 104; Cke., Illustr., pl. 952A; Cke., Hdbk., p. 370.

On the ground among fragments of wood, and on trunks.

Gregarious and caespitose. Distinguished from the numerous white species of *Mycena* by its size, form, and especially the straight, very brittle stem. Pileus typically hyaline-white, but the umbo or sometimes every part yellowish. Gills often with a slight decurrent tooth.

**Mycena luteoalba.** Bolton.

Pileus ½–1½ in. across, membranaceous, acutely campanulate, becoming expanded and umbonate, pellucidly and finely striate, glabrous, pale yellow, not becoming pale; gills adnate somewhat uncinate, joined both behind at first, broad, alternately long and short, distinct, clear white, margin quite entire; stem 1–2 in. long, very slender, equal, rather

wavy, tough, glabrous, even, yellowish, base slightly fibrillose, hollow.

*Agaricus luteoalbus*, Bolton, t. 38, f. 1; Cke., Illustr., pl. 159A; Cke., Hdbk., p. 78.

In pine woods, among moss, &c.

Differs from *M. flavoalba* in the pale yellow stem.

**Mycena flavoalba.** Fr.

Pileus $\frac{1}{2}$–$\frac{2}{3}$ in. across, almost membranaceous, campanulate, stem convex, at length expended, umbonate, even, not truly striate, cracking when dry, ochraceous, yellowish-white, or altogether white; gills adnexed, soon seceding and free, at length plane, ventricose, distant, white; stem about 1 in. long, rather rigid, up to 1 line thick, equal, not rooting, pellucid white, base glabrous, apex pruinose, fistulose; spores elliptical, 6–8 × 3–4 $\mu$.

*Agaricus* (*Mycena*) *flavoalbus*, Fries, Epicr., p. 103; Cke., Hdbk., p. 78; Cke., Illustr., pl. 159B.

On naked ground or among thin grass, heather, &c., in sunny places.

Scattered or not unfrequently in troops. Closely resembling some forms of *M. lactea*, which differs in the adnate gills and more or less downy base of the stem. Known from *M. luteoalba* in the white, pellucid stem.

**Mycena lineata.** Bull.

*Var.* **expallens**, Fries, Ic., t. 84, p. 78, f. 5.

Pileus $\frac{1}{2}$–$\frac{2}{3}$ in. across, membranaceous; campanulate, obtuse, striate with fine lines up to the disc, pale yellow; gills adnate, linear, white; stem up to 2 in. long, $\frac{1}{2}$ line thick, even, pallid, base with white down.

*Agaricus* (*Mycena*) *lineatus*, Cke., Hdbk., p. 78; Cke., Illustr., pl. 185B.

On the ground, among moss.

Slender, soft, colour (probably) variable. Stem fistulose, filiform, 2 in. long, equal, even, glabrous, pallid, often yellowish, with white down at the base. Pileus remarkably membranaceous, campanulate then expanded, obtuse, $\frac{1}{2}$ in, or a little more broad, entirely covered with fine striate lines, glabrous, yellowish in our specimens, then pallid. Gills

adnate, linear, very narrow, rather distant, distinct, white, margin similar in colour and quite entire. (Fries.)

The typical form has probably occurred in this country, but I am not aware of the fact. It differs more especially in the pileus being of a brownish colour, and in not becoming expanded, but retaining the campanulate form.

**Mycena adonis.** Bull.

Pileus about $\frac{1}{4}$ in. across, almost membranaceous, conical then campanulate, glabrous, almost even, dry, somewhat rosy but colour variable; stem about $1\frac{1}{2}$ in. long, very slender, equal, white, glabrous; gills uncinately adnexed, narrow, white, then tinged with pink.

*Agaricus adonis*, Bulliard, pl. 560, f. 2; Cke., Hdbk., p. 78; Cke., Illustr., pl. 185A.

In woods; among short grass, &c.

Characterised among the small species of this section by the even, dry, usually more or less rose-coloured pileus and the very slender, entirely glabrous white stem.

**Mycena flavipes.** Quelet.

Pileus about $\frac{2}{3}$ in. high and across, flesh very thin; campanulate or semiorbicular, obtuse, rosy-pink, purplish-pink, or violet, the disc becoming darker and brownish; gills adnexed with a very slight decurrent tooth, distant, 1 line broad, connected by veins, white then tinged with pink; stem about 2 in. long, thin, equal, tough, shining, pellucid, yellow, rooting and downy at the base, hollow; spores elliptical, $10 \times 4$–$5\ \mu$.

*Agaricus* (*Mycena*) *flavipes*, Quelet, Fung. Jura, ii. t. 1, f. 4: Cke., Hdb., p. 369; Cke., Illustr., pl. 951B.

On stumps, &c.

Smell resembling radishes. Clustered, the stems more or less connate at the base. Distinguished from every form of *M. galericulata* by the rosy or purple pileus and yellow stem.

**Mycena zephira.** Fr.

Pileus about 1 in. across, almost membranaceous, diaphanous, campanulate then convex, obtuse, striate to the middle, glabrous, not hygrophanous, livid-reddish, or pinkish-white, disc sometimes with a tinge of brown; gills adnate,

with a slightly decurrent tooth, broad, but not ventricose, at length separating from the stem, indistinctly connected by veins, white; stem 2–3 in. long, 1–2 lines thick, equal or slightly thinner upwards, round, slightly striate, when young everywhere, or at all events at the apex, whitish, squamulose, at length naked, rufescent, base incurved, cottony.

*Agaricus* (*Mycena*) *zephirus*, Fries, Epicr., p. 102; Cke., Hdbk., p. 78; Cke., Illustr., pl. 158B.

On the ground, among twigs, &c.

Somewhat resembling *M. pura*, but distinguished by the absence of a radishy smell. The stem often has a lilac tinge. *M. pseudopura* differs in the stem being glabrous at all ages and in the margin of the pileus being very indistinctly striate.

**Mycena pseudopura.** Cooke.

Pileus about 1 in. across, flesh thin; campanulate then convex, and at length expanded, obtusely umbonate, smooth, margin obscurely striate, rosy then pale; gills adnate, narrow, whitish; stem 2–3 in. high, 1 line thick, rigid, straight, even, naked, at first rosy-white, becoming brown when dry, hollow; spores elliptical, 2 × 5 $\mu$; smell none.

*Agaricus* (*Mycena*) *pseudopurus*, Cke., Hdbk., p. 77; Cke. Illustr., pl. 158A.

In woods.

Pileus scarcely exceeding an inch, rosy, then pale; stem 2–3 in. long, slender, erect, hollow, turning dark brown in drying; spores conspicuously larger and longer than in *M. pura*. (Cooke.)

*M. zephira* is close to the present species, but differs in the more strongly striate pileus, and in the stem being covered with whitish squamules when young. *M. pura* is distinguished by the radish-like smell. Gills with an indistinct decurrent tooth.

**Mycena pura.** Pers.

Smell strong, resembling radishes. Pileus $1\frac{1}{2}$–$2\frac{1}{2}$ in. across, flesh thin; campanulate then expanded, obtusely umbonate, glabrous, margin striate, colour variable, generally clear pale rose-colour, but also lilac, greyish, pallid, yellowish, and white; gills adnexed and broadly sinuate behind, very broad,

distinctly connected by veins, pale; stem 2–3 in. long, 2–3 lines thick, rigid, even, almost naked, whitish or tinged with the colour of the pileus, base downy; spores elliptical, 6–8 × 3–3·5 μ.

*Agaricus purus*, Pers., Syn., p. 339; Cke., Hdbk., p. 77; Cke., Illustr., pl. 157.

In woods.

Distinguished by the strong, radishy smell, and by the broad gills being connected by veins. *M. pelianthina* differs in having the edge of the gills dark. *M. pseudopura* is distinguished by the absence of smell, as is also *M. zephira*.

Gregarious. Pileus ½–2 in. broad, subcarnose, obtuse, convex, at length depressed, the margin thin, pellucid; sometimes marked with two or three concentric grooves, amethyst or rose-coloured soon changing to a pale brown-purple, at length nearly white. Gills broad, adnate, sometimes almost decurrent, at first whitish, then amethyst or rose, then subrufescent; connected by veins, margin uneven. Stem often twisted, more or less fibrillose, at length smooth, tough, hollow, the cavity lined with white silky fibres, splitting easily upwards, the base often strigose. Sometimes the pileus from the first is pure white, also occasionally brownish or yellowish. Always distinguishable by its taste and odour like that of radishes. (Berk.)

## IX. CALODONTES.

**Mycena strobilina.** Fr.

Entire fungus shining deep red, not becoming pale nor discoloured. Pileus up to ½ in. across, conical then campanulate, membranaceous, umbo acute, even, the remainder slightly striate and often paler in colour, glabrous, dry; gills adnate with a slender decurrent tooth, distant, distinct, with alternate shorter ones, a little paler than the pileus, but the edge darker and blackish blood-red; stem about 2 in. long, 1 in. thick, equal, juiceless, even, glabrous, base with white down, hollow, rather rigid; spores elliptical, 8–10 × 4 μ.

*Agaricus* (*Mycena*) *strobilinus*, Fries, Hym. Eur., p. 132; Cke., Hdbk., p. 77; Cke., Illustr., pl. 131A.

On fir cones, among fallen leaves, &c.

Distinguished from *M. rosella* by the deeper colour and by not becoming pale, also by its larger size. More or less fasciculate.

Subgregarious, subfasciculate. Pileus 3–5 lines broad, campanulate, with a rather short fleshy umbo, smooth, bright-red or orange-red, striate at the margin. Gills adnate, with a decurrent process, distant, whitish-red, edges dull and darker red. Stem 1–2 in. high, hollow, firm, smooth, pale-red, strigose at the base and whitish, often with a long root. (Grev.)

*Var.* **coccinea**, Sow., t. 197; Cke., Illustr., pl. 131B.

Similar in appearance to *M. strobilina*, but the gills are not at all darker at the edge.

On fir cones and twigs.

**Mycena rosella.** Fr.

Every part clear rose-colour. Pileus about $\frac{1}{4}$ in. across, entirely membranaceous and striate, campanulate then hemispherical, obtusely umbonate, rather hygrophanous; gills adnate with traces of a decurrent tooth, rather distant, margin blackish-purple; stem about 1 in. long, very slender, soft, base with white down but not strigose; obliquely elliptical, 7–8 × 4 $\mu$.

*Agaricus* (*Mycena*) *rosellus*, Fries, Epicr., p. 101; Cke., Hdbk., p. 77; Cke., Illustr., pl. 131C.

Among moss and leaves in pine woods.

Loosely gregarious; becoming pale with age.

Agreeing with *M. strobilina* in many respects, but quite distinct. Smaller and more slender, softer, paler in colour, every part being a pretty rose-colour; at length becoming pale.

**Mycena rubromarginata.** Fr.

Pileus $\frac{1}{2}$–1 in. across, flesh thin; campanulate, obtuse, striate, hygrophanous, grey, livid, reddish, whitish when dry; gills adnate, $\frac{1}{2}$ line broad, distant, whitish, margin purple-brown; stem 1–2 in. long, up to 1 line thick, even, rigid, juiceless, pallid.

*Agaricus* (*Mycena*) *rubromarginata*, Fries, Syst. Myc., i. p. 150; Cke., Illustr., pl. 284B; Cke., Hdbk., p. 76.

On rotten wood, pine stumps, twigs, &c.

Small, fragile, inodorous, juiceless, not caespitose. Stem fistulose, 1–2 in. long, not exceeding 1 line thick, equal, often curved and ascending, even, glabrous, livid becoming pale. Pileus membranaceous, campanulate, obtuse, 1 in. across, glabrous, hygrophanous, grey, livid-reddish or brownish-purple, pale when dry. Gills adnate, with a decurrent tooth, distant, distinct, not ventricose, whitish then grey, margin purple-brown, not evidently toothed. Differs from *M. sanguinolenta* in size and in the juiceless stem. Allied to *M. metata*, which differs in growing on the ground, pileus silky-atomate when dry, margin of gills not discoloured. (Fries.)

*Var.* **fusco-purpureus**, Lasch; Linn., 1829, no. 544; Cke., Hdbk., p. 76.

Purple-brown; stem finely striate, with a rooting downy base; gills eroded, edged with brown.

On willow trunks.

**Mycena olivaceo-marginata.** Mass.

Pileus about ½ in. high and across, flesh very thin, campanulate, striate up to the disc, honey-colour with a tawny tinge, rather darker when dry; gills adnexed with a very slight decurrent tooth, rather distant, nearly 1 line broad, slightly connected by veins, pallid, edge brownish-olive, wholly greyish when dry; stem 1½–2 in. long, very slender, equal, smooth, shining, naked, dry, paler or similar in colour to the pileus, tinged rufous below, base with a little white down; spores broadly elliptical, 6 × 4–5 $\mu$.

*Agaricus (Mycena) olivaceo-marginatus*, Massee, in Cooke's Hdbk., p. 369; Cke., Illustr., pl. 959A.

Among short grass.

Scattered or gregarious. Readily known by the honey-coloured pileus and stem; the olive-coloured margin of the gills shows best when the fungus is fresh.

**Mycena aurantio-marginata.** Fr.

Pileus 1–1½ in. across, disc rather fleshy, campanulate then convex, obtusely or indistinctly umbonate, even, glabrous, brownish-olive, paler when old, margin straight, slightly striate when moist; gills narrowed behind and adnexed, very much ventricose, and at first sight appearing

to be free, crowded, connected by veins, livid with a greenish tinge, margin orange, fimbriate; stem firm, hollow, 1–1½ in. long, 3–4 lines thick at the base, 1–2 lines at the apex, even, glabrous, livid or pale, base inflated, ventricose, and strigose with yellow down.

*Agaricus* (*Mycena*) *aurantio-marginatus*, Fries, Epicr., p. 100; Cke., Hdbk., p. 76.

Distinguished by the fimbriate, orange margin of the gills, and the swollen base of the stem with yellow down.

**Mycena elegans.** Pers.

Pileus ½–⅔ in. across, membranaceous, campanulate, more or less umbonate, striate, glabrous, brown or livid-yellow, opaque, not hygrophanous; gills adnate with a decurrent tooth, narrow, rather distant, distinct, colour variable, usually livid, sides greyish, but varying to whitish, yellowish, &c., the edge entire, darker, saffron-colour; stem about 2 in. long, 1 line thick, equal, livid, base fibrillosely downy, hollow, rigid, straight; spores 8–10 × 4–5 $\mu$.

*Agaricus elegans*, Persoon, Syn., p. 391; Cke., Hdbk., p. 76; Cke., Illustr., pl. 284A.

In pine woods, &c., on the ground.

Gregarious; smell weak or absent. Distinguished by the saffron-coloured margin of the gills.

**Mycena balanina.** Berk.

Pileus ⅔–1½ in. across, flesh rather thick at the disc, margin thin, convex then plane, often with an umbo; striate when moist, even when dry, pale yellowish-brown; gills adnate, then separating from the stem, connected by veins, 1½ line broad, white with a pinkish tinge, edge purple; stem about 3 in. long, 1–1½ line thick at the apex, usually becoming thinner downwards, striate, downy below, squamulose above, brownish, becoming paler at the apex, hollow.

*Agaricus* (*Mycena*) *balaninus*, Berk., Mag. Zool. & Bot., vol. i., t. 15, f. 2; Cke., Hdbk., p. 76; Cke., Illustr., pl. 156, f. 2.

On beech-mast, among beech leaves, &c.

Distinguished among species having the margin of the gills darker, by the large size and colour of the pileus.

**Mycena pelianthina.** Bolton.

Pileus about 1 in. across, flesh rather thick at the disc, thin elsewhere; convex then expanded, obtuse, moist, hygrophanous, margin striate, pale livid-purple, becoming pale when dry; gills adnexed, broad, distinctly connected by veins, purplish, with a darker, fimbriated edge; stem 2–3 in. long 1½ line thick, equal, firm, fibrillosely-striate above, pallid, base more or less downy, hollow; spores elliptical, 7 × 4 μ.

*Agaricus (Mycena) pelianthinus*, Fries, Syst. Myc., p. 112; Cke., Hdbk., p. 75; Cke., Illustr., pl. 156, f. 1.

*Agaricus denticulatus*, Bolton, t. 4, f. 1.

Among dead leaves in woods.

Sometimes gregarious. Known by the purplish pileus and gills.

Pileus 1–2 in. broad, when dry whitish, tinged with purple; stem 2–3 in. high, 1½–2 lines thick; the gills are sprinkled over with short purple hairs, arranged in fascicles on the edge; smell strong, (Berk.)

## COLLYBIA. Fries.

Pileus symmetrical, flesh usually thin, margin incurved at first, not coarsely striate nor corrugated; gills free or adnexed and rounded behind, membranaceous, soft; stem with a cartilaginous cortex, internally cartilaginous or soft, fistulose, often rooting; spores white, smooth.

*Collybia*, Fries, Epicr., p. 81; Cke., Hdbk., p. 62 (as a subgenus of *Agaricus*).

Growing on wood, leaves, and on decaying fungi, also on the ground, and then often rooting.

Most closely allied to *Marasmius*, which, however, differs in the dry, somewhat coriaceous, tough substance of the whole fungus, somewhat persistent, and fully expanding when moistened after being dried. *Clitocybe* and *Tricholoma* differ in the stem being fibrous externally, and *Mycena* in having the margin of the pileus straight, and not incurved when young.

## *ANALYSIS OF THE SPECIES.*

A. *Gills white or clear in colour, never grey; flesh white.*

### I. Striaepedes.

Stem stout, hollow or imperfectly filled with a spongy pith; grooved or fibrillosely striate.

* Gills broad, rather distant.

** Gills crowded, narrow.

### II. Vestipedes.

Stem thin, equal, fistulose or stuffed, even, velvety, floccose, or pruinose.

* Gills broad, rather distant.

** Gills very narrow, closely crowded.

### III. Laevipedes.

Stem thin, equal, fistulose, naked, glabrous (leaving out the base), not conspicuously striate (truly but minutely striate under a lens in *C. dryophila*, &c.).

* Gills broad, lax, usually more or less distant.

** Gills narrow, crowded.

B. *Gills greyish, hygrophanous.*

### IV. Tephrophanae.

Colour brown or greyish.
Allied to the terminal sections of *Tricholoma* and *Clitocybe*, but known from these by the cartilaginous stem.

* Gills crowded, very narrow. Some are strong-scented.

** Gills very broad, rather distant.

## I. STRIAEPEDES.

### * *Gills broad, rather distant.*

**Collybia radicata.** Relh.

Pileus 1½–4 in. across, flesh thin, soft, elastic, white, convex then expanded, more gibbous than umbonate, often irregular, glutinous, radiately rugose or wrinkled; brownish-olive, ochraceous-brown, sometimes with a greenish tinge, rarely altogether white; gills narrowed behind and adnexed, often with a decurrent tooth, at length separating more or less from the stem, ventricose, distant, rather thick, white; stem 4–7 in. long, 3–5 lines thick at the base, from where it becomes gradually thinner upwards, glabrous, but at length more or less striately grooved, the cartilaginous cuticle often twisted, greyish-pallid, base fusiformly rooting, often 6–8 in. long, descending vertically; spores elliptical, 14–15 × 8–9 $\mu$.

*Agaricus radicatus*, Relh., Cant., no. 1040; Cke., Hdbk., p. 62; Cke., Illustr., pl. 140.

In woods and grassy places under trees.

Distinguished by the viscid, rugulose pileus and the long, polished stem, ending in a long, tapering root.

*C. longipes* differs in the more or less downy pileus and stem.

Pileus 3 in. or more broad, flat, more or less umbonate, radiato-rugose, smooth, at first slimy, carnose, tough elastic, delicate fusco-ochraceous, olivaceous, &c., often irregular, triangular, &c. Gills white, thick, distant, ventricose, adnate, with or without a tooth, sometimes almost decurrent. Spores white, nearly round. Stem 4–8 in. high, about ⅜ of an inch thick, attenuated upwards, twisted, not smooth but rather furfuraceous, sometimes striate above with raised lines, paler than the pileus, juicy, brittle, splitting longitudinally, but sometimes tough, stuffed at length, sometimes hollow, rufescent within, penetrating very deeply into the ground by a fusiform root. (Berk.)

**Collybia longipes.** Bull.

Pileus 1–2 in. across, flesh rather thin, conical then expanded, umbonate, dry, minutely downy or velvety, pale brown; gills adnexed and rounded behind, 1½–2 lines broad,

rather distant, white; stem 4–6 in. long, 2–3 lines thick below, attenuated upwards, at length more or less grooved, minutely velvety or downy, coloured like the pileus, ending in a long, fusiform, rooting base.

*Agaricus longipes*, Bulliard, Champ. France, t. 232; Cke., Hdbk., p. 63; Cke., Illustr., pl. 201.

*Agaricus pudens*, Berk., Ann. Nat. Hist., no. 64.

On old stumps, &c.

Stem quite as velvety as in *C. velutipes*, and the pileus, especially its margin, more or less so, and by no means glutinous. (Berk.)

With the habit, size, colour, and general appearance of *C. radicata*, but distinguished by the velvety stem and pileus.

**Collybia platyphylla.** Fr.

Pileus 3–4 in. across, flesh thin, fragile; soon expanded, obtuse, watery when moist, fibrillosely virgate or streaked, brown then grey or whitish; gills slightly adnexed, obliquely truncate behind, $\frac{1}{2}$ in. and more broad, distant, soft, white; stem 3–4 in. long, about $\frac{1}{2}$ in. thick, equal, fibrillosely striate, otherwise glabrous, naked or the apex obsoletely mealy, whitish, base abrupt and springing from broadly extending, whitish, cord-like, branched and anastomosing mycelium; spores elliptical, 9–10 × 6 $\mu$.

*Agaricus* (*Collybia*) *platyphilla*, Fr., Epicr., p. 82; Cke., Hdbk., p. 63; Cke., Illustr., pl. 128.

On rotten wood, or on the ground near trunks and stumps, among leaves, &c.

Distinguished by the abundant cord-like, rooting mycelium, and the broad, distant gills.

**Collyba semitalis.** Fr.

Pileus 1–4 in. across, flesh cartilaginous, thin, cracking, white when dry; convex then plane, obtuse, even, glabrous, moist when growing, pitch-black, sooty, livid-smoky, &c., hygrophanous; greyish-yellow, dingy pale ochraceous, or greyish when dry; margin incurved at first, glabrous, then spreading and slightly pellucidly striate; gills obtuse behind, attenuated or rounded, adfixed in the form of a ring and with a minute decurrent tooth, broad, distinct, white, then greyish, becoming spotted with black where touched,

and finally altogether blackish, but the spores are white, elliptical, 7–9 × 4–5 $\mu$; stem stuffed at first, then imperfectly hollow, tough, elastic, attenuated from the slightly bulbous base, 2–4 in. long, 3–4 lines thick, fibrillosely striate, brownish or greyish-white, apex naked; often attenuated below the bulb into a tapering rooting base.

*Agaricus* (*Collybia*) *semitalis*, Fries, Epicr., p. 82; Cke., Hdbk., p. 63; Cke., Illustr., pl. 292.

On the ground by paths; in woods, after much rain.

Sometimes caespitose, not truly allied to any species, and its true position very doubtful; judging from habit, it belongs to this group, but it grows on the ground, and the cuticle of the stem is membranaceous and fibrous inside. Every part truly somewhat cartilaginous, rather tough, size very variable, sometimes tall, at others very small. The typical form is described above, other noticeable forms are:—(B) Stem sometimes short, 1 in. long, 2 lines thick, equal but curved and ascending, altogether solid; pileus plano-depressed, irregular, only slightly hygrophanous:—(C) Stem solid, bulbous, bulb up to 1 in. thick, &c. Readily known by the peculiar characters of the gills. (Fries.)

**Collybia fusipes.** Bull.

Pileus 1½–2½ in. across, flesh rather thick, convex then expanded, umbonate (the umbo at length disappearing); even, glabrous, dry, reddish-bay, becoming pale and dingy tan-colour, generally cracked and broken up when dry; gills adnexed and joined into a ring, soon separating from the stem and becoming free, broad, distant, firm, connected by veins, crisped, white then almost coloured like the pileus, often spotted; stem 3–4 in. long, ½ in. and more thick, tumid and ventricose at the centre and tapering to both ends, often twisted, longitudinally, grooved, rufous or rufous-brown, base rooting, fibrously stuffed, then hollow, remarkably cartilaginous outside; spores 5–6 × 3–4 $\mu$.

*Agaricus fusipes*, Bull., Champ., t. 106; Cke., Hdbk., p. 63; Cke., Illustr., pl. 141.

On or near stumps.

Densely tufted. Pileus 1½ in. broad, when young hemispherical, smooth, dull vinous-brown, fleshy, margin incurved; then expanded, cracked, sometimes tesselated and

warty, paler but here and there towards the margin marked with dark patches as if burnt. Gills pale umber, free, or only apparently adnate from the change of form of the pileus, sometimes rounded behind and then separating from the stem, as represented by Bulliard, t. 106, they have a rather watery appearance, though dry, like that of a piece of half-dry parchment, connected by veins, distant. Stem 2–6 in. long, ½–1 in. thick, ventricose, rooting, paler than the pileus, marked towards the base with little dark specks, striate longitudinally, not truly though apparently fibrillose, often cracked longitudinally and transversely, the transverse cracks extending only through the cartilaginous coat; substance within loose and fibrous, the fibres crisped, at length hollow. Taste agreeable. (Berk.)

**Collybia lancipes.** Fr.

Pileus 2–3 in. across, flesh thick, firm, not watery; convex then expanded, umbonate, radiately wrinkled from the umbo, dry, glabrous, pale flesh-colour, becoming pallid, margin striate; gills adnexed, emarginate, very broad behind, distant, thick, firm, up to ½ in. broad, connected by veins, tinged flesh-colour; stem stout, remarkably cartilaginous externally, almost solid, but when adult sometimes stuffed with crisp, twisted filaments, striate, glabrous or indistinctly fibrillose, gradually attenuated towards the base, whitish with a flesh-coloured tinge, base rooting, downy.

*Agaricus* (*Collybia*) *lancipes*, Fries, Epicr., p. 83.

On the ground.

Scattered, rarely clustered; every part rigid and firm. Allied to *C. fusipes*, but differing in the radiately rugose pileus and in being solitary.

** *Gills crowded, narrow.*

**Collybia maculata.** A. & S.

Pileus 2–5 in. across, flesh thick, firm, at first white, then more or less spotted with reddish-brown, or sometimes altogether rufescent; convex then plane, obtuse, sometimes wavy, even, glabrous, whitish, becoming more or less stained or spotted with reddish-brown; margin thin, incurved at first, almost naked, gills emarginate, almost or quite free,

closely crowded, 1–2 lines broad, white then pallid; stem 3–4 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. thick, somewhat ventricose, striate or channelled, white, becoming spotted like the pileus, base attenuated and rooting, cartilaginous externally, stuffed or sometimes hollow (wavy in slender forms); spores subglobose, 4–6 $\mu$ diameter.

*Agaricus maculatus*, Albertini & Schweinitz, p. 186; Cke., Hdbk., p. 64; Cke., Illustr., pl. 142.

*Agaricus (Collybia) fodiens*, Kalchbr., Icon. Hung., t. 36, f. 2; Cke., Hdbk., p. 367; Cke., Illustr., pl. 949.

In pine and other woods; among grass, &c.

*Var.* **immaculatus**, Cke., Hdbk., p. 64; Cke., Illustr., pl. 221.

Differing from the typical form in not changing colour or being spotted, and in the broader and serrated gills.

In fir woods.

**Collybia prolixa.** Fl. Dan.

Pileus 3–4 in across, fragile, flesh rather thick, white; convex then expanded, broadly gibbous, lax, even, glabrous, tawny with a brick-red tinge; margin often irregular; gills free, crowded, narrow, quite entire, white, not spotted; stem 3 in. long, 4–6 lines thick, solid, almost equal, ending abruptly, grooved, with a brick-red tinge; spores elliptical, apiculate, 8–9 × 5 $\mu$.

*Agaricus prolixus*, Fl. Dan., t. 1608; Cke., Hdbk., p. 363; Cke., Illustr., pl. 950.

Among leaves, &c.

Densely tufted. (Cooke.)

Large, up to a span. Stem firm, often scrobiculate; pileus fragile, rusty brick-red, becoming pale. (Fries.)

**Collybia distorta.** Fr.

Pileus about 3 in. across, flesh thin, convex then expanded, umbonate, very lax, even, glabrous, bay, becoming pale, but not hygrophanous; gills slightly adnexed, closely crowded, rather narrow, margin scarcely serrulate, white becoming spotted with red; stem about 3 in. long, up to $\frac{1}{2}$ in. thick, attenuated upwards from the tomentose base, twisted, sulcate, pallid, fragile, externally cartilaginous, spongy inside and soon hollow; spores elliptical, 6–7 × 4 $\mu$.

*Agaricus* (*Collybia*) *distortus*, Fries, Epicr., p. 84; Cke., Hdbk., p. 64; Cke., Illustr., pl. 282, 652.

On rotten pine trunks; also on heaps of leaves, &c.

Allied to *C. fusipes*, but closely resembling *C. butyracea*; known by the broad, lax pileus; thin, fragile, contorted stem, and the gills becoming spotted with reddish-brown.

**Collybia butyracea.** Bull.

Pileus 2–3 in. across, flesh rather thick at the disc, thin elsewhere, soft, somewhat hygrophanous, dingy then white; convex then expanded and more or less umbonate, dry, even, glabrous, reddish-brown and shining as if oiled, becoming pale and dull, dingy ochraceous or whitish when quite dry; gills slightly adnexed, almost free, thin, crowded, crenulate, white, never becoming spotted or stained with brown or red; stem 2–3 in. high, 3–4 lines thick at the base, $1\frac{1}{2}$ lines at the apex, base incrassated, equally attenuated upwards, striate, rufous, usually glabrous, but sometimes downy all over, with a rigid cartilaginous cuticle, stuffed or hollow; spores elliptical, 7–9 × 4–5 $\mu$.

*Agaricus butyraceus*, Bull., t. 572; Cke., Hdbk., p. 64; Cke., Illustr., pl. 143.

On the ground in woods.

Solitary, or usually growing in troops; closely resembling *C. distorta* in many respects, but more constant in form, and differing in the gills not becoming spotted with red.

Pileus $1\frac{1}{2}$ in. broad, subcarnose, convex, expanded, umbonate, subviscose, of a livid ochre or dull green, when quite young livid-brown; the margin subrufescent, but a portion below the umbo soon grows pale, so that the pileus appears of four colours. The umbo is always dark, but sometimes the rest of the pileus is pale rufescent or ochraceous, margin occasionally striate; flesh white mottled with rufous. Gills close, free, not ventricose, rounded, edge rather uneven and notched. Sporules white. Stem $1\frac{1}{2}$–2 in. high, $\frac{3}{8}$ in. thick below, somewhat twisted, smooth, slightly striate, downy at the bulbous base, stuffed white within, the outer coat being of quite a different structure and rufescent. (Berk.)

**Collybia bibulosa.** Mass.

Pileus 1–2 in. across, fleshy, subglobose, obtuse, then ex-

panded, moist, very smooth and even, dark obscure green when moist, pale grey or whitish when dry; gills narrow, crowded, thin, margin rather undulate, dingy, slightly adnexed, separated from the flesh of the pileus by a dark cartilaginous line, a continuation of the outer portion of the stem; spores subpiriform, $6 \times 3\ \mu$; stem cartilaginous, spongy, stuffed, becoming imperfectly hollow, tapering upwards, minutely striate, $1\frac{1}{2}$–2 in. long, $\frac{2}{3}$ in. thick at base, pale clear brown, darkest below.

*Agaricus* (*Collybia*) *bibulosus*, Massee.

On stumps. In groups of 2–4, pileus very bibulous, changing from blackish green to pale grey during drying. Often rooting into the wood. Allied in many points to *Collybia butyracea*.

**Collybia xylophila.** Fr.

Pileus 2–3 in. across, flesh thin, fragile; campanulate, lax then expanded, broadly gibbous, glabrous, disc brownish-tan becoming whitish towards the margin; gills adnate, closely crowded, very narrow, white; stem about 2 in. long, 2–3 lines thick, equal, not quite straight, fibrillosely striate, whitish; spores elliptical, $4 \times 2{\cdot}5\ \mu$.

*Agaricus* (*Collybia*) *xylophilus*, Fries, Monogr., ii. p. 289; Cke., Illustr., pl. 202 ?; Cke., Hdbk., p. 65.

On rotten trunks, elm, &c.

Cooke's figure differs very materially from that of Fries, Icon., t. 63, f. 2.

A very fine species, usually densely caespitose. Stem hollow, 2–3 in. long, 3 lines thick, equal but often flexuose, fibrillosely striate, whitish, brownish inside. Pileus ample, campanulate, broad, up to 3 in. across (up to 4 in. when expanded), usually obtuse, sometimes with a small but true umbo, and when much expanded broadly gibbous, glabrous, whitish or the centre brownish-tan. When much expanded the margin is cracked and split. Flesh everywhere very thin, fragile, watery-brown. Gills adnate, often with a small decurrent tooth, very narrow, a line broad at most, very much crowded, edge entire. (Fries.)

*C. confluens* and *C. ingrata* differ in having the stem downy or pulverulent.

## II. VESTIPEDES.

* *Gills broad, rather distant.*

**Collybia velutipes.** Fr.

Pileus $1\frac{1}{2}$–3 in. across, convex then more or less plane, often obscurely umbonate, smooth, even, viscid, bright yellow, disc darker, or altogether fulvous, flesh 1 line or more thick, margin very thin, tinged yellow; gills subdistant, 2–3 lines broad, adnexed, cut out behind, then with a minute decurrent tooth, margin entire, pale opaque yellow; stem 2 in. long and more, $\frac{1}{4}$ in. thick or more, subequal, attenuated into a rooting base, orange-bay, darkest downwards where it is often very dark brown, minutely velvety, stuffed; spores elliptical, $7 \times 3$–$3 \cdot 5$ $\mu$.

*Agaricus* (*Collybia*) *velutipes*, Fries, Hym. Eur., p. 115; Cke., Hdbk., p. 65; Cke., Illustr., pl. 184A.

*Agaricus velutipes*, Curtis, Flor. Lond., t. 73.

On trunks, logs, &c. Tufted. Pileus variable in colour, clear yellow, tawny-yellow, or fulvous, stem sometimes very short, at others elongated, usually curved and ascending. One of the few species of the Agaricini that bear frost well.

Caespitose. Pileus 1–3 in. broad, smooth, slimy, of a beautiful tawny colour, convex, expanded, fleshy; margin thin, subtransparent. Gills ventricose, broad, scarcely adnate, ochraceous. Stem 2–9 in. high, $\frac{3}{8}$ in. thick, incurved, velvety, rich tawny-brown, pale above, often compressed and striate, fistulose. (Berk.)

*Var.* **rubescens**, Cke., Illustr., pl. 650.

Pileus viscid, dark reddish-brown; gills becoming spotted and stained with rusty brown; stem elongated, tapering downwards, dingy umber.

Among firs.

Caespitose. Pileus 1–3 in. broad, smooth, slimy, of a beautiful tawny colour, convex, expanded, fleshy, margin thin, subtransparent. Gills ventricose, broad, scarcely adnate, ochraceous. Stem 2–9 in. high, $\frac{3}{8}$ in. thick, incurved, velvety, rich tawny brown, pale above, often compressed and striate, fistulose. (Berk.)

**Collybia laxipes.** Fr.

Pileus $\frac{1}{2}$–$\frac{2}{3}$ in. across, flesh thin; convex then plane, obtuse, glabrous, even, moist, milk-white or with a very slight tinge of buff; gills soon becoming free, distant, 1 line broad, ventricose, milk-white; stem 3–4 in. long, 1 line thick, equal, not quite straight, rigid, with rufous velvety down, apex pale, stuffed.

*Agaricus* (*Collybia*) *laxipes*, Fries, Epicr., p. 86; Cke., Hdbk., p. 65; Cke., Illustr., pl. 184B.

On chips, twigs, &c.

Resembling *C. fusipes* in the brown velvety stem, but much smaller and slenderer in every part.

**Collybia floccipes.** Fr.

Pileus $\frac{1}{2}$–$\frac{2}{3}$ in. across, flesh thin; campanulate then convex, and umbonate, even, sooty-brown, becoming pale; gills adnexed, ventricose, thick, rather distant, white; stem $1\frac{1}{2}$–2 in. long, $\frac{1}{2}$ line thick, equal, straight, whitish, rough with minute black points, fistulose, rooting.

*Agaricus* (*Collybia*) *floccipes*, Fries, Epicr., p. 87; Cke., Hdbk., p. 368; Cke., Illustr., pl. 1168.

On stumps and on the ground.

Distinguished at once from other species with a dark pileus by the whitish stem being sprinkled with minute, black, point-like warts.

**Collybia mimica.** W. G. Smith.

Pileus smooth, with a thin separabls cuticle, stem fibrillose at the base, fibrillose striate in the middle, and naked or slightly pruinose at the apex. Gills very broad, somewhat distant, thin, white.

*Agaricus* (*Collybia*) *mimicus*, W. G. Smith in Cke., Hdbk., p. 65; Cke., Illustr., pl. 129.

Among wood shavings.

Odour and taste strong like fish. Agreeing in some points with *A. cucumis*, but differing very materially in others. (W. G. Smith.)

The above brief description differs in many important points from Smith's original figure, which may be described as follows. Every part inside and outside, gills also, dingy ochraceous, stem reddish downwards. Pileus about 1 in. across, plane, flesh thin; gills 3 lines broad, narrowed in

front, slightly cut out behind; stem about 2 in. long, 2½ lines thick at the apex, gradually becoming narrow to the base, very wavy, hollow; spores elliptic-oblong, white, 8 × 4–5 μ.

**Collybia vertiruga.** Cooke.

Pileus ¼–1 in. across, flesh thin, tough, radiately wrinkled, minutely pulverulent, campanulate, then convex, at length plane, dull brown or grey; gills adnate, narrow, connected by veins, white with a tinge of yellow; stem 2–2½ in. high, ½–1 line thick, tawny, minutely velvety, strigose at the base, fistulose.

*Agaricus* (*Collybia*) *vertirugis*, Cke., Hdbk., ed. 1, p. 147; ed. 2, p. 66; Cke. Illustr., pl. 149A.

*Agaricus undatus*, Berk., Outl., p. 117.

On dead fern roots, twigs, &c.

Distinguished from *C. stipitaria* by the dingy pileus, and the adnate gills, connected by veins.

Pileus 1 line to 1 in. broad, campanulate, at length convexo-plane, wrinkled in the direction of the gills, tough, submembranaceous, minutely pulverulent, dull brown or cinereous. Gills truly adnate, ascending or horizontal, moderately distant, connected by veins, white with a yellowish tinge. Stem 2–2½ in. high, ½–1 line thick, strigose at the base, rufous, minutely velvety, fistulose, sometimes compressed. (Berk.)

**Collybia stipitaria.** Fr.

Pileus 2–5 lines across, flesh thin; convex then plane, umbilicate, whitish, clothed with tawny or brown fibrils that sometimes form minute squamules; gills separating from the stem and becoming free, rather distant, ventricose, white; stem 1–2 in. long, slender, equal, tough, bright brown or bay, more or less hairy, stuffed then hollow.

*Agaricus* (*Collybia*) *stipitarius*, Fries, Syst. Myc., i. p. 138; Cke., Hdbk., p. 66; Cke., Illustr., pl. 149B.

On grass, twigs, &c.

Gregarious. Very remarkable, small, pileus whitish, often discoid, with the habit of *Marasmius perforans*. (Fries.)

In some of Cooke's figures the pileus is minutely papillate. Stem shorter than in *C. vertiruga*, and gills free.

** *Gills very narrow, closely crowded.*

**Collybia hariolorum.** Bull.

Pileus 1–2 in. across, flesh thin, tough; campanulately convex, then expanded, obtuse, sometimes depressed, even, glabrous, whitish, margin slightly striate; gills slightly adnexed at first, soon free, not much crowded, narrow, whitish; stem up to 3 in. long, 2–3 lines thick, rather compressed, for the most part covered with a whitish woolly down, apex generally naked and pale, the remainder reddish-brown, hollow, the wall of the cavity downy, cartilaginous, almost equal; spores elliptical, 6–7 × 3–4 $\mu$.

*Agaricus hariolorum*, Bull., t. 585, f. 2; Cke., Hdbk., p. 66; Cke., Illustr., pl. 150A.

In woods, among leaves, especially beech; also on rotten wood.

*C. confluens* differs from the present in the densely crowded, very narrow gills, and crowded habit of growth.

**Collybia confluens.** Pers.

Pileus 1 in. and more across, flesh thin but tough, flaccid; convex then expanded, obtuse, at length broadly and obtusely umbonate, hygrophanous, rufescent when moist, margin slightly striate; even and altogether white when dry; gills free, at length distant from the stem, very closely crowded and very narrow, linear, pinkish then whitish; stem 3–5 in. long, 1 line and more thick, hollow, remarkably cartilaginous, apex often dilated, rufous, covered everywhere with whitish down, often densely crowded and hence more or less compressed; spores subglobose, 7–9 $\mu$ diameter.

*Agaricus confluens*, Pers., Syn., p. 368; Cke., Hdbk., p. 66; Cke., Illustr., pl. 150B.

In woods, among leaves, &c.

Growing in troops, many individuals springing from the same spreading mycelium and becoming confluent, but easily separating from each other, and not truly caespitose. (Fries.)

Known by the crowded habit, crowded rufous stems, everywhere covered with white down, and the thin, flaccid pileus.

Densely tufted, often in large rings. Pileus 1–1½ in.

broad, reddish-brown, changing when dry to cream-colour, at first convex, with the gills perfectly free so as to leave a naked ring round the top of the stem, at length expanded absolutely umbonate more or less irregular and compressed, the margin when fresh finely striate. Gills distinctly free, linear, finely serrulate, pale changing to cream-colour. Stem 2 in. or more high, above 1 line thick, compressed, thickest upwards, and pale rufous below; the whole villous with white mealy pubescence; not strigose. (Berk.)

Pileus 1 in. across, reddish-brown, caespitose; stem 2 in. high and more, above 1 line thick, pale rufous below, the whole covered with white mealy pubescence. Probably this is a true *Marasmius*. It is of a much drier texture than is usual in *Agaricus*. (Cooke.)

**Collybia ingrata.** Schum.

Pileus about 1½ in. across, flesh thin, tough; globose, then campanulate, then expanded and umbonate, glabrous, dingy brownish-tan; gills free but close to the stem, closely crowded and very narrow, quite entire, pallid; stem 2–3 in. long, 2–3 lines thick, often twisted, wavy and compressed, brownish, umber below, with white pulverulent down above, or sometimes everywhere, cartilaginous, hollow.

*Agaricus ingratus*, Schum., Saell., ii. p. 304; Cke., Hdbk., p. 67; Cke., Illustr., pl. 283 (very different to the figure given by Fries, Icon., pl. 64, f. 1).

Damp places in woods.

Caespitose, tough, with a mouldy unpleasant smell. Allied to *C. confluens*, but differing in habit, the stems being brownish and not matted together at the base and not floccose, pileus brownish-tan, and gills although free, very close to the stem.

Fries describes two forms:—(*A.*) Tufted, tough, with a mouldy smell. Stem cartilaginous, hollow, 2–3 in. long, 2–3 lines thick, or broader when compressed, flexuous, twisted, brownish, base not rooting, at length umber, powdered with white meal above, wall of the cavity downy. Pileus thin, tough, globoso-campanulate then expanded, umbonate, 1½ in. across, even, glabrous, dingy brownish-tan, difficult to describe. Gills free, very much crowded and narrow, but slightly ventricose, quite entire, pallid.

(*B.*) Minor. Stem 1½ in. long, about 1 line thick, pulverulent, glabrous and thinner downwards, outside and inside colour of the pileus, not rufescent. Pileus convex then plane, 1 in. across. (Fries.)

**Collybia conigena.** Pers.

Pileus ½–1 in. across, flesh thin, rather firm; convex then almost plane, somewhat umbonate, unequal, often angular, also depressed, glabrous, yellowish brick-red, becoming pale and sometimes almost white, margin slightly striate when moist; gills slightly adnexed, soon free, crowded, rather narrow, pallid; stem 1–3 in. long, very slender, cartilaginous, tough, coloured like the pileus, covered everywhere at first with white flocculent powder, at length almost naked, terminating in a strigose, rooting base, spores broadly elliptical, 4–5 × 3 $\mu$.

*Agaricus conigenus*, Pers., Syn., p. 388; Cke., Hdbk., p. 67; Cke., Illustr., pl. 130.

In pine woods, growing on cones and among pine leaves.

Usually gregarious. Known from *C. tenacella* and *C. esculenta* by the free, closely crowded, narrow gills. *C. cirrhata* differs in the adnate gills.

Gregarious. Pileus 1 in. or more broad, rather irregular, umbonate, expanded, often depressed, sometimes quite smooth, but occasionally more or less lanato-pubescent; sometimes tinged with chocolate, but generally ochraceo-rufous; pale when dry, and then occasionally zoned, flesh woolly when dry, firm when moist. Gills very numerous, linear, free or only adnexed, tinged with yellow, or of the colour of the pileus, the unequal ones very long. Spores white, globose. Stem very various in height, ½–1½ lines thick, tough, pulverulento-pubescent with a long very strigose rooting base, rufous, hollow, the inside woolly. Certainly a very distinct species from the last (*A. tenacellus*). I do not find any processes on the gills. It must not be confounded with *A. confluens*. (Berk.)

**Collybia cirrhata.** Fr.

Pileus up to ½ in. across, flesh thin; conico-convex then plane, the disc at length umbilicately depressed, rufescent, often with a central papilla, rather silky, at length very slightly and often concentrically rivulose, opaque, white;

gills adnate, at length separated from the stem, crowded, exceedingly narrow, very unequal, white; stem 1–2 in. long, very slender, flexuous, pallid, delicately coated with white mealy down, ending in an elongated fibrillose, twisted root; spores elliptical, 4–5 × 2–3 $\mu$.

*Agaricus* (*Collybia*) *cirrhatus*, Fries, Epicr., p. 89.

Among moss, &c.

Sclerotium not present in this species. Very variable in size, but always small, tough, whitish, often becoming tinged with rufous. (Fries.)

Allied to *C. conigena* but known by the gills being adnate at first. Differs from *C. tuberosa* in the rooting fibrillose base of the stem, and the absence of a sclerotium.

**Collybia tuberosa.** Bull.

Pileus up to $\frac{1}{2}$ in. across, flesh thin, convex then plane, umbonate but not umbilicately depressed, minutely silky then almost glabrous, even, opaque, white; gills adnate, crowded, thin, unequal, white, slightly ventricose; stem $\frac{1}{2}$–$1\frac{1}{2}$ in. long, thin, usually ascending, equal, obsoletely powdery, white, rarely tinged rufous, base quite glabrous, springing from a smooth, solid, yellowish or reddish sclerotium; spores elliptical, 4–6 × 2–3 $\mu$.

*Agaricus tuberosus*, Bulliard, t. 256; Cke., Hdbk., p. 67; Cke., Illustr., pl. 144A.

*Agaricus* (*Collybia*) *cirrhatus*, Cke., Hdbk., p. 67; Cke., Illustr., pl. 144B.

Growing on decaying species of *Russula* and other Agarics, and on the ground among moss, &c.

Small but tough, rather firm, gregarious, entirely white. *C. cirrhata* resembles the present species, but differs in having a downy rooting base to the stem, and in not springing from a sclerotium.

**Collybia racemosa.** Pers.

Pileus 3–4 lines across, flesh very thin; convex, papillate, covered with grey down; gills adnate, crowded, white; stem 1–2 in. long, slender, bearing slender, minute stems with abortive pilei, base black, sclerotioid, stuffed.

*Agaricus racemosus*, Persoon, Disp., t. 3, f. 8; Cke., Hdbk., p. 67.

*Agaricus racemosus*, Sowerby, t. 287.

On putrid Agarics, and on the ground.

In all probability a monstrous or abnormal form of some species, bearing a raceme of minute secondary stems, with minute imperfect pilei on the main stem.

## III. LAEVIPEDES.

* *Gills broad, lax, usually more or less distant.*

**Collybia collina.** Scop.

Pileus 1–2 in. across, flesh thin, white; campanulate then expanded, becoming flattened and umbonate, glabrous, rather viscid when moist, also slightly striate; even and shining when dry; brown or tan-colour, becoming pale; gills adnexed when young, then free, rather distant, broad, lax, white then pallid; stem 3–4 in. long, 2–3 lines thick, hollow, rather fragile, almost equal or slightly thinner upwards, even, glabrous, pallid-white, base downy.

*Agaricus collinus*, Scopoli, Carn., p. 132; Cke., Hdbk., p. 68; Cke., Illustr., pl. 205.

In grassy places.

Usually gregarious. With the habit of a *Mycena*, but the margin incurved at first. Somewhat resembling a small form of *C. radicata*, but differing in the abrupt, and not rooting base of stem.

**Collybia thelephora.** Cke. & Mass.

Pileus $\frac{3}{4}$–$1\frac{1}{2}$ in. across, flesh rather thin; campanulate, lax, with a small but acute papillate umbo, margin incurved at first, then expanded and wavy, glabrous, slightly striate, pale dingy ochraceous, the disc darker; gills adnate, $1\frac{1}{2}$ line broad, narrower in front, thin, rather crowded, whitish; stem 3–4 in. long, 1–$1\frac{1}{2}$ line thick, equal, hollow, glabrous, even, base purplish-brown, paler upwards; spores elliptical, $9 \times 7$ $\mu$.

*Agaricus* (*Collybia*) *thelephorus*, Cke. & Massee, Grevillea, xviii. p. 51; Cke., Illustr., pl. 1167.

In partly dried up *Sphagnum* bogs.

Gregarious. Inodorous. The pileus is sometimes slightly depressed round the umbo. The habit is that of a *Mycena*,

but the margin is distinctly incurved when young. Known by the thin, persistently campanulate, lax pileus, and the small but acute, pointed umbo.

**Collybia ventricosa.** Bull.

Pileus 1–1½ in. across, flesh thin; campanulate, then convex and umbonate, glabrous, pale tan or pale dingy ochraceous; gills arcuately adnexed, ventricose, 1½ line broad, rather crowded, undulate, rufescent; stem 3–4 in. long, ventricose near the base, where it is 2–3 lines thick, almost equal above and 1 line thick, ending below the swelling in a slender, tapering, rooting base, coloured like the pileus or rufescent, even, naked, hollow.

*Agaricus ventricosus*, Bulliard, Champig. Fr., t. 411, f. 1; Cke., Illustr. pl. 145A; Cke., Hdbk., p. 68.

In woods.

Somewhat resembling *C. dryophila*, but distinguished by the longer stem being ventricose or swollen near the base, and rooting.

**Collybia leucomyosotis.** Cke. & Sm.

Strong-scented, rather fragrant. Pileus about 1 in. across, flesh rather thick, dingy; convex then expanded, sometimes obtusely umbonate, pale mouse-colour, disc darker, margin paler and faintly striate, almost white when dry; gills adnate and distinctly sinuate behind, thick, rather distant, 1½ line broad, white; stem 4–5 in. long, 1½–2 lines thick, equal, straight or slightly wavy, very brittle, pallid, base white and obtuse, slightly pruinose above; spores elliptical, $6 \times 4\ \mu$.

*Agaricus* (*Collybia*) *leucomyosotis*, Cke. and Smith; Cke., Hdbk., p. 369; Cke., Illustr., pl. 651.

On *Sphagnum*, in bogs.

Habit very much resembling the figure in Fries' Icones, of *Naucoria myosotis*, hence the name. (Cooke.)

Distinguished by the strong scent and the adnate, sinuate gills.

**Collybia Stevensoni.** B. & Br.

Pileus ½ in. across and high, flesh thin; semiovate or hemispherical, obtuse, viscid, pallid yellow, spotted here and there; gills broadly adnate with a decurrent tooth,

broad, distant, white; stem 1½ in. long, not 1 line thick, equal, fibrillose, pulverulent above, externally and internally rufous, rooting; spores 10–11 × 7–8 μ.

*Agaricus* (*Collybia*) *Stevensoni*, Berk. and Broome; Cke., Hdbk., p. 68; Cke., Illustr., pl. 145B.

On the ground.

Somewhat resembling *C. esculenta*, but differing in the pileus not becoming plane, and in the broad, distant, adnate gills.

**Collybia psathyroides.** Cooke.

Ivory-white. Pileus about ¾ in. broad, and nearly 1 in. high, flesh thin; campanulate, obtuse, rather viscid, margin regular, even; gills broadly adnate and with a decurrent tooth, triangular, ¼ in. and more broad, rather distant, persistently white; stem 3–4 in. long, 1 line thick, equal, straight, hollow, rather tough; spores elliptic-oblong, 15 × 7 μ.

*Agaricus* (*Collybia*) *psathyroides*, Cke., Hbk., p. 68; Cke., Illustr., pl. 266.

On the ground.

A very remarkable and distinct species with the habit of a *Psathyra*. Known by being wholly white, and the very broad and broadly adnate gills.

**Collybia xanthopoda.** Fr.

Pileus 1–2 in. across, flesh thin, campanulately convex then expanded, lax, umbonate, glabrous, dry, tan-colour becoming pale, margin at length spreading and slightly striate; gills adnexed at first, soon free, truncate behind, crowded, very broad, lax, whitish; stem 3–4 in. long, 2–3 lines thick, tough, hollow, equal, even, glabrous, tawny-yellow, base strigosely rooting.

*Agaricus* (*Collybia*) *xanthopus*, Fr., Epicr., p. 91; Cke., Hdbk., p. 69; Cke., Illustr., pl. 203.

In pine woods, &c.

Allied to *C. dryophila*, but distinguished by the umbo, very broad gills and strigose rooting base of stem. *C. succinea* differs in not being umbonate.

**Collybia nitellina.** Fr.

Pileus 1–1½ in. across, flesh thin, coloured; convex then expanded, even, shining, tawny, often with a brick-red

tinge, pale when dry, hygrophanous; gills broadly adnate, thin, rather crowded, white then pallid; stem 2–3 in. long, about 1½ in. thick, equal, rigid, glabrous, tawny, very slightly fistulose.

*Agaricus* (*Collybia*) *nitellinus*, Fries, Epicr., p. 80; Cke., Hdbk., p. 69.

Among grass by paths in pine woods, &c.

Solitary or gregarious, inodorous. Stem stuffed then fistulose, 2–3 in. long, 1½ line thick, equal and often flexuose, glabrous, slightly striate, tawny-ferruginous, yellow when dry, base often with down and rooting; apex rarely pruinose. Pileus somewhat membranaceous, convex then plane, obtuse, 1–1½ in. broad, glabrous, but somewhat rugulose when seen in a good light, tawny or brick-red-tawny and pellucidly striate when moist, somewhat tan-colour when dry; flesh thin, similarly coloured. Gills adnate, very obtuse behind, and equally attenuated to the front, not very much crowded, narrow, quite entire, whitish. A pretty species, very distinct, and widely separated from *C. acervata*. With the habit of *Laccaria laccata*, there is a smaller variety having the stem scarcely 1 in. long, pileus ½ in. broad, umbonate. (Fries.)

Cooke has figured a fungus (Illustr., pl. 146) that on the plate is called a *variety* of the present species, but in the "Handbook" is quoted under the species which appears to be very different from the present species. The figure in Illustr., pl. 202, called *Agaricus* (*Collybia*) *xylophilus*, agrees closely with his fig. 146, quoted above; what these are in reality, I do not know.

**Collybia succinea.** Fr.

Pileus 1 in. or more across, flesh thin; convex then expanded, obtuse, at length usually depressed and unequal, even, glabrous, rufous or brownish, cracked when dry; gills adnate, obtuse behind not much crowded, very broad, rather thick, pallid white, margin minutely toothed; stem 1–2 in. long, 1–2 lines thick, equal or narrowed at the base, not rooting, even, glabrous everywhere, polished, pale rufescent, hollow, tough.

*Agaricus* (*Collybia*) *succineus*, Epicr., p. 91; Cke., Hdbk., p. 69; Cke., Illustr., pl. 151A.

Among grass, under trees, &c.

Clearly distinguished from *C. dryophila* by the broader, thicker, less crowded gills; and from *C. xanthopoda* by the absence of an umbo.

**Collybia nummularia.** Bull.

Pileus about 1½ in. across, dry, flesh thin; soon almost plane and slightly depressed round the umbo, even, pallid or whitish, often variegated with reddish or yellow stains; gills free, broadest behind, rather distant, white; stem 1½–2 in. long, 1 line or more thick, often slightly thinner downwards, pallid, stuffed then hollow.

*Agaricus nummularius*, Bulliard, Champ., t. 56; Cke., Illustr., pl. 151B; Cke., Hdbk., p. 69.

Among leaves.

Distinguished by being entirely white or pallid, and by the plane pileus being slightly depressed round the small, obtuse umbo.

**Collybia esculenta.** Wulf.

Pileus ½–¾ in. across, flesh thin, tough, white, pleasant tasted; convex then plane, orbicular, obtuse, glabrous, even, or slightly striate when old, ochraceous-tan or brownish; gills adnexed, often with a very minute decurrent tooth, then seceding from the stem, very broad, almost obovate, lax, rather distant, whitish or with a tinge of tan-colour; stem 1–2 in. long, scarcely 1 line thick, tough, straight, indistinctly hollow, even, glabrous, rather shining, yellowish-tan, ending in a long, perpendicular, usually glabrous, rooting base.

*Agaricus esculentus*, Wulf, in Jacq. Coll., xi. t. 14, f. 4; Cke., Hdbk., p. 69; Cke., Illustr., pl. 152A.

In woods, pastures, &c.

Gregarious but never caespitose. *C. tenacella* is allied to the present species, but differs in the rooting base of the stem being fibrillose, and in the snow-white gills.

The root is sometimes 6 in. long, and downy when growing amongst leaves, either perpendicular or flexuous. Much eaten in Austria, where, in the beginning of April large baskets of it are brought to market under the name of *Nagelschwamme*, which accords with Linneus's name

*A. clavus.* It has, however, a bitter, unpleasant taste. (Berk.)

**Collybia tenacella.** Pers.

Pileus about $\frac{1}{2}$–$\frac{2}{3}$ in. across, flesh thin, white, not hygrophanous; convex then expanded, orbicular, somewhat umbonate, even, glabrous, brown, becoming pale, livid, or rarely white; gills adnexed, emarginate, broad, ventricose, hence appearing lax, rather distant, distinct, snow-white; stem 2–3 in. long, sometimes up to 5 in., not 1 line thick, equal, straight, even, glabrous, tawny, apex white, naked, ending in a long, fibrillose rooting base; spores elliptical, 5–6 × 3 $\mu$.

*Agaricus tenacella*, Pers., Ic. Pict., t. 1, f. 3, 4; Cke., Hdbk., p. 70; Cke., Illustr., pl. 152B, and 649.

In woods, especially pine.

Very tough; inodorous, solitary, or sometimes in troops. Differs from *C. esculenta* in the root being downy, and the gills snow-white.

Pileus $\frac{1}{2}$–1 in. broad, when young conic, then convex and subhemispherical, at length expanded then plane, sometimes slightly umbilicate, not striate, sub-carnose, smooth, dry, cinereous, inclining to yellowish; often altogether abortive. Gills free, or often adnexed, ventricose, sometimes remarkably so, rather distant, the shorter ones truncate behind; in general pure white, but sometimes with a tinge of grey; under a powerful lens covered with variously hooked or conic papillae. Stem 2–4 in. long, scarcely 1 line thick, flexuous, filiform, attenuated very much towards the base and somewhat strigose, hollow, pale above, below tawny, very minutely pubescent under a good lens; when young beautifully downy, and then not distinctly hollow, but with only a pale line down the centre. Taste very pleasant. (Berk.)

*Var.* **stolonifer**, Jungh., in Linnea (1830), p. 396; Cke., Hdbk., p. 70; Cke., Illustr., pl. 152C.

The plants spring at intervals from a long, creeping, stolon-like or rhizomorphoid mycelium.

Among fir leaves, &c.

**Collybia eustygia.** Cooke.

Odour of rancid meal. Pileus $1\frac{1}{2}$–2 in. across, flesh white,

thick at the disc, margin very thin; convex then plane, sometimes depressed, sometimes wavy, even, smooth, tough, dingy white, a little darker at the disc, shining when dry; gills rounded behind and adnexed or appearing to be almost free when the pileus is depressed, not crowded, dark grey; stem 2–3 in. long, 3 lines thick, attenuated downwards into a rooting base, usually slightly curved, white above and sprinkled with small point-like scales, darker below and often becoming sooty, somewhat longitudinally striate or fibrous, stuffed or rarely hollow; spores white, globose, 4–5 $\mu$ diameter.

*Agaricus* (*Collybia*) *eustygius*, Cke., Grev., xix. p. 41; Cke., Illustr., pl. 1185.

On the ground.

A well-marked species, characterised by the dark grey gills and strong rancid smell. Distinguished from the grey-gilled species of *Clitocybe* and *Tricholoma* by the character of the gills. The whole plant turns black when dry.

** *Gills narrow, crowded.*

**Collybia acervata.** Fr.

Pileus 2–3 in. across, flesh thin, convex then expanded, obtuse or at length gibbous, pale flesh-colour when moist, whitish when dry, margin at first incurved, then expanded and slightly striate; gills adnexed at first, soon free, very closely crowded, narrow, plane, tinged flesh-colour then whitish; stem 2–4 in. long, 1–2 lines thick, rigid, fragile, distinctly fistulose, slightly attenuated upwards, rarely compressed, very glabrous except at the base, even, rufous or sometimes brown, wall of the cavity of the stem glabrous; spores elliptical, 7–8 $\times$ 3·5 $\mu$.

*Agaricus* (*Collybia*) *acervatus*, Fries, Epicr., p. 92; Cke., Hdbk., p. 70; Cke., Illustr., pl. 267.

In woods at base of pine trunks, &c.

Caespitose, stems numerous, crowded, joined together and covered with white down at the base. Allied to *C. confluens*, but distinguished by the very glabrous stem.

**Collybia dryophila.** Bull.

Pileus 1–2 in. across, flesh thin, white; convex then

plane, obtuse, centre usually depressed, reddish bay or pale tan, becoming pale but not hygrophanous, even, glabrous, margin incurved at first, then expanded; gills almost free, with a minute decurrent tooth, but appearing as if adnexed, when the pileus is depressed, crowded, narrow, distinct, plane, white or pallid; stem 1–2 in. long, 1–2 lines thick, cartilaginous, distinctly hollow, even, glabrous, somewhat rooting, base often swollen when growing in damp places among leaves, coloured, usually yellowish or rufescent; spores elliptic-fusiform, 7–8 × 4 $\mu$.

*Agaricus* (*Collybia*) *dryophilus*, Cke., Hdbk., p. 70; Cke., Illustr., pl. 204.

*Agaricus dryophilus*, Bull., Champ., t. 434.

On the ground; among fallen leaves; on rotten wood, &c.

Distinguished from its nearest allies by the narrow, crowded gills and obtuse pileus.

Solitary or loosely gregarious, inodorous, very variable; pileus rufous-bay, yellowish, or tan-colour; in dry pine woods a form occurs having a white pileus and gills and a yellow stem. Gills sometimes sulphur-colour, and sometimes (a morbid state) cinnamon-tan. The following forms occur:—

(*A.*) Stem elongated, flexuous, decumbent, base swollen; pileus broad, lobed, gills white:—

(*B.*) *funicularis*, large tufted; stem lax, decumbent, base equal, downy; gills sulphur-colour:—

(*C.*) Numerous individuals growing together in a large tuft; stem thick, swollen, deformed, sulcate, brown, mycelium binding the soil into a mass; pileus much deformed, angular, waved, blackish then bay. Damp soil in gardens. (Fries.)

Solitary or tufted, very variable in size and colour. Pileus 1–3 in. broad, whitish, pinkish, yellowish or livid, plane, sometimes depressed, fleshy, thin, tender, easily injured, of a watery substance. Gills free, white or very pale flesh-colour, soft, tender, entire or serrate, numerous. Stem 2–3 in. high, $\frac{1}{4}$–$\frac{1}{3}$ in. thick, shining, splitting, sometimes twisted, of the same colour as the pileus, but the summit is generally darker and pinkish. The whole plant is fragile and easily detached from the stem. (Grev.)

**Collybia aquosa.** Fr.

Every part honey-colour, watery, hygrophanous. Pileus about 1 in. across, very thin but tough, soon plane, obtuse, orbicular, not depressed, margin densely and finely striate; gills slightly adnexed, soon leaving the stem and becoming free, very much crowded, narrow, whitish; stem stuffed $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, scarcely 1 line thick, equal, rather wavy, surface slightly undulated, polished and glabrous, stuffed; spores elliptical, 6 × 3–4 $\mu$,

*Agaricus* (*Collybia*) *aquosus*, Fries, Vet. Ac. Förh, 1851; Cke., Hdbk., p. 71; Cke., Illustr., pl. 234.

Damp woods, among moss, &c.

*Var.* **Bulliardii**; *Agaricus aquosus*, Bull., Champ. Fr., t. 12. Pileus ochraceous, with a brick-red tinge, becoming whitish; stem tawny-rufous, base fibrillose.

Intermediate between the present and *C. dryophila*.

**Collybia extuberans.** Fr.

Pileus $\frac{3}{4}$–$1\frac{1}{2}$ in. across, flesh rather thin, convex then expanded, with a broad, prominent umbo, margin slightly incurved, bay or umber; gills narrowed behind and slightly adnexed, nearly free, crowded, narrow, white; stem 2–3 in. long, 2–3 lines thick, glabrous, pallid, fistulose, rooting.

*Agaricus* (*Collybia*) *extuberans*, Fries, Epicr., p. 93; Fries, Icon., t. 67, f. 1; Cke., Hdbk., p. 71.

On the ground, near trunks, and on rotten wood.

Solitary, tough, inodorous; stem fistulose or stuffed, rooting, 2–3 in. long, 1–2 lines thick, equal, straight or a little wavy, even, glabrous, not pulverulent, whitish. Pileus campanulate then expanded, umbo broad, prominent, orbicular, 1–$1\frac{1}{2}$ in. broad, glabrous, even, not hygrophanous, rufous-brown, bay, or umber, becoming paler towards the margin, which is at first incurved. Flesh white. Gills attenuated behind and adnate, separating and appearing to be free, crowded, 1–2 lines broad, whitish. Affinities difficult to indicate, in point of size may be compared with *Collybia protracta*, but differs from every species in the large tuberculiform umbo. (Fries.)

**Collybia exsculpta.** Fr.

Pileus 1–2 in. across, flesh thin, convex, truly umbiliccate

tawny-brown, not becoming pale; gills adnexed, densely crowded, arcuate, linear, bright sulphur-yellow; stem about 1 in. long, 1 line thick, incurved, clear sulphur-yellow, hollow.

*Agaricus* (*Collybia*) *exsculptus*, Fries, Epicr., p. 93; Cke., Hdbk., p. 71; Cke., Illustr., pl. 268A.

On dead wood, &c.

Distinguished from allied species by its toughness, and the sulphur-yellow colour of the gills and stem.

Entire fungus very dry and tough. This species and *C. aquosa* may almost be considered as the two opposite extremes of *C. dryophila*. (Fries.)

**Collybia macilenta.** Fr.

Pileus about 1 in. across, flesh thin, yellow; convex then flattened, obtuse, orbiculate, even, glabrous, quite dry, dark yellow; gills soon separating from the stem and becoming free, closely crowded, narrow, linear, very unequal, pure yellow; stem about $1\frac{1}{2}$ in. long, not 1 line thick, equal, not straight but usually wavy throughout, naked, glabrous, bright yellow, indistinctly hollow, tough, cartilaginous, base slightly rooting; spores elliptical, 5–6 × 3 $\mu$.

*Agaricus* (*Collybia*) *macilentus*, Fries, Epicr., p. 93; Cke., Hdbk., p. 71; Cke., Illustr., pl. 268B.

In pine woods on leaves, &c.

Agreeing in size with *C. esculenta*, but readily known from this and every other species by the yellow colour of every part.

**Collybia clavus.** Linn.

Pileus 1–4 lines across, flesh very thin, conically-convex then plane, somewhat papillate, glabrous, shining, orange-scarlet, disc often darker, margin slightly striate; gills adnexed, ventricose, rather broad, somewhat crowded but not numerous, white, rarely with a yellow tinge; stem up to 1 in, long, very slender, naked glabrous, whitish, base downy; spores pip-shaped, 4 × 2·5 $\mu$.

*Agaricus clavus*, Linn., Fl. Suec., n. 1212; Cke., Hdbk., p. 71; Cke., Illustr., pl. 147A.

On twigs, &c.

The smallest species in the genus, distinguished by the

bright-coloured pileus. *Mycena acicula* differs in the yellow gills and larger spores, also in the rooting stem.

Pileus ½–4 lines broad, campanulate, generally umbonate, margin striate, under a powerful lens most minutely pilose, bright orange, the umbo darkest, subcarnose, within deep orange. Gills few, somewhat ventricose, adnexed or adnate, with shorter ones between them, white tinged with yellow. Stem about 1 in. long, quite filiform, flexuous, nearly equal, minutely pilose like the pileus, pale yellow with a line within showing it to be fistulose. When growing on sticks there are a few minute strigae at the base. (Berk.)

**Collybia ocellata.** Fr.

Pileus about ½ in. across, flesh thin; conico-convex then plane; disc depressed and darker, brown, rufous, yellowish, with a small paler umbo; even whitish, margin usually crenulate; gills adnate, at length separating from the stem, closely crowded, alternate ones shorter, white; stem 1–1½ in. long, very slender, equal, tough, glabrous, naked, brownish-white or yellowish, base slightly rooting, fibrillose, minutely fistulose.

*Agaricus* (*Collybia*) *ocelatus*, Fries, Epicr., p. 94; Cke., Hdbk., p. 71; Cke., Illustr., pl. 147B.

Among grass in pine woods, &c.

Dry, persistent. Distinguished from *C. cirrhata* by the glabrous stem.

**Collybia muscigena.** Schum.

Pure white. Pileus 1–3 lines across, almost membranaceous; convex then plane, obtuse, even; gills adnate, rather crowded, linear; stem about 1 in. long, very slender, equal, wavy, glabrous.

*Agaricus muscigenus*, Schum., Saell., p. 307; Cke., Hdbk., p. 72; Cke., Illustr., pl. 147C.

Among moss near trunks, &c.

Readily distinguished in the present genus by its pure white colour and very small size. Known from the small white species of *Mycena* by the broadly adnate gills and even pileus.

## IV. TEPHROPHANAE.

* *Gills crowded, very narrow.*

**Collybia rancida.** Fr.

Smell strong. Pileus 1–2 in. across, flesh thin, cartilaginous and tough; convex then plane, broadly and obtusely umbonate, glabrous, even, not hygrophanous but viscid after being wet for some time, greyish-black, sooty, becoming pale, covered at first with a delicate whitish bloom; gills free, crowded, narrow but ventricose, dark grey, slightly pruinose; stem 3-6 in long, 2 lines thick, equal, glabrous, even, livid, hollow, rigid, straight, with a long, fusiform, downy rooting base; spores elliptical, 7–10 × 4–5 $\mu$.

*Agaricus* (*Collybia*) *rancidus*, Fries, Epicr., p. 95; Cke., Hdbk., p. 72; Cke., Illustr., pl. 153A.

On trunks and stumps, also on the ground among moss, &c.

Smell strong, like fresh meal but somewhat rancid.

Fries describes a form of this species as follows:—

Stem 2 in. long, with a short rooting base. Pileus bullate, wavy, $2\frac{1}{2}$ in. across, depressed round the umbo, and outside the depression bounded by an elevated ridge, almost black; gills linear, veined and connected by veins, sooty, powdered with white. (Fries.)

Distinguished among the strong-smelling species by the long rooting stem.

Pileus convex-conical when young, at length, nearly quite plane, obtusely umbonate, more or less rugose and somewhat glutinous, smooth, generally possessing considerable toughness and elasticity; in regard to colour it is very irregular, being whitish, ash-colour, brown, smoke-grey, reddish, olivaceous, greenish, or even, according to Schumacher, sometimes yellow, the most frequent is an olivaceous and greenish hue. Flesh very thin, white. Lamella rather distant, white, fixed, rather broad, entire, mostly 4 in a set. Stipes generally solid, rarely with a small spongy cavity, 4–8 in. high, firm, smooth, slightly twisted, pale fawn-colour, or tinged with green, gradually tapering upwards. Root fusiform, 4–12 in. in length or more, brownish, tough. The

pileus is so tenacious, that, in some specimens it may be folded betwixt the fingers without tearing. (Grev.)

**Collybia coracina.** Fr.

Smell strong. Pileus up to 1½ in. across, flesh very thin except at the disc; convex then expanded, naked, hygrophanous, brownish then grey; gills adnexed, soon separating from the stem, rather broad, hardly crowded, greyish-white; stem about 1½ in. long, 2 lines or more thick at the base, becoming thinner upwards, not rooting, brown, apex pale and mealy with white squamules, hollow, rigid, often deformed.

*Agaricus* (*Collybia*) *coracinus*, Fries., Epicr., p. 95; Cke., Hdbk., p. 72; Cke., Illustr., pl, 153B.

Among grass in woods.

Smell strong, like new meal. Stem hollow, remarkably cartilaginous, rigid and tough when young and mostly compressed, sometimes lacunose, 1½. in. long, 2 lines thick, more when compressed, becoming thinner upwards, not rooting, brownish, apex mealy with white squamules; pileus rather thin and cartilaginous, convex then expanded, sometimes umbonate, at others depressed, often deformed and wavy, 1½ in. and more broad, even or wrinkled towards the margin, glabrous, brown and shining when growing, grey and opaque when old and dry; gills obtusely adnate, soon separating from the stem and often appearing to be free, broad, scarcely crowded, distinct at first, then especially in deformed individuals, connected by veins, greyish-white. (Fries.)

The present species agrees with *C. rancida* and *C. ozes* in the strong smell; differs from the former in the short stem being thickened at the base and not rooting. *C. ozes* differs in the long, slender, flexuous stem.

**Collybia ozes.** Fr.

Smell strong, resembling new meal. Pileus 1–1½ in. across, flesh thin; convex then plane, umbonate, glabrous, hygrophanous, greyish-brown when moist and margin striate; brownish-tan or pallid, and everywhere even when dry; gills adnate, slightly ventricose, crowded, 2–3 lines broad, quite entire, smoky-olive; stem 2½–4 in. long, 1 line thick, equal,

or very slightly narrowed at the base, lax, wavy, fragile, smoky-grey, apex powdered with white meal.

*Agaricus* (*Collybia*) *ozes*, Fries, Epicr., p. 95; Cke., Hdbk., p. 72.

On pine leaves, &c.

Allied to *C. rancida*, which differs in the free gills connected by veins.

**Collybia inolens.** Fr.

Pileus 1–2 in. across, flesh rather thick, not cartilaginous; campanulate then convex, at length plane, and for the most part broadly and obtusely umbonate, very glabrous, hygrophanous, livid when moist; pale tan, rather silky but opaque when dry; gills adnexed, seceding and becoming almost free, 1–2 lines broad, linear or slightly ventricose, greyish-white; stem 2–4 in. long, 1–2 lines thick, more when compressed, equal, the surface wavy, livid, pale when dry; rigid at first, then very soft and hollow; base with white strigose down, apex with white squamules; spores elliptical, 7–8 × 4–5 $\mu$.

*Agaricus* (*Collybia*) *inolens*, Fries, Epicr., p. 96; Cke., Hdbk., p. 73; Cke., Illustr., pl. 154A.

On the ground in pine woods, &c.

Smell very weak or entirely absent, and in this respect differing from *C. rancida*, *C. ozes*, and *C. coracina*, *C. plexipes* and *C. protracta* differ in the stem being glabrous at the apex.

**Collybia plexipes.** Fr.

Pileus 1–2 in. across, flesh thin; campanulate, not expanding, umbonate, somewhat wrinkled, slightly striate, at first blackish with a whitish margin, then sooty-livid; gills free, very much narrowed behind, ventricose, white then glaucous; stem about 3 in. long, 1–2 lines thick, equal, altogether cartilaginous, silkily fibrous and slightly striate under a lens, from the presence of adpressed interwoven fibrils, livid, hollow; stem shortly and abruptly rooting, not fibrillose; spores elliptical, 8–9 × 5 $\mu$.

*Agaricus* (*Collybia*) *plexipes*, Fries, Epicr., p. 96; Cke., Hdbk., p. 73; Cke. Illustr., pl. 154B.

Among grass, near stumps, &c.

Inodorous, tough, firm, habit exactly that of a *Mycena*, and

the margin is perhaps straight, but from analogy nearest to *Collybia rancida*. (Fries.)

Differs from *C. rancida* in absence of smell, and from *C. protracta* in the free gills.

**Collybia atrata.** Fr.

Pileus 1–1½ in. across, flesh rather thick, firm; orbicular, disc often slightly depressed, margin arched, very smooth and even, viscid after prolonged rain, pitch black and shining when moist, fuscous when dry; gills adnate, scarcely decurrent, arcuate, then plane, rather broad and distant, whitish, then greyish or brownish; stem up to 1 in. long, 1–2 lines thick, equal or slightly thickened upwards, round, even, glabrous, brown both inside and outside; stuffed, often becoming hollow, distinctly cartilaginous, tough.

*Agaricus* (*Collybia*) *atratus*, Fries, Syst. Myc., 1. p. 168; Cke., Hdbk., p. 73; Cke., Illustr., pl. 155A.

On the ground in sunny places, and especially where the ground has been burnt.

Small, firm, pileus often umbilicate, a distinct species, but hovering between *Collybia* and *Omphalia*.

**Collybia ambusta.** Fr.

Pileus ½–1 in. across, flesh very thin; convex then plane, at length depressed, with a minute papillate umbo, glabrous, brown at first, even, then slightly striate and fusco-livid, margin involute at first; gills adnate, with a decurrent tooth, crowded, plane, lanceolate, becoming tinged with brown; stem about 1 in. long, rarely more, not 1 line thick, at length hollow, truly cartilaginous, straight, livid brown, pruinose when young, naked when adult; spores 5–6 × 3–4 $\mu$.

*Agaricus* (*Collybia*) *ambustus*, Fries, Epicr., p. 97; Cke., Hdbk., p. 73; Cke., Illustr., 155B.

On scorched ground, &c.

Small, tough, often gregarious, inodorous, entirely sooty-brown. Closely allied to *C. atrata*, but the present species approaches *Mycena* to the same extent that *C. atrata* does *Omphalia*. The present species is certainly a *Collybia*, as shown by the margin of the pileus being incurved at first. (Fries.)

Distinguished from *C. atrata* by the papillately umbonate pileus, and by the stem being whitish-flocculose when young.

** *Gills very broad, more or less distant.*

**Collybia lacerata.** Lasch.

Pileus about 1½ in. across, flesh thin; campanulate, rather obtuse, moist, streaked with dark brown on a pale ground-colour, disc darker; gills adnexed, distant, broad, thick, greyish-white, stem 2–4 in. long, 2 lines thick, equal, firm, twisted, fibrosely-striate, apex floccosely pruinose, at length compressed, stuffed then hollow.

*Agaricus* (*Collybia*) *laceratus*, Lasch, in Fries, Hym. Eur., p. 127; Cke., Hdbk., p. 73; Cke., Illustr., pl. 269.

On the ground, near trunks in pine woods.

Somewhat caespitose. Pileus 1½ in. across, sooty-brown, at length pale and somewhat shining like the stem, which is 2–4 in. long. Not a typical *Collybia*, but allied to *C. platyphylla*, (Fries.)

**Collybia murina.** Fr.

Pileus 1–1½ in. across, flesh thin, tough; campanulate then convex, at length expanded, not striate, rugulose or very minutely squamulose, dark brown, becoming pale when dry; margin incurved at first, always even; gills adnexed, very broad, almost obovate, narrowed behind, rather thick, distant, distinct, white, becoming grey; stem 2–3 in. long, 2 lines thick, equal, straight, not rooting but the base downy; at first sight appearing to be glabrous, but minutely fibrillose under a lens, grey, apex white and rather flocculose when young, hollow; spores 7 × 4 $\mu$.

*Agaricus* (*Collybia*) *murina*, Fries, Epicr., p. 97; Cke., Hdbk., p. 74; Cke., Illustr., pl. 1198.

On the ground, under oaks, &c.

Somewhat resembling *C. strata*, but differing in the very broad, almost free gills, and in the pileus not being umbilicate.

**Collybia protracta.** Fr.

Pileus up to 1 in. across, flesh thin; convex then plane, the slightly fleshy disc depressed, often with a vestige of a

central umbo, greyish-brown, shining, margin paler and distinctly striate; gills adnexed but remarkably ventricose, almost truncate behind, very broad, 3 lines and more, rather distant, grey, slightly powdered with white; stem about 3 in. long and 1 line thick, straight, even, glabrous everywhere, livid grey, slightly hollow, distinctly cartilaginous, but becoming soft, produced underground into a tapering, fibrous, rooting base.

*Agaricus* (*Collybia*) *protractus*, Fries, Epicr., p. 97; Cke., Hdbk., p. 74; Cke., Illustr., pl. 270A.

On the ground in pine woods, &c.

Distinguished by the very broad, rather crowded gills and the rooting stem. *C. plexipes* differs in the free gills and persistently campanulate pileus. Smell none, thus differing from *C. rancida*.

**Collybia tesquorum.** Fr.

Pileus up to $\frac{1}{2}$ in. across, flesh thin; convex, obtuse, even, blackish-brown, becoming pale; gills free, rather distant, ventricose, pale greyish-brown; stem up to 2 in. long, $\frac{1}{2}$ line thick, equal, brown, apex pruinose, fistulose.

*Agaricus* (*Collybia*) *tesquorum*, Fries, Monogr., ii. p. 290; Cke., Hdbk., p. 74; Cke., Illustr., pl. 270B,

Among grass in sunny places.

Stem fistulose, $1\frac{1}{2}$ in. high, not a line thick, equal, flexuous, glabrous, fuscous, apex mealy. Pileus almost membranaceous, rather firm, convex, very obtuse, glabrous, not striate, 3–5 lines broad, blackish-brown, becoming pale. Gills entirely free, very ventricose, 2 lines broad, rather distant, greyish brown. Smell none.

The broad, free gills distinguish this from all allied species. (Fries.)

**Collybia clusilis.** Fr.

Pileus $\frac{1}{2}$–1 in. across, almost membranaceous; hemispherical then expanded, umbilicate, glabrous, hygrophanous, livid, becoming pale; gills adnexed and with a small decurrent tooth, broad, almost semicircular, plane, crowded, white then pallid; stem $1\frac{1}{2}$–2 in. long, thin, soft, polished and cartilaginous, glabrous, not quite straight, not rooting, coloured like the pileus, then pale, base with white down, stuffed then hollow.

*Agaricus* (*Collybia*) *clusilis*, Fries, Epicr., p. 98; Cke., Hdbk., p. 74; Cke., Illustr., pl. 247B.

In woods.

Allied to *C. tylicolor* but differs in the umbilicate pileus and decurrent tooth to the gills. The same features separate this species from *C. nummularia*.

**Collybia tylicolor.** Fr.

Pileus ½–⅔ in. across, flesh thin, convex then expanded, somewhat umbonate, even, unpolished, opaque, bluish-grey, everywhere powdered with white meal when young; gills free, distant, broad, plane, rather thick, grey but paler than the pileus; stem about 1 in. long and 1 line thick, equal, even, grey, everywhere powdered with white meal, hollow.

*Agaricus* (*Collybia*) *tylicolor*, Fries, Epicr., p. 98; Cke., Hdbk., p. 74; Cke., Illustr., pl. 247A.

In woods.

Inodorous. Known by being entirely grey, and in having the pileus and stem powdered with white, at least when young.

*Introduced species.*

**Collybia caldarii.** Berk.

Pileus ½ in. across, hemispherical, umbonate, brown, rugose, not turning pale; stem paler, even, cartilaginous externally, 2 in. high, not a line thick; gills adnato-decurrent, somewhat ash-coloured, interstices near the margin veined.

*Agaricus* (*Collybia*) *caldarii*, Berk., Grevillea, i. p. 89; Cke., Hdbk., p. 75.

On *Sphagnum* in an orchid pot at Dangstein.

**Collybia Dorotheae.** Berk.

Pileus 1 in. and more across, at first globose, dark brown, then flatly hemispherical, at length expanded, with a slight umbo, and eventually depressed, pale brown, radiately sulcate from the crenate margin almost to the centre, granulated, beset with short white bristles, which in the young state point in every direction; stem 2–2½ in. high, scarcely a line thick, at first brownish above, white below, with a minute disc-like swelling at the base, then yellowish or rufous below and white above, granulated like the pileus,

and beset with white bristles; gills white, distant, annexed, slightly ventricose, connected behind; edge quite entire.

*Agaricus* (*Collybia*) *Dorotheae*, Berk., Grevillea, i. p. 88; Cke., Hdbk., p. 75.

On dead fern stem, in a hothouse, Dangstein.

## MARASMIUS. Fries.

Pileus regular, thin, tough and pliant; gills pliant and rather tough, somewhat distant, variously attached or free, edge thin and quite entire, often connected by veins; stem cartilaginous or horny, continuous with the substance of the pileus, but differing in structure. The species are tough, dry, shrivelling and drying up (not putrescent), and expanding when moistened.

*Marasmius*, Fries, Epicr., p. 372; Cke., Hdbk., p. 344.

A very distinct genus, but distinguished more especially by biological characters, and differing from *Collybia* and *Mycena*, its nearest allies, by not deliquescing at maturity, but drying up and again assuming the original form when moistened. The species are comparatively rare in temperate regions, but are numerous in the tropics, where the gills are often narrow, very distant, and connected by prominent veins. Many species have a smell resembling garlic.

Most species grow on wood, branches, or leaves.

### *ANALYSIS OF THE SPECIES.*

#### I. Collybiarii.

Flesh of pileus pliant, at length somewhat coriaceous, grooved or wrinkled, margin incurved at first; stem somewhat cartilaginous; mycelium woolly, absent in only very few species.

#### A. *Scortei.*

Stem solid, or stuffed then hollow, fibrous inside, outside the cartilaginous cuticle is covered with down; gills separating from the stem and becoming free.

* Base of stem woolly or strigose.

** Base of stem naked, often composed of twisted interwoven fibres.

B. *Tergini.*

Stem rooting, distinctly tubular, not fibrous, evidently cartilaginous; gills separating from the stem and becoming free; pileus thinner than in the previous section, hygrophanous, sometimes even, sometimes with the margin striate.

* Stem woolly below, glabrous above.

** Stem (at least when dry) everywhere covered with a fine pruinose down.

C. *Calopodes.*

Stem short, not rooting, often with a floccose or downy tubercular base; pileus convex and with the margin incurved, then expanded and more or less depressed, and in this condition the gills, that are typically adnate, become somewhat decurrent.

On twigs, branches, &c.; gregarious, dry.

* Stem very glabrous upwards, shining, base not swollen.

** Stem covered with fine pruinose down, base somewhat tuberculose.

II. Mycenarii.

Stem horny, fistulose but often filled with pith, tough, dry, corticate, mycelium rhizomorphoid, not floccose; pileus somewhat membranaceous, campanulate then expanded, margin at first straight and pressed to the stem.

A. *Chordales.*

Stem rigid, rooting or adnate by a dilated base; pileus campanulate or convex.

The *Mycena* type of structure evident.

B. *Rotulae.*

Stem very slender, flaccid, base not dilated nor floccose, but appearing to enter the matrix abruptly; pileus soon more or less plane or umbilicate.

Growing on leaves, twigs, &c.

* Stem quite glabrous, shining.

** Stem minutely velvety or downy.

III. Apus.

Pileus sessile, resupinate.

## I. COLLYBIARII.

A. *Scortei.*

**Marasmius urens.** Fr.

Pileus 2–3 in. across, flesh rather thick at the disc, thin elsewhere, more or less campanulate then expanded, usually gibbous, rather tough, margin drooping or incurved, smooth, even, pinkish-buff, paler when dry, sometimes almost umber when moist, the surface usually becoming broken up when dry; gills free, joined behind and becoming remote from the stem, distant, tough, pale buff then brownish; stem 2–3 in. long, 3 lines thick, equal, or sometimes ventricose and up to $\frac{1}{2}$ in. thick, pallid, covered everywhere with minute white downy particles, base white, downy, solid, rigid; spores elliptical, $8 \times 4$ $\mu$.

*Marasmius urens*, Fries, Epicr., p. 373; Cke., Hdbk., p. 344; Cke., Illustr., pl. 1116 (pileus brownish umber).

Woods and grassy places, among fallen leaves.

Gregarious or caespitose. Taste very pungent, a feature which separates the present from *M. oreades*. Not coarsely tomentose at the base, as in *M. peronatus*, but only downy.

**Marasmius peronatus.** Fr.

Very acrid. Pileus 1-2 in. across, flesh thin, pliant; convex then almost plane, obtuse, opaque, becoming depressed here and there, or lacunose, pale rufous with a

brick-red tinge then tan-colour; gills adnexed then seceding, rather thin, somewhat crowded, 1 line broad, pallid then with a rufescent tinge; stem about 2 in. long, 1½–2 lines thick at the base, slightly thinner upwards, pale, downy above, at the base and for some distance up densely covered with long, spreading down (= peronate), varying in colour from whitish to bright yellow, stuffed with fibres; spores pip-shaped, 10 × 6–7 μ.

*Marasmius peronatus*, Fries, Epicr., p. 373; Cke., Hdbk., p. 345; Cke., Illustr., pl. 1117.

In woods among leaves.

Amongst rotten leaves, especially oak-leaves, in woods. July, November. Common. Pileus 1–2½ in. broad, convex or campanulate at length expanded, sometimes umbonate, carnoso-coriaceous, sub-rufescent or yellowish, pallid when dry, clothed with a minute matted silkiness. Gills of the colour of the pileus with a yellowish margin, distant, rounded behind, almost free. Stem 2–3 in. high, 2 lines thick, composed of fibres, solid above and downy, hollow below and there covered with dense yellow strigae. Taste acrid. (Berk.)

Allied to *M. urens*, but readily recognised by the densely woolly or peronate base of the stem.

### Marasmius porreus. Fr.

Smell resembling garlic. Pileus 1–2 in. across very thin, coriaceous, flaccid, convex then expanded, obtuse, disc even, margin striate, opaque, dingy-yellowish, paler when dry; gills soon becoming free, distant, rather thick, tough, about 1 line broad, at length coriaceous, yellow then pallid; stem up to 3 in. long, 1–1½ line thick, downy, reddish-brown, apex paler, stuffed then hollow; spores subglobose, about 4 μ diameter.

*Marasmius porreus*, Fries, Epicr., p. 374; Cke., Hdbk., p. 345; Illustr., pl. 1133.

Among fallen leaves, &c.

Often confounded with *M. prasiosmus*, which it resembles in the strong garlic smell. In the present species the smell disappears on drying, the stem is pubescent throughout its length, the gills are yellowish, and the spores small and subglobose; all points of distinction from *M. prasiosmus*.

Pileus ½–1 in. broad, plane slightly depressed, dirty-white with a brownish shade, paler on the margin which is membranaceous, and regularly striate. Gills nearly free, paler than the pileus, slightly connected by veins. Stem 2–3 in. high, 2–3 lines thick, velvety, albido-pulverulent, as is at once evident even in dry specimens, rufescent, tomentose below, pale above, fistulose, generally growing on the midrib of the leaves. Odour like that of garlic, very powerful. Specimens in Sowerby's Herbarium gathered July 31, 1796, still retain their garlic scent. (Berk.)

**Marasmius oreades.** Fr.

Pileus 1–1½ in. across, flesh rather thin, tough; convex then plane, somewhat umbonate, glabrous, brownish when young, then tan, becoming pale; gills free, 1½–2 lines broad, distant, whitish then pallid, pliant; stem 1½–2 in. long, 1½ line thick, equal, solid, whitish, everywhere covered with closely interwoven down, base naked; spores elliptical, 8 × 5 $\mu$.

*Marasmius oreades*, Fries, Epicr., p. 375; Cke., Hdbk., p. 345; Cke., Illustr., pl. 1118.

In open pastures, forming rings.

Smell weak but pleasant, stronger when dry. Pileus rufescent, becoming pale, margin striate when moist. (Fries.)

Root little more than a minute tomentosity, stipes firm, solid, brittle in very young plants, tough in old ones, furnished with a kind of fibrous bark, tearing and twisting longitudinally, about as thick as a goose-quill, flexuose or crooked, of a pale whitish brown, sometimes farinose towards the top, from whence it is gradually attenuated downwards. In height it is much influenced by situation, varying from 2 to 5 in. Pileus 1–2 in. or more in breadth, hemispherical in the young state, then obtusely conical, finally plano-convex, and most frequently umbonate, smooth, the margin more or less waved, and turning up with age. The substance is leathery, the flesh white, small in quantity. Colour a reddish opaque cream-colour in dry weather; but in a moist state a watery brown, darker in the centre, and somewhat striate at the margin. Lamellae distant, mostly four in a series, rather thick and fleshy, free, yellowish-white, frequently

with a tinge of pink, generally lying obliquely one over another. Fairy-rings are often observed to be formed by this plant. (Grev.)

Gregarious. Pileus ½–1 in. broad, smooth, fleshy, convex, at length nearly plane, more or less umbonate, generally more or less compressed and sinuate, tough, coriaceous, elastic, wrinkled and sometimes cracked, watery brown, as it becomes dry cream-coloured; margin pale. Flesh white, quite distinct from that of the stem. Gills free, pale, distant, slightly ventricose. Stem 1–2 in. high, 2–3 lines thick, equal, solid, very tough, composed of fibres splitting longitudinally, the outer coat squamuloso-fibrous, base downy, somewhat rooting and attached to the roots of the grass. Taste and odour strong but agreeable. Though tough, much used, as an article of food on the continent and occasionally in this country, but too frequently very different and poisonous fungi are gathered under the name. (Berk.)

**Marasmius plancus.** Fr.

Pileus ¾–1½ in. across, flesh rather thin, pliant, white; convex, soon plane then more or less depressed, somewhat wavy, obtuse, even, rufescent, becoming pale; gills slightly adnexed, soon separating from the stem and free, distant, 1 line broad, linear, pale dingy ochraceous-brown; stem about 1½ in. long, hollow, tough, soon compressed, pallid, and covered with white down, base somewhat attenuated, naked.

*Marasmius plancus*, Fries, Epicr., p. 375; Cke., Hdbk., p. 345; Cke., Illustr., pl. 1119A,

In woods.

Allied to *M. oreades*, but differing in the narrower, darker-coloured gills, and in growing in woods or shady places. Taste sweet.

**Marasmius scorteus.** Fr.

Pileus about ½ in. across, flesh thin, tough; convex then expanded, obtuse, not striate but becoming wrinkled, whitish or pallid and becoming pale; gills free and rounded behind, 1 line broad, distant, white; stem 1–1½ in. long, hardly 1 line thick, equal, tough, white with a tinge of brown, apex very slightly pruinose, otherwise glabrous, indistinctly fistulose; spores elliptical, 8 × 6 μ.

*Marasmius scorteus*, Fries, Hym. Eur., p. 468; Cke., Hdbk., p. 346; Cke., Illustr., pl. 1119B.

In damp woods.

Taste mild. Resembling *M. oreades* in habit, but much smaller, and differing in the almost glabrous stem.

## B. *Tergini.*

### * *Stem strigose below, smooth upwards.*

**Marasmius prasiosmus.** Fr.

Smell strong, resembling garlic, persistent. Pileus, $\frac{1}{2}$–$\frac{3}{4}$ in. across, flesh thin, tough, campanulate then convex, at length expanded, obtuse, not striate but becoming wrinkled, pale dingy yellow or whitish and disc often darker; gills adnexed, rather crowded, up to 1 line broad, white; stem 2–3 in. long, 1 line thick, tough, pallid and almost glabrous upwards; incrassated downwards, brownish, and downy, often slightly curved, fistulose; spores, pip-shaped, or elliptical and narrowed at the base, 14–15 × 7 $\mu$.

*Marasmius prasiosmus*, Fries, Epicr., p. 370; Cke., Hdbk., p. 346; Cke., Illustr., pl. 1120.

Among leaves in woods.

Differs from *M. porreus* in the white gills and absence of striae on the pileus. The remaining garlic-scented species belong to quite different sections of the genus.

**Marasmius vatricosus.** Fr.

Pileus $\frac{1}{2}$–$\frac{3}{4}$ in. across, flesh rather thin, tough, and like that of the stem with a reddish-brown tinge; campanulate then plane, sometimes depressed or wavy; gills adnexed, soon seceding and free, closely crowded, very narrow, tinged with purple-brown, darker when dry; stem 2–3 in. long, 1 line thick, glabrous above, reddish, containing dark blood-red juice, base covered with tawny down, hollow; spores broadly elliptical, 4 × 3 $\mu$.

*Marasmius vatricosus*, Epicr., p. 376; Cke., Hdbk., p. 346; Cke., Illustr., pl. 1121A.

Damp places, among moss, &c.

Inodorous. A very remarkable species, but certainly a *Marasmius* notwithstanding the crowded gills, not at all

comparable with *Mycena haematopoda*. Pileus ½ in. broad or a little more; gills purplish-brown, and contrary to the general rule, darker when dry. Stem sometimes (among high mosses) 3 in. long, covered with blackish red down half way up, the rest glabrous (not pruinose when dry). (Fries.)

**Marasmius fuscopurpureus.** Fr.

Pileus ⅔–1 in. across, flesh rather thick, whitish; convex then expanded, often somewhat umbilicate, dark purplish-brown, becoming tan-colour when dry; gills joined into an indistinct collar behind, at length free, distant, 1 line broad, with a rufous or dingy lilac tinge; stem 1–3 in., 1 line thick, juiceless, blackish-purple, glabrous, with reddish strigose down at the base, hollow; spores 4 × 3 μ.

*Marasmius fuscopurpureus*, Fries, Epicr., p. 377; Cke., Hdbk., p. 346; Cke., Illustr., pl. 1121B.

Among leaves, especially beech.

Inodorous. Sometimes small and caespitose, sometimes larger and solitary. Stem varying from 1–3 in. long, pallid at first. Pileus blackish-purple, tan-colour when dry. (Fries.)

Gregarious. Pileus 1 in. or more broad; at first conic, obtuse, then expanded, rugose, dark brown-purple, changing to pallid umber, subcarnose; flesh white, firm, elastic. Gills slightly ventricose, almost free, nearly of the same colour as the pileus, not very close, the edge dark, denticulate. Spores white, round. Stem 1½ in. long, 2 lines thick, fistulose, composed of fibres, sometimes slightly compressed, elastic, distinct from the pileus, umber, with a few scattered dark fibrillose specks, strigose at the base, the strigae pale-brown, and sending down many matted roots amongst the leaves on which it grows. (Berk.)

**Marasmius terginus.** Fr.

Pileus about 1 in. across, flesh thin, tough, convex then plane, obtuse, becoming slightly depressed, dingy flesh-colour when moist, whitish when dry, margin striate; gills separating and becoming free, rather crowded, narrow, pallid; stem 2–3 in. long, 1–2 lines thick, slightly thickened below, and attenuated into a white, downy rooting base,

reddish below, glabrous, shining, and pallid above, not at all pruinose when dry, hollow; spores elliptical, 6–7 × 4 μ.

*Marasmius terginus*, Fries, Epicr., p. 377; Cke., Hdbk., p. 347; Ck., Illustr., pl. 1122A.

Among fallen beech leaves, moss, &c.

Solitary. Exactly resembling *M. prasiosmus* in habit, but distinct in the entire absence of smell, and in being juiceless. The same features separate this species from *M. porreus*.

Fasciculated. Pileus ½–1 in. across, depressed and wrinkled in the centre, opaque, tough, cream-coloured, stained with vinous-red, especially when bruised; flesh white, thin. Stem 1–2 in. high, hollow, twisted, white and mealy above, quite smooth and shining below, of a rich light nut-brown. Gills few and distant, rather broad, of the same colour as the pileus. Taste and smell exactly like that of *M. oreades*. (B. & Br.)

** *Stem minutely downy or velvety when dry.*

**Marasmius Wynnei.** B. & Br.

Inodorous. Caespitose. Pileus 1–1½ in. across, convex then almost plane, slightly umbonate, lilac-brown, not readily changing colour; gills adnexed, distant, thick, 1 line broad, pale lilac; stem 1½–2½ in. high, up to 1 line thick, equal, paler than the pileus, minutely powdered or scurfy, hollow; spores elliptical, 7–8 × 4 μ.

*Marasmius Wynnei*, B. & Br., Outl., t. 19, f. 3; Cke., Hdbk., p. 347; Cke., Illustr., pl. 1123A.

Among leaves, twigs, &c.

Amongst twigs, &c. Gregarious or caespitose. Pileus 1–1½ in. across, variously tinged with brown and lilac, not rapidly changing colour, umbonate, slightly fleshy. Stem 2 in. high, 1½ line thick, rather paler than the pileus, fistulose, furfuraceous, springing from a white mycelium, but by no means strigose or tawny at the base. Gills distant, thick, moderately broad, adnexed, beautifully tinged with lilac; interstices even. One of the most beautiful of Fungi, and apparently quite distinct from *M. fuscopurpureus*, of which Fries thinks it may be a form destitute of strigae. The pileus does not, however, rapidly change colour, as in that

species; the stem is not of a blackish-purple, neither is it smooth, and the lilac tint is very striking. (B. & Br.)

A good figure of this beautiful species is given in "Fungi Tridentini" by Bresadola, under the name of *Clitocybe xanthophylla*. (B. and Br.)

**Marasmius erythropus.** Fr.

Pileus about 1 in. across, flesh thin, convex then plane, obtuse, hygrophanous, pallid, rugulose and almost white when dry; gills almost free, broad, lax, not crowded, connected by veins, whitish margin quite entire; stem 2–4 in. long, 2 lines thick, hollow, firm, tough, round or becoming depressed, blackish-red, glabrous upwards and paler at first, rather pruinose when dry; furnished with white strigose down below, wall of the hollow of the stem downy; spores 8–10 × 5–6 $\mu$.

*Marasmius erythropus*, Fries, Epicr., p. 378; Cke., Hdbk., p. 347; Cke., Illustr., pl. 1123B.

In beech woods among fallen leaves; rarely on trunks.

Scattered or somewhat caespitose; inodorous, juiceless. The colour of the pileus varies according to the amount of moisture in the air. Stem sometimes decumbent and contorted. Agreeing in habit with *Collybia confluens* and *C. acervata*, but distinguished from both by the broad, distant gills.

**Marasmius archyropus.** Fr.

Pileus $\frac{1}{2}$–1 in. across, flesh rather thin; convex then plane and more or less depressed, glabrous, pale tan, becoming paler with age; gills slightly adnexed then separating from the stem, crowded, linear, $\frac{1}{2}$–$\frac{3}{4}$ line broad, pallid; stem 3–4 in. long, $\frac{3}{4}$ line thick, rigid, straight, pale rufescent, but everywhere covered with dense white down, base similar, stuffed then hollow; spores subglobose, 4–5 $\mu$ diameter.

*Marasmius archyropus*, Fries, Epicr., p. 378; Cke., Hdbk., p. 347; Cke., Illustr., pl. 1122B.

Among leaves, &c.

Inodorous. Fasciculate; differs from *M. terginus* in the tufted habit, and from *M. prasiosmus* in the absence of scent. The down on the stem is rather long, like that of *M. oreades*.

**Marasmius torquescens.** Quelet.

Pileus about $\frac{1}{2}$ in across, flesh very thin; convex then plane, rugosely striate, pallid, disc tawny; gills free, thin, ventricose, distant, white with a red tinge; stem about 2 in. long, slender, slightly velvety or downy, brown, glabrous and whitish at the top; spores broadly pip-shaped, 5 × 4 $\mu$.

*Marasmius torquescens*, Quelet, Fung. Jura, p. 198, t. 22, f. 3; Cke., Hdbk., p. 348; Cke., Illustr., pl. 1124A.

On twigs in woods.

Distinguished among species with a velvety stem by the small, whitish pileus. When dry the stem is twisted and grooved.

**Marasmius impudicus.** Fr.

Smell strong, foetid. Pileus $\frac{1}{2}$–1 in. across, flesh thin, soft, convex then plane, the centre often depressed, reddish-bay, pale when dry; membranaceous from the margin half way to the disc, paler, rather coarsely striate; gills at first touching the stem, but soon free and abrupt behind, connected by veins, ventricose, at first crowded, then distant, white with a tinge of pink; stem $1\frac{1}{2}$–2 in. long, 1 line thick, equal, tough, and slightly wavy, base attenuated and rooting, rufous or rufous-brown, sometimes purple-violet, naked, but entirely covered with white down when dry; spores elliptical, 8 × 4–5 $\mu$

*Marasmius impudicus*, Fries, Epicr., p. 277; Cke., Hdbk., p. 348; Cke., Illustr., pl. 1124B.

On or about rotten fir trunks, &c.

Small; gregarious, smell strong, unpleasant. Somewhat resembling *M. foetidus*, but distinguished by the free gills and smaller size.

C. *Calopodes.*

* *Stem glabrous upwards, base not swollen.*

**Marasmius scorodonius.** Fr.

Smell strong, resembling garlic. Pileus $\frac{1}{2}$–$\frac{3}{4}$ in. across, flesh thin, tough; convex, soon plane, obtuse or slightly gibbous, always dry, even when young, rufous, but soon becoming pale and whitish, at length rugose, and wrinkled; gills adnate, often leaving the stem, narrow, connected by

veins, whitish, at length dry and wrinkled; stem 1–1½ in. long, up to 1 line thick, equal, everywhere glabrous and shining, rufous, base naked, penetrating the substance on which the fungus is growing, horny, tough, hollow; spores elliptical 6 × 4 μ.

*Marasmius scorodonius*, Fries, Epicr., p. 379; Cke., Hdbk., p. 348; Cke. Illustr., pl. 1125A.

On twigs, &c., in pastures, heaths, &c.

Distinguished from its allies by its strong smell, resembling garlic. Usually gregarious.

**Marasmius calopus.** Fr.

Pileus about ½ in. across, flesh thin, tough; convex then expanded, obtuse, sometimes depressed at the centre, even, glabrous, whitish and wrinkled when dry; gills slightly emarginate and adnexed, rather distant, thin, white; stem about 1 in. long, not 1 line thick, slightly thinner upwards, even, glabrous, tough, shining, rufous or rufous-bay, slightly rooting; spores elliptical, 7 × 4 μ.

*Marasmius calopus*, Fries, Epicr., p. 379; Cke., Hdbk., p. 348; Cke., Illustr., pl. 1125B.

On twigs, roots of grass, &c.

With the habit of *M. scorodonius*, but without smell, smaller, and paler pileus.

**Marasmius Vaillantii.** Fr.

Pileus ½–1 in. across, flesh thin, pliant, rather convex but soon flattened and more or less depressed at the disc, marked with radiating ridges, whitish; gills adnate, from the triangular form appearing somewhat decurrent, broad, distant, distinct, simple, white; stem about 1 in. long, thickened upwards, glabrous, bay, the apex pale, shining, base blackish, naked, penetrating the substance upon which it is growing; spores elliptical, 10 × 6 μ.

*Marasmius Vaillantii*, Fries, Epicr., p. 330; Cke., Hdbk., p. 349; Cke., Illustr., pl. 1126A.

On dead wood, fallen twigs, leaves, &c.

Inodorous. Small, tough, dry; smell none. *M. impudicus* differs in the purplish stem becoming covered with white velvety down when dry. *M. foetidus* differs in the strong smell and in colour.

**Marasmius angulatus.** Pers.

Gregarious. Pileus $\frac{1}{4}$–$\frac{1}{2}$ in. across, flesh thin; hemispherical then plane, becoming plicate and more or less angular, whitish with a tawny tinge; gills adnate, narrow, distant, paler than the pileus; stem 1–$1\frac{1}{2}$ in. long, slender, thickened at the base, and often at the apex also, greyish upwards, base dark and pilose; spores elliptical, $7 \times 4$ $\mu$.

*Marasmius angulatus*, Pers., Myc. Eur., iii. p. 155, t, 26, f. 3, 4; Cke., Hdbk., p. 349; Cke., Illustr., pl. 1226B.

On grass, rushes, &c.

Closely resembling *M. Curreyi*, and *M. graminum;* differs from the former in the gills not being ventricose, and in not forming a collar; and from the latter in the larger, elliptical spores, and in the gills being attached to a free collar round the stem. *M. calopus* differs in the shining, bay stem, and emarginate gills.

**Marasmius languidus.** Fr.

Pileus $\frac{1}{2}$–$\frac{2}{3}$ in. across, thin, tough, at first convex with the margin involute, then more expanded and umbilicate, flocculose, rugosely grooved, white with a tinge of flesh-colour or yellow; gills adnate then decurrent, distant, narrow, white, connected by veins; stem about 1 in. long, $\frac{1}{2}$–1 line thick, slightly thickened upwards, naked pallid, base brownish and usually with white down; spores $6$–$7 \times 4$ $\mu$.

*Marasmius languidus*, Fries, Epicr., p. 379; Cke., Hdbk., p. 349; Cke., Illustr., pl. 1126c.

On twigs, dead grass, leaves, &c.

Small, gregarious, tough, pliant, inodorous; remarkable for the decurrent gills. (Fries.)

Inodorous. Exactly the habit of a small *Omphalia*, pileus, convex, umbilicate, margin coarsely sulcate; stem thickened upwards.

**Marasmius rubricatus.** Mass.

Caespitose; pileus about $\frac{1}{4}$ in. across, convex then plane, whitish then tinged with red or buff, gills adnexed, white then brownish, stem $\frac{1}{4}$–$\frac{1}{2}$ in. long, slender, incurved at the base, hollow; spores pyriform, colourless, $6 \times 3$ $\mu$.

*Agaricus* (*Naucoria*) *rubricatus*, B. & Br., Ann. Nat. Hist.,

n. 1873; Cke. Hdbk., p. 175; Cke., Illustr., pl. 509c; Sacc., Syll., vol. v., n. 3428.

On dead twigs.

Having made a drawing of this species at the time it was found, I am able to add somewhat to Berkeley's description. It was growing on a bramble twig. The largest specimen was scarce half an inch high, and the diameter of the pileus about $\frac{1}{4}$ of an in.; the stem hollow, sprinkled with delicate mealy granules at the base, and about half way up; gills adnexed behind, narrowed in front; whitish, then flesh-coloured, becoming brownish. (Cooke.)

An examination of Berkeley's type specimen shows that the spores are perfectly colourless, hence the species belongs to the genus *Marasmius*.

** *Stem slightly velvety or downy, base often somewhat tuberculose.*

**Marasmius foetidus.** Fr.

Very foetid. Pileus about 1 in. across, flesh rather thin, pliant, and like that of the stem, tinged reddish-brown; convex then expanded and umbilicate or irregular and wavy, rather pellucid, tawny-bay or rufous, paler and slightly pruinose when dry, margin striate, rather incurved when young; gills adnexed and joined in an imperfect ring at the base, distant, rather thin, reddish with a tinge of yellow; stem about 1 in. long, hollow, bay, 1 line or more thick, sometimes thinner at the base, minutely pruinosely velvety, bay, the flocculose base abruptly piercing the matrix; spores elliptical, 7 × 4 $\mu$.

*Agaricus foetidus*, Sowerby, t. 21.

*Marasmius foetidus*, Fries, Epicr., p. 380; Cke., Hdbk., p. 349; Cke., Illustr., pl. 1134A.

On rotten branches.

Smell very strong and unpleasant, but not like garlic.

**Marasmius amadelphus.** Fr.

Pileus 2–3 lines broad, flesh thin; tough, convex then plane or depressed, discoid, obtuse, somewhat pruinose, margin at length striate, pale reddish-yellow, disc darker, becoming pale; sometimes whitish; gills broadly adnate,

distant, broad, pallid; stem up to $\frac{1}{2}$ in. long, very slender, pallid, base bay, slightly pruinose; spores elliptical, $4 \times 2{\cdot}5\ \mu$.

*Marasmius amadelphus*, Fries, Epicr., p. 380; Cke., Hdbk., p. 349; Cke., Illustr., pl. 1127A.

On dead branches.

Gregarious. Inodorous. Fries says the base of the stem is sometimes dilated, and that he has seen the gills rufescent when dry.

We have three small species gregarious on twigs, bramble stems, &c., the present, *M. ramealis*, and *M. candidus*, distinguished respectively as follows:—

*M. amadelphus;* pileus striate, coloured; gills broadly adnate.

*M. candidus;* entirely white; pileus pellucid.

*M. ramealis;* pileus opaque, whitish, disc rufescent; gills adnate.

*Var.* **insignis**; gills very distant, with slightly thickened veins, at length separating from the stem, pale umber.

On fir twigs.

**Marasmius ramealis.** Fr.

Pileus 2–4 lines across, flesh thin; plane or slightly depressed, obtuse, opaque, not striate but wrinkled, white, disc more or less rufescent; gills adnate; rather distant, narrow, white; stem up to $\frac{1}{2}$ in. long, very slender, incurved, mealy, white, base rufous; spores elliptical, $4 \times 2\ \mu$.

*Marasmius rameales*, Fries, Epicr., p. 381; Cke., Hdbk., p. 350; Cke., Illustr., pl. 1127B.

On bramble stems, twigs, &c.

Densely gregarious. Inodorous. Gills connected behind, and rather crowded for this genus.

Common upon small decaying branches, especially of bramble and hazel, during the whole year. Gregarious. Pileus 3–4 lines broad, plano-convex, at length wrinkled and depressed, pale rufescent, the centre darker, under a lens clothed with minute matted silkiness. Gills distant, adnate, sometimes broad behind, whitish or subrufescent, margin denticulate. Stem $\frac{1}{2}$–$\frac{3}{4}$ in. high, $\frac{1}{2}$ line thick, curved, fibrillose with furfuraceous scales; the base minutely dilated, whitish or subrufescent.—I believe *A. amadelphus* to be

only a state of this species. The gills are not unfrequently reddish or ochraceous; generally so in decay, and though often narrow, they vary in breadth and degree of adherence to the stem. (Berk.)

**Marasmius candidus.** Bolton.

White. Pileus 2–4 lines across, flesh almost membranaceous; hemispherical then plane or slightly depressed, pellucid, naked, at length wrinkled into grooves; gills adnexed, ventricose, distant, narrow; stem $\frac{1}{2}$–$\frac{2}{3}$ in. long very slender, incurved, slightly pruinose, base downy and at length brownish; spores elliptical, 4 × 2 $\mu$.

*Marasmius candidus*, Fries, Epicr., p. 381; Cke., Hdbk., p. 350; Cke., Illustr., pl. 1127c (after Bolton).

*Agaricus candidus*, Bolton, t. 39, f. D.

On twigs, pine leaves, &c.

Gregarious. Thinner and altogether more delicate than *M. ramealis*, tough and persistent.

## II. MYCENARII.

### A. *Chordales.*

**Marasmius alliaceus.** Fr.

Smell strong, like garlic. Pileus 1–1$\frac{1}{2}$ in. across, flesh very thin, campanulate then expanded, slightly umbonate; even at first, becoming striate or sulcate, glabrous, dry, gills at first attached to a collar and adnate, then free, slightly ventricose, dry, rather distant, brownish-white, crisped when dry; stem 3–5 in. long, about 1$\frac{1}{2}$ line thick, slightly attenuated upwards, minutely velvety, blackish, base more or less rooting, naked, horny, rigid, hollow; spores 14–16 × 8 $\mu$.

*Marasmius alliaceus*, Fries, Epicr., p. 383; Cke., Hdbk., p. 350; Cke., Illustr., pl. 1128A.

Among fallen leaves, and sometimes on rotten wood.

Distinguished by its strong garlic smell and minutely velvety blackish stem.

**Marasmius cauticinalis.** Fr.

Pileus about $\frac{1}{2}$ in. across, flesh very thin, and like that of

the stem, with a yellow tinge; campanulately convex, obtuse, sometimes slightly depressed, glabrous, even at first then coarsely striate, tawny; gills adnately decurrent, $\frac{1}{2}$ line or more broad, connected by veins, yellow; stem $1\frac{1}{2}$–2 in. long, 1 line thick, slightly attenuated upwards, minutely flocculose, bay, paler and powdery upwards, fistulose but containing a pith; spores elliptical, 7 × 3·5 $\mu$.

*Marasmius cauticinalis*, Fries, Epicr., p. 383; Cke., Hdbk., p. 350; Cke., Illustr., pl. 1134B.

On pine leaves, &c.

Distinguished by the yellow, slightly decurrent gills connected by veins.

Pileus 2–7 lines broad, convex at first and minutely umbonate, then expanded, depressed, or umbilicate, whitish, with small red-brown scales, disposed sometimes in zones, rendering the margin jagged; in large specimens it is sulcate. Gills distant with very few shorter ones, nearly free, thickish, of a yellow tinge, various in breadth, sometimes rather ventricose. Stem $\frac{3}{4}$–$1\frac{1}{2}$ in. high, not $\frac{1}{2}$ a line thick, flexuous, filiform, clothed with red-brown woolly tomentum or squamules, darker than the pileus, often perforating the substance on which it grows, composed of fibres, with a narrow fistulose line down the centre. (Berk.)

### B. *Rotulæ.*

#### * *Stem glabrous, shining.*

**Marasmius rotula.** Fr.

Pileus about $\frac{1}{4}$ in. across, membranaceous; slightly convex, umbilicate, plicate, entirely whitish or the disc darker; gills few, broad, distant, joined behind to a collar that is quite free from the stem; stem 1–$1\frac{1}{2}$ in. long, very slender, equal, horny, shining, quite glabrous, blackish; spores pip-shaped, 6 × 3–4 $\mu$.

*Marasmius rotula*, Fries, Epicr., p. 385; Cke., Hdbk., p. 351; Cke., Illustr., pl. 1129A.

On fallen twigs, &c.

Not to be confounded with any other of the smaller species if attention is paid to the collar connecting the gills behind being quite free from the stem.

There is often a blackish, creeping cord-like or rhizomorphoid mycelium, from which individuals spring at intervals.

On sticks, stumps, dead leaves, &c. The whole year. Common. Pileus 1–3 lines broad, hemispherical, umbilicate, and minutely umbonate, plaited, smooth, margin crenate, white or pale buff with a dark umbilicus. Gills broad distant, equal, or occasionally with a few short ones of the same colour as the pileus, connate behind and separating from the stem so as to present the appearance of being fixed to a free collar surrounding the stem. Stem setiform, slightly flexuous, white above, then tawny, deep shining brown at the base, striate, fistulose, frequently branched and sarmentose, with or without abortive pilei. (Berk.)

**Marasmius graminum.** Berk.

Pileus 4–6 lines across, membranaceous, convex then nearly plane, umbonate, deeply and distantly striate or sulcate, tinged with rufous, the furrows paler, disc brown; gills attached to a collar that is free round the stem, few in number, slightly ventricose, cream-colour; stem 1–2 in. long, very slender, equal, smooth, shining, black, whitish above; spores subglobose, 3–4 $\mu$ diameter.

*Marasmius graminum*, Berk., Outl., pl. 14, f. 8; Cke., Hdbk., p. 351; Cke., Illustr., pl. 1129B.

On grass, leaves, &c.

Allied to *M. rotula* but distinguished by the pale rufescent, distantly sulcate pileus, and in growing on grass.

**Marasmius androsaceus.** Fr.

Pileus up to $\frac{1}{2}$ in. across, membranaceous dry, umbilicate, glabrous, striate, whitish; gills directly adnate to the stem without the intervention of a collar, simple, distinct, distant, narrow, whitish; stem $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, very slender and tough, equal, absolutely glabrous and polished, black; twisted and striate, due to contraction, when dry; spores pip-shaped, 7 × 3–4 $\mu$.

*Marasmius androsaceus*, Fries, Epicr., p. 385; Cke., Hdbk., p. 351; Cke., Illustr., pl. 1129C.

On fallen leaves.

Fries distinguished two principal forms:—(*A*) on deciduous leaves; pileus whitish, deeply umbilicate, plicate; mycelium usually traversing the substance of the leaf; (*B*)

on pine and juniper leaves, also on the bark; pileus scarcely umbilicate, surface more even; mycelium usually superficial. (Fries.)

Distinguished by the long, slender, horny, black stem.

On fern stems, oak and beech leaves, &c., generally on the principal nerves. The whole year. Common. Pileus 3–6 lines broad, convex, with a slight depression, pale rufescent, darker in the centre, grooved and notched, under a lens clothed with a minute matted silkiness. Gills adnate, sometimes quite simple (about 15) with shorter ones between and no rugae; occasionally forked with wrinkles in the interstices. Stem 1–2 in. high, filiform, quite smooth, shining-black, twisted when dry, often branched and sarmentose at the base like the last, (*A. rotula.*)—*A. androsaceus*, Sow., t. 94, though represented as growing on oak-leaves, is pronounced by Fries to be *A. perforans*; but an inspection of the specimen in Sowerby's 'Herbarium' proves them to be undoubtedly the true *A. androsaceus*. (Berk.)

**Marasmius splachnoides.** Fr.

Inodorous. Pileus 4–6 lines across, flesh membranaceous; convex then expanded and umbilicate, glabrous, striate, whitish with a shade of pale tan; gills slightly decurrent, crowded, simple, anastomosing, white, narrow; stem 1–2 in. long, slender, equal, horny, glabrous, shining, reddish or brownish, penetrating the matrix abruptly, fistulose; spores elliptical, 8 × 5 $\mu$.

*Marasmius splachnoides*, Fries, Epicr., p. 384; Cke., Hdbk., p. 352; Cke., Illustr., pl. 1130A.

On pine leaves, &c.

Size and habit of *M. perforans*, but readily known by the absence of smell, and the quite white, slightly decurrent, anastomosing gills.

**Marasmius Curreyi.** B. & Br.

Pileus 3–5 lines across, flesh very thin; convex then plane, coarsely striate, pale rufous, grooves paler, umbo tawny; gills attached to a collar round the stem, few in number, rather ventricose, cream-colour, interstices sometimes veined; stem about 1 in. long, slender, equal, quite smooth, shining, black, apex white; spores 9 × 5–6 $\mu$.

*Marasmius Curreyi*, B. & Br., Ann. Nat. Hist., no. 1795; Cke., Hdbk., p. 352; Cke., Illustr., pl. 1130B.

On leaves of grass.

Distinguished from other species in the present section by the pale rufous pileus and cream-coloured gills.

** *Stem velvety or hairy.*

**Marasmius insititus.** Fr.

Pileus about $\frac{1}{2}$ in. across, flesh membranaceous, pliant; convex then plane, slightly umbilicate, not polished, at length plicate and grooved, pale yellowish-brown, becoming whitish; gills broadly adnate, becoming narrower in front, distant, simple, unequal, pallid then white; stem about 1 in. long, thin, equal, horny, minutely floccose or scurfy, fistulose, slightly attenuated at the base and abruptly piercing the matrix, coloured like the pileus; spores $4 \times 2{\cdot}5\ \mu$.

*Marasmius insititus*, Fries, Epicr., p. 386; Cke., Hdbk., p. 352; Cke., Illustr., pl. 1135A.

On fallen oak leaves, &c.

In Cooke's figures the stem is about 2 in. long. Berkeley has described a form having a white stem.

**Marasmius perforans.** Fr.

Smell very foetid. Pileus 3–5 lines across, almost membranaceous, soon becoming nearly plane, rarely depressed, not umbilicate nor striate, but at length more or less radiately rugulose, whitish or with a rufous tinge; gills adnate, rather crowded, simple or not forked, unequal (with intermediate shorter ones), narrow, whitish; stem 1–$1\frac{1}{2}$ in. long, very thin, equal, not horny but tough, even, everywhere minutely velvety, bay then blackish, base abruptly entering the substance on which the fungus is growing; spores broadly elliptical, $4 \times 3\ \mu$.

*Marasmius perforans*, Fries, Epicr., p. 385; Cke., Hdbk., p. 352; Cke., Illustr., pl. 1130C.

On pine leaves, &c.

Distinguished from every allied species by the very foetid smell.

**Marasmius Hudsoni.** Pers.

Pileus 1–2 lines across, very thin; hemispherical, rugulose, brownish, covering with long, spreading, purplish, slender hairs; gills adnexed, narrow, white, unbranched, alternate ones shorter; stem $\frac{1}{2}$ in. long, slender, coloured like the pileus and beset with similarly coloured, long hairs; spores elliptical, 5 × 3 $\mu$.

*Marasmius Hudsoni*, Fries, Epicr., p. 386; Cke., Hdbk., p. 353; Cke., Illustr., pl. 1135B.

*Agaricus Hudsoni*, Pers., Syst. Myc., i. p. 139.

*Agaricus pilosus*, Hudson, Flor. Angl.; Sowerby, t. 164.

On fallen holly leaves.

Readily distinguished by its small size, and by the pileus and stem being densely covered with long, coloured, spreading hairs.

Pileus 3 lines broad, convex, almost hemispherical, white, clothed with red erect subrigid hairs, Gills dirty white. Stem 1–2 in. high, filiform, whitish, red brown or reddish, somewhat hairy at the base. (Berk.)

**Marasmius epichloe.** Fr.

Pileus 2–3 lines across, flesh very thin; convex then plane, papillate, not striate, whitish, disc bay-brown; gills rounded behind, rather crowded, broadest behind; stem about 1 in. long, slender, equal, opaque, bay, coarsely striate, striae setulose, base paler; spores elliptical, 3 × 2 $\mu$.

*Marasmius epichloe*, Fries, Hym. Eur., p. 479; Cke., Hdbk., p. 353; Cke., Illustr., pl. 1136A.

On dry grass stems, on spines of *Robinia*, &c.

In Cooke's figure the stem is dark to the base, and the margin of the pileus striate or puckered.

**Marasmius actinophorus.** B. & Br.

Pileus 1–2 lines across, very thin; convex then plane and umbilicate, pale bay brown, with distant darker, radiating lines, wrinkled when dry; gills adnexed, narrow, whitish, alternate ones shorter; stem $\frac{2}{3}$–1 in. long, very slender, equal, paler than the pileus; spores subglobose, 3 $\mu$ diameter.

*Marasmius actinophorus*, B. & Br., Ceylon Fungi, no. 385; Cke., Hdbk., p. 353; Cke, Illustr., pl. 1136B.

On fallen twigs.

Readily distinguished by the brown pileus marked with darker, radiating lines. Not striate.

**Marasmius saccharinus.** Batsch.

Pileus 1–2 lines broad, membranaceous; convex, minutely papillate, glabrous, sulcate, white; gills broadly adnate, narrow, thick, very distant, connected by veins, whitish; stem $\frac{2}{3}$–1 in. across, very slender, equal, reddish, apex pale, minutely flocculose then almost glabrous, piercing the matrix obliquely and abruptly; spores elliptical, 5 × 3 $\mu$.

*Marasmius saccharinus*, Fries, Epicr., p. 386; Cke., Hdbk., p. 353; Cke., Illustr., pl. 1136c.

On slender twigs, leaves, &c.

Somewhat resembling *M. polyadelphus* but differing in not being clustered, and in the persistently convex and papillate pileus, which resembles that of a *Mycena*.

**Marasmius epiphyllus.** Fr.

Pileus about $\frac{1}{4}$ in. across, very thin; soon plane and at length umbilicate, glabrous, wrinkled in folds, milk-white; gills adnate, few, distant, entire, veined, white; stem 1–2 in. long, very slender, equal, rather horny, minutely velvety, apex whitish, bay downwards, fistulose, piercing the matrix abruptly; spores 3 × 2 $\mu$.

*Marasmius epiphyllus*, Fries, Epicr., p. 386; Cke., Hdbk., p. 353; Cke., Illustr., pl. 1137a.

On dead fallen leaves, twigs, &c.

Gregarious.

Pileus 3 lines broad, plane, at length umbilicate, cream-coloured, rugose. Gills veiny, branched, adnate, broad at the base; in large specimens they are seen, when accurately examined, to form a close collar round the stem, which is evident even when the gills are obsolete; margin of the collar cream-coloured. Stem 1–2 in. high, filiform, brown or blackish below, paler upwards, minutely velvety. (Berk.)

**Marasmius polyadelphus.** Lasch.

Snow-white. Pileus 1–1$\frac{1}{2}$ line broad, membranaceous; rather tough, hemispherical, sometimes becoming plane, coarsely striate, minutely flocculose; gills decurrent, narrow and resembling wrinkles; stem $\frac{1}{2}$–$\frac{3}{4}$ in. long, exceedingly slender, base downy; spores elliptical, 5 × 2·5 $\mu$.

*Marasmius polyadelphus*, Cke., Hdbk., p. 354; Cke., Illustr., pl. 1137B.

*Agaricus (Omphalia) polyadelphus*, Fries, Hym. Eur., p. 165.

*Agaricus polyadelphus*, Lasch, no. 208.

On rotten leaves.

Densely gregarious.

### III. APUS.

**Marasmius spodoleucus.** B. & Br.

Pileus 2–3 lines across, flesh very thin; shell-shaped, resupinate, quite stemless, grey, slightly pulverulent or scurfy; gills few, white.

*Marasmius spodoleucus*, B. & Br., Ann. Nat. Hist., May, 1859; Cke., Hdbk., p. 354; Cke., Illustr., pl. 1137c.

*Marasmius Broomei*, Berk., Ann. Nat. Hist., 1795.

On dead elm twigs.

About 2 lines across, resupinate, altogether stemless, conchiform, margin free, arched; above cinereous, pulverulent, or slightly furfuraceous. Hymenium white, very even. Gills few, narrow, entire, so short as to leave a naked space at the base. (B. & Br.)

## TRICHOLOMA. Fries.

Pileus symmetrical, fleshy, rarely umbonate, never truly umbilicate; gills always (at least at first) sinuate behind, often with a slightly decurrent tooth, white, rarely yellow, often becoming spotted with reddish stains, and in some species dingy grey, or lilac; stem central, flesh continuous with that of the pileus, flesh fibrous, not corticated; veil obsolete or evident in the form of down or fibrils on the margin of the pileus; ring and volva absent; spores white or dingy.

*Tricholoma*, Fries, Syst. Myc., i. p. 36; Cke., Hdbk., p. 24 (as a subgenus of *Agaricus*).

All the species grow on the ground, and are typically fleshy and robust. Some species of *Pleurotus* with a nearly central stem closely resemble in structure the present genus, but are distinguished by growing on wood. *Collybia*

differs in the stem being cartilaginous and not fibrous externally. *Clitocybe* differs in the gills never being sinuate, but gradually narrowed behind; pileus often umbilicate, &c.

In some species the gills separate readily from the pileus, as in *Paxillus*, the latter, however, is distinct in the strongly incurved margin of the pileus, and the anastomosing gills.

## *ANALYSIS OF THE SPECIES.*

*Series* A. Pileus viscid, fibrillose, scaly, or downy; not hygrophanous; stem fibrillose from the remains of the adnate universal veil.

### I. Limacina.

Pellicle of pileus viscid when moist, innately fibrillose or squamulose, but not broken up; flesh of pileus thick, firm; margin almost naked.

* Gills not discoloured, and not becoming rufescent.

** Gills discoloured, usually spotted with reddish-brown.

### II. Genuina.

Pellicle of pileus never viscid, but torn into floccose or fibrillose squamules; flesh of pileus soft, not hygrophanous, margin involute and somewhat downy at first. Not to be confounded with those species that have the pileus fibrillose from the remains of the veil.

* Gills unchangeable, not becoming spotted with rufous or black.

** Gills becoming tinged with rufous or greyish; edge usually at length spotted with rufous or black.

### III. Rigida.

Pellicle of the pileus rigid, granulated or broken up into small glabrous squamules when dry, not viscid; floccosely scaly, not torn into fibrils. Pileus rigid, hard when the

flesh is thick, very fragile when thin, margin naked (except in the first species.

Young specimens are often fibrillose from the remains of the veil, and not from the torn cuticle.

* Gills white or pallid, not becoming spotted with rufous or grey. Smell often unpleasant.

** Gills discoloured, becoming spotted with rufous or grey.

### IV. Sericella.

Pileus (without a distinct pellicle) slightly silky at first; soon almost glabrous, very dry; not moist, viscid, hygrophanous, not distinctly scaly. Pileus somewhat thin, opaque, absorbing moisture, but the flesh resembles the gills in colour, and is not hygrophanous. Flesh of stem entirely fibrous, a character by which the smaller species that resemble *Collybia* in habit, are distinguished.

* Gills broad, rather thick, somewhat distant, strong-scented.

** Gills thin, crowded, narrow. Small; inodorous.

*Series* B. Pileus even, glabrous, not downy, nor scaly, not viscid, moist in rainy weather; when quite young pruinose from the universal veil (but this character is not always very conspicuous). Flesh soft, spongy or very thin, watery and hygrophanous.

### V. Guttata.

Pileus fleshy, soft, fragile, marked with drop-like spots, or rivulose; stem solid.

Appearing in the spring, rarely obvious during the autumn, caespitose or growing in troops, often in circles.

* Gills whitish.

** Gills discoloured, rufous or smoky grey.

### VI. Spongiosa.

Pileus compact then spongy, obtuse, even, glabrous, moist but not hygrophanous.

Firm, appearing in the autumn, in troops. Stem stout, base usually incrassated, spongy-fibrous. Gills at length spuriously decurrent, but sinuate, a character by which the species are readily distinguished from *Clitocybe*.

* Gills not discoloured.

** Gills discoloured.

Gills readily separating from the pileus in *T. cinerascens* and some others.

### VII. Hygrophana.

Pileus thin, somewhat umbonate, flesh at length soft, hygrophanous.

Stem not rooting, containing a pith, entirely fibrillose. Pileus unequally fleshy, hence more or less umbonate, very thin towards the margin. Colour of the pileus, both when moist and dry, very variable in the same species. Flesh moist, watery; at first compact, then soft; gills thin, not broad.

Pileus sometimes pulverulent, but this is abnormal, and due to the persistence of the veil during dry weather. Closely allied to the group *Spongiosa*, but tending towards *Collybia* rather than *Clitocybe*.

* Gills whitish, not spotted.

** Gills more or less violet, grey, or smoky.

## *Series* A.

### I. LIMACINA.

* *Gills not discoloured.*

**Tricholoma equestre.** Linn.

Pileus 3–5 in. across, flesh thick, firm, white; convex then expanded, obtuse or sometimes more or less gibbous, often wavy, discoid, viscid, squamulose, yellow usually with a rufous tinge, disc darker, often greenish late in the season,

gills much cut out behind and free, 3 lines broad, crowded, sulphur-yellow; stem $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $\frac{1}{2}$–$\frac{2}{3}$ in. thick, base more or less swollen, whitish, or yellow like the gills, solid; spores elliptical, 7–8 × 5 $\mu$.

*Agaricus equestris*, Linn., Suec., no. 1219; Fries, Elench., i. p. 6; Cke., Hdbk., p. 24; Cke., Illustr., pl. 72.

In fir woods.

Taste and smell none. Sometimes very large specimens occur. Differs from *T. sejunctum* in the absence of black streaks on the pileus, and the yellow gills.

**Tricholoma sejunctum.** Sow.

Smell strong, like new meal; taste bitter. Pileus about 3–4 in. across, flesh thin, fragile, white; convex then expanded, gibbous, the umbo at length disappearing, viscid in moist weather, bright yellow, virgate or streaked with brownish, minute fibrils; gills emarginate, broad, rather distant, pure white; stem solid, stout, ventricose, then elongated up to 4–5 in., up to 1 in. thick, even, glabrous, pure white, apex slightly squamulose; spores subglobose, about 6 $\mu$ diameter.

*Agaricus sejunctus*, Sowerby, t. 126; Cke., Hdbk., p. 25; Cke., Illustr., pl. 53?

In pine and other woods.

Stout, showy, smell resembling rancid meal. Stem fleshy, solid, ventricose, then elongated, about 3 in. long, usually 1 in. thick, even, glabrous, pure white, apex slightly squamulose, pileus fleshy at the disc, thin towards the margin, convex then expanded, gibbous at first, but the umbo disappearing, about 3 in. across, viscid in damp weather, yellow, virgate or streaked with blackish-brown innate fibrils. Flesh thin in proportion, white or marbled with grey, gills emarginate, rounded when young, broad, rather distant, colour not changing. (Fries.)

In one of the figures of this species in Fries, Icon., pl. 23, the pileus is 5 in. across; stem 6 in. long, and $1\frac{1}{4}$ in. at the thickest part. Other figures on the same plate are smaller. Cooke's figure is not at all characteristic, and is an extreme form, if this species at all.

**Tricholoma portentosum.** Fr.

Pileus 3–5 in. across, flesh thin, white or with a faint

yellow tinge, fragile, convex then expanded, unequal, viscid, usually sooty or with a purple tinge, virgate or streaked with fine black lines; margin thin; gills rounded behind, often almost free, very broad, 4–8 lines, at length distant, pallid; stem usually about 3 in. long, and $\frac{3}{4}$ in. thick, somewhat equal, glabrous, striate, whitish, firm, solid; spores subglobose, 4–5 × 4 $\mu$,

*Agaricus* (*Tricholoma*) *portentosus*, Fries, Syst. Mycol., i. p. 39; Cke., Hdbk., p. 25; Cke., Illustr., pl. 54?

In pine woods.

Solitary or gregarious, also rarely forming dense tufts; inodorous, taste mild, these points separate the present from *T. sejunctum*. Stem solid, stout, entirely remarkably cartilagineo-fibrous, usually 3 in. long, 1 in. thick, somewhat equal, naked but fibre closely striate, white. Flesh of pileus very thin in proportion to the stout stem; convex then plane, somewhat umbonate, unequal and wavy, 3–5 in. broad, viscid, virgate from innate, black fibrils; for the rest even, glabrous, usually sooty, but varies to a violet tint, livid and pale when old; margin thin, always naked. Flesh white, with a faint yellow tinge, fragile, gills rounded, almost free, 3–4 lines up to 1 in. broad, distant, white at first, then becoming yellowish or pallid-greyish. Easily known from other species by the virgate pileus; *T. flavobrunneum* and *T. albobrunneum* differ in having the gills spotted rufescent. *T. virgatum* has the pileus absolutely dry. (Fries.)

Cooke's figures, if the right species, differ in the slender stem being hollow, and coloured like the pileus.

**Tricholoma fucatum.** Fr.

Pileus 2–3 in. across, flesh thin, pallid; convex then plane, somewhat wavy, viscid, lurid-yellowish, variegated with darker stains, disc darker; gills emarginate, 3–4 lines broad, somewhat crowded, whitish or with a yellow tinge; stem 2–3 in. long, up to $\frac{1}{2}$ in. thick, almost equal, fibrillosely squamulose, whitish or with a yellow tinge, stuffed, soft.

*Agaricus* (*Tricholoma*) *fucatus*, Fries, Syst. Myc., i. p. 40; Cke., Hdbk., p. 25; Cke., Illustr., pl. 73.

In woods, especially pine.

Stem stuffed, soft; often ascending, 2–3 in. long, 4–6

lines thick, somewhat equal, at first minutely and densely squamulose, then distinctly fibrillose, at length variegated with blackish fibrils, pallid then white, apex white and with meal at the apex, at length fragile. Pileus slightly fleshy, convexo-plane, obtuse, often irregular, 2–3 in. broad, rarely more, viscid, but readily becoming dry and opaque, even, glabrous, not variegated with black fibrils, but marked with stains, lurid-yellowish or greyish-yellow, disc darker. Flesh thin, pallid, at length fragile. Margin thin, naked. Gills deeply emarginate, 3–5 lines broad, ventricose, somewhat crowded, fragile, whitish, trama hyaline and coloured like the flesh of the pileus. Inodorous. Often confounded with forms of *T. portentosum*, but clearly and easily distinguished by paying attention to the above notes. The stem is not always so distinctly scaly as in the figure in "Icones," tab. 24, which was drawn from a highly evolved specimen. There are forms with the stem short and somewhat bulbous that require to be carefully distinguished from *T. portentosum*. (Fries.)

*T. portentosum* is clearly distinguished from all forms of the present species by having the pileus streaked or virgate with innate black fibrils.

**Tricholoma quinquepartitum.** Fr.

Pileus 3–4 in. across, fragile; flesh, with the exception of the disc, thin, fragile, white, rather hygrophanous; convex then expanded, wavy, even, glabrous, not by any means virgate, viscid, fragile, pale yellow; gills emarginate, not crowded, $\frac{1}{2}$ in. broad, white; stem 3–4 in. long, $\frac{1}{2}$ in. and more thick, usually attenuated from base to apex, striate, glabrous, white, solid; spores 5–6 × 3–4 $\mu$.

*Agaricus* (*Tricholoma*) *quinquepartitus*, Fries, Epicr., p, 27; Cke., Hdbk., p. 25; Cke., Illustr., pl. 74.

In pine woods, &c.

Sometimes confounded with wavy forms of *T. portentosum* and *T. fucatum;* known from the first by the pileus not being virgate or radially streaked with wrinkles; from the second, by the glabrous striate stem. Smell none, taste mild.

**Tricholoma spermaticum.** Fr.

White. Smell strong, unpleasant. Pileus 2–3 in. across,

flesh rather thin except at the disc, white, compact; convex then expanded, obtuse, wavy, glabrous, viscid, shining when dry, never spotted or stained; margin naked, incurved at first, then spreading; gills emarginate, often with a more or less defined decurrent tooth, 3 lines broad; rather distant, margin irregular; stem 2–3½ in. long, ½–¾ in. thick, even, twisted, stuffed then hollow.

*Agaricus* (*Tricholoma*) *spermaticus*, Fries, Epicr., p. 27; Cke., Hdbk., p. 26; Cke., Illustr., pl. 87.

In fir woods.

Distinguished among the white strong-smelling species by its stout, twisted, hollow stem.

**Tricholoma resplendens.** Fr.

Entirely clear white. Pileus 2–4 in. across, everywhere equally fleshy but not thick; convex then expanded, obtuse, even, glabrous, and viscid when fresh, silvery shining when dry, and often with hyaline spots; disc becoming yellowish and appearing adpressedly silky but glabrous; gills almost free when young, then remarkably emarginate, rather crowded, thickish, but the edge thin and quite entire, 3–4 lines broad, equally narrowed in front; stem 2–3 in. long, ½ in. and more thick, equal or bulbous, even, glabrous, or apex slightly floccose, dry, sometimes curved, solid; spores elliptical, 7–8 × 4 $\mu$.

*Agaricus resplendens*, Fries, Monogr., i. p. 55; Cke., Illustr., pl. 55; Cke., Hdbk., p. 26.

In woods.

Gregarious, entirely clear white, or disc yellowish; smell and taste pleasant. Resembling *Hygrophorus eburneus* in habit.

** *Gills becoming discoloured, usually with reddish spots.*

**Tricholoma colossus.** Fr.

Pileus 6–8 in. across, flesh 2 in. and more thick, becoming pinkish-red when broken, very hard; convex then expanded, glabrous, at length broken up into squamules; margin naked at first strongly incurved, then expanded or even upturned, wavy; brick-red, or reddish-umber, especially at the disc; gills rounded behind, crowded, thin, white, then becoming very broad, up to ½ in., and pale brick-red;

stem 3–4 in. long, very hard and solid, base ovately bulbous and 3–4 in. thick, brick-red, apex constricted, 2 in. thick, whitish; spores broadly elliptical, 6 × 4 μ.

*Agaricus (Tricholoma) colossus*, Fries, Epicr., p. 38; Cke., Hdbk., p. 26; Cke., Illustr., pl. 87.

In fir woods.

Inodorous. Readily known by its large size, and by the flesh becoming red when broken.

The following form or variety is published by Berkeley and Broome, Ann. Nat. Hist., 1871, p. 3, no. 1190.

Pileus about 4 in. across, irregularly lobed and undulated, minutely scaly, grey; stem about 2 in. high, thicker upwards, buff, yellow at the base; gills rather wide, pallid. Smell strong, like that of cheese. Under an elm. (B. & Br.)

**Tricholoma acerbum.** Bull.

Taste bitter. Pileus 3–4 in. across, flesh thick in the centre, thin elsewhere, margin at first strongly involute, rugulose or pitted, becoming straight with age, viscid when moist, smooth, convex, then almost plane, whitish then pale testaceous with yellow tinge; gills rather narrow, crowded, emarginate, creamy then pale rufous; stem 2–3 in. long, $\frac{3}{4}$ in. thick, solid, pale, apex squamulose; spores subglobose, 5–6 μ diameter.

*Agaricus (Tricholoma) acerbus*, Bull., t. 571, f. 2; Cke., Hdbk., p. 26; Cke., Illustr., t. 76 (poor).

In woods. Taste bitter. Distinguished in the young stage by the strongly involute margin of pileus and squamulose apex of stem, later by the plane pileus, rusty gills and stem as before.

**Tricholoma nictitans.** Fr.

Pileus $1\frac{1}{2}$–$2\frac{1}{2}$ in. across, flesh thin, white; convex then expanded, obtuse, even, glabrous, viscid, yellowish, disc darker; gills rounded behind and adnexed, but not with a decurrent tooth, crowded, rather broad, somewhat ventricose, yellow, spotted with reddish spots when old; stem about 3 in. long, $\frac{1}{2}$ in. thick, dry, slightly scaly at the apex, pale yellow, solid, equal or attenuated upwards, base truncate; spores elliptic, 7–8 × 5 μ.

*Agaricus* (*Tricholoma*) *nictitans*, Fries, Syst. Myc., i. p. 38; Cke., Hdbk., 27; Cke., Illustr., pl. 56.

In woods.

Inodorous; taste sweet. Allied to *T. fulvellum*, but differing as follows. Stem not viscid, base not attenuated, but if anything, incrassated, ending abruptly, becoming yellowish; pileus thin, not virgate; gills without a decurrent tooth. (Fries.)

**Tricholoma fulvellum.** Fr.

Pileus 1–2 in. across, flesh rather thin except at the disc, dingy; convex then plane, viscid, even, yellowish rufescent or tan-colour, disc darker and wrinkled into minute projections; gills rounded then emarginate, 2 lines broad, crowded, white then rufescent; stem about 2 in. long, 2–3 lines thick, almost equal, whitish with a rufescent tinge, fibrillose, apex naked, stuffed then hollow; spores subglobose, 4–5 $\mu$ diameter.

*Agaricus* (*Tricholoma*) *fulvellum*, Fries, Hym. Eur., p. 50; Cke., Hdbk., p. 27; Cke., Illustr., pl. 57.

In woods.

Inodorous. Cooke's figures differ considerably from Fries' description. The pileus is campanulate, lax, and with a prominent umbo, resembling in habit a large *Galera*.

**Tricholoma flavobrunneum.** Fr.

Smell strong, like new meal. Pileus 3–6 in. across, flesh thick, either the whole, or that of the stem and the edge of the pileus clear yellow; conically convex then expanded, broadly gibbous, viscid, fibrillosely virgate, or innately squamulose but the surface not broken up, tawny-rufous with the disc darker, or entirely bay or rufous-brown; gills emarginate with a decurrent tooth, crowded, pale yellow, becoming spotted with brown when touched or with age; stem 3–5 in. long, $\frac{1}{2}$–$\frac{3}{4}$ in. thick, rufescent or brownish, generally ventricose and narrowed at each end, more or less equal when small, with rufous fibrils on the surface, viscid at first, apex naked, hollow; spores 6–7 × 4–5 $\mu$.

*Agaricus flavobrunneus*, Fries, Epicr., p. 28; Cke., Hdbk., p. 27; Cke., Illustr., pl. 58.

In woods, &c.

Usually gregarious and often caespitose, gills sometimes

whitish, and thus superficially more nearly approaching *T. albobrunneum*, from which it is always distinguished by the strong smell, and yellow flesh of the stem.

**Tricholoma albobrunneum.** Pers.

Pileus about 3 in. across, flesh rather thick, especially at the disc, clear white; campanulate then hemispherical, viscid, almost even, but distinctly virgate or minutely streaked with innate fibrils, clear brown; margin at first incurved and puckered; gills emarginate, rounded behind, not decurrent, scarcely crowded, very broad (3–4 lines), firm but not thick, clear white at first, but soon becoming pallid; stem $1\frac{1}{2}$–2 in. long, about 1 in. thick, equal appearing at first sight to be glabrous, but in reality minutely silky on the surface, rufescent, white at both ends but most constantly so at the apex, which is powdered with white meal, solid, flesh firm, clear white; spores 4–6 × 3·5 $\mu$.

*Agaricus albobrunneus*, Pers., Syn., p. 293; Cke., Hdbk., p. 27; Cke., Illustr., pl. 197.

In pine woods, &c.

Closely allied to *T. flavobrunneum*, differing in absence of smell, mild taste, and persistently white flesh.

**Tricholoma ustale.** Fr.

Pileus 2–3 in. across, flesh rather thick, white; hemispherical then expanded and umbonate, finally almost plane and obtuse, even, glabrous, not virgate or streaked, disc rugulosely punctate, bay-brown; gills emarginate with a decurrent tooth, crowded, rather broad, white then tinged rufous; stem 2–3 in. long, about $\frac{1}{2}$ in. thick, stuffed then hollow, equal, somewhat rooting, dry, fibrillose, whitish or with a rufescent tinge, apex silky, whiter but not mealy; spores elliptical, 7–8 × 5 $\mu$; smell none.

*Agaricus* (*Tricholoma*) *ustalis*, Fries, Epicr., p. 29; Cke., Illustr., pl. 88; Cke., Hdbk., p. 28.

In woods.

Intermediate between *T. flavobrunneum* and *T. pessundatum*, but distinct from both in the absence of smell. (Fries.)

**Tricholoma pessundatum.** Fr.

Smell strong, resembling new meal. Pileus about 3 in. across, flesh rather thick, convex then expanded, very obtuse,

wavy, glabrous, not virgate but usually marked with spots, viscid, bay or rufescent, becoming paler near the edge, margin incurved, naked; gills deeply emarginate, almost free, at first very narrow and pure white, then 3 lines broad and with a rufescent tinge; stem 2–3 in. long, and up to 1 in. thick, almost glabrous, white; solid, hard, bulb-like at first and covered with down, then elongating; spores $5 \times 2\frac{1}{2}$ $\mu$.

*Agaricus* (*Tricholoma*) *pessundatus*, Fries, Epicr., p. 26; Cke., Hdbk., p. 28.

In pine woods, &c.

Often in company with *T. equestre*, with which it agrees in size, most nearly allied to *T. russula*, which is distinguished by the granular, rosy pileus. (Fries.)

**Tricholoma stans.** Fr.

Pileus 3–4 in. across, flesh thick, firm, white, reddish under the cuticle; convex then expanded, even (not granulated nor spotted), viscid, rufescent; gills rounded behind, crowded, white, stained with reddish brown; stem 2–3 in. long, almost equal, solid, $\frac{1}{2}$–1 in. thick, whitish with a rufescent tinge, squamulose; spores elliptical, $5–6 \times 4$ $\mu$.

*Agaricus* (*Tricholoma*) *stans*, Fries, Syst. Myc., i. p. 38; Cke., Hdbk., p. 28; Cke., Illustr., pl. 198,

On the ground.

Fries distinguishes two forms of the present species:—(A.) *campestris;* stem stout [2 in. long, $1\frac{1}{4}$ in. thick], reddish, squamulose but not villose; pileus broad [5 in. across], more expanded, rufous brown, indistinctly virgately squamulose:—(B.) *montana;* stem up to 4 in. long, quite equal, white, apex distinctly whitish squamulose; pileus smaller [3 in. across], more convex, and altogether even. (Fries.)

Allied to *T. pessundatum* by the granulated or spotted pileus, and the flesh being reddish under the cuticle.

**Tricholoma russula.** Schaeff.

Pileus about 3 in. across, flesh very thick at the disc, becoming thin towards the margin, white, tinged with rose under the cuticle; convex then depressed, obtuse or slightly gibbous, granulated, viscid, rosy flesh-colour, sometimes very deep; gills slightly rounded behind then slightly

decurrent with an indistinct trace of a sinus, rather distant, pure white, becoming slightly spotted; stem 1½–2 in. long, ⅔ in. thick, almost equal, solid, firm, white, more or less tinged with rose-colour, apex squamulose; spores elliptical, 10–5 μ.

*Agaricus russula*, Schaeffer, t. 58; Cke., Hdbk., p. 363; Cke., Illustr., pl. 926.

Among grass under trees.

Smell and taste pleasant; eaten in Austria. Flesh-colour, sometimes spotted with yellow, as in *Hygrophorus pudorinus*, with which, and *Hygrophorus erubescens*, it is often confused. (Fries.)

The present differs from both the above-named species of *Hygrophorus* in the granulated pileus, flesh tinged with rose-colour under the cuticle, and in not growing in pine woods.

**Tricholoma frumentaceum.** Bull.

Pileus 2½–4 in. across, flesh compact, thick at the centre, becoming gradually thinner towards the margin, white; convex then expanded, obtuse, glabrous, pallid, with a red tinge, and streaked with darker lines; gills rounded behind and slightly annexed, 3–4 lines broad, crowded, white then reddish; stem 2½–3 in. long, about ⅔ in. thick, equal or slightly thickened at the base, solid, fibrillose, whitish, more or less variegated with pale red; spores faintly tinged with red, elliptical, smooth, 5 × 3·5 μ.

*Agaricus frumentaceus*, Bull., Champ., t. 571, f. 1; Cke., Illustr., pl. 470.

*Agaricus (Entoloma) frumentaceus*, Berk., Outl., p. 144.

On the ground.

Smell like meal. There is a difference of opinion, as shown by the following notes, as to the position of the present species.

The plate issued in "Illustrations" was copied from a drawing made by Mr. Worthington Smith, from specimens sent to him from Forres, by the Rev. Dr. Keith. Never having been so fortunate as to see this species, we accepted the designation attached to the drawing, and published it as an *Entoloma*, under the impression that it was the *Agaricus (Entoloma) frumentaceus*, B. & Br. Dr. Keith has kindly

drawn our attention to this figure, at the same time stating his conviction that the original specimens were those of an undoubted *Tricholoma*, the pink tinge of the spores being faint and quite of a different character to the spores in *Hyporhodii*. Whatever, therefore, the plant of Berkeley and Broome may be, to which they attach the name of *A. frumentaceus*, and include in the subgenus *Entoloma*, it cannot be the species figured as above, since Dr. Keith must have had ample material to judge, and no one would doubt his ability to form an authoritative opinion. Plate 470 must, therefore be corrected to *Ag.* (*Tricholoma*) *frumentaceus*, Bull. We may add that the majority of Continental mycologists contend that Bulliard's species is a *Tricholoma*, and both the size and form of the spores given in our plate certainly are more in accordance with those usually found in *Tricholoma* than those of *Entoloma*. (Cke.)

On the ground under a hedge. Somewhat caespitose; pileus 3½ in. across, plane, with the margin arched and sinuated, dry, buff, tinged with red, marked with fine streaks, which are sometimes slightly raised, fleshy, firm, rather brittle. Stem 2 in. high, 1 in. thick, of the same colour as the pileus, streaked and slightly cracked, sometimes compressed, blunt at the base, with a little white down stained with the spores. Gills broad, moderately distant, sinuated and toothed, rounded behind, sometimes emarginate, adnate, cinereous, with a reddish yellow tinge; spores elliptic, minute, ·0002 in. long, rose-coloured. Taste agreeable; smell farinaceous with a slight taint of amadou. This is undoubtedly the plant of Bulliard, which is not described by him as viscid. The spores are decidedly rose-coloured and not white. (Berk.)

Entirely pallid then white, but stem and pileus stained with rufous, the gills at length becoming rufescent, and the strong smell, resembling new meal, point to an undoubted affinity with *T. pessundatum*. Stem solid, 3 in. long, ½ in. thick, equal, dry, fibrillose, whitish. Pileus truly fleshy, but less compact than in *T. pessundatum*, convex then plane, obtuse, 2–3 in. broad; viscid, dry in very dry weather, even, glabrous, whitish or tan-colour, and variegated with rufous. Flesh white. Gills rounded, somewhat crowded, rather broad, white, at length spotted with rufous. (Fries.)

## II. GENUINA.

### * *Gills not discoloured nor spotted.*

**Tricholoma rutilans.** Schaeff.

Pileus 3–6 in. across, flesh thick, soft, deep yellow from the earliest stage, becoming golden-yellow when broken; semiovate, obtuse, and with the margin incurved when young, entirely covered with a dense, uninterrupted coating of dark purple or reddish-brown down; when older becoming campanulate and often umbonate, purple, all one colour; when mature convex then expanded, often umbonate, the cuticle broken up into small, innate flocose squamules, yellow, variegated with purple; always dry; gills yellow from the first, broadly adnexed, crowded, edge thickened, obtuse, floccose, often wavy; thinner, broader, and less crowded when adult, edge deep yellow, sides paler; 2–3 in. long, $\frac{3}{4}$ in. thick, fleshy, imperfectly hollow, soft, bulbous when short, ventricose when elongated, yellow; variegated, especially upwards, with purplish, floccose squamules; spores subglobose, 5–6 $\mu$ diameter.

*Agaricus rutilans*, Schaeffer, t. 219; Cke., Hdbk., p. 28; Cke., Illustr., pl. 89.

*Agaricus serratus*, Bolton, t. 14.

*Agaricus xerampelinus*, Sow., t. 31.

In pine woods, &c.

Inodorous. Dimensions very variable; in large specimens, usually caespitose, stem 1–2 in thick, pileus up to a span broad, but usually much smaller. (Fries.)

Commonly confounded with *T. variegatum*, from which it differs in the flesh being yellow from the first, and deeper in colour; and more especially in the downy or floccose margin of the gills being deep yellow at maturity. In *T. variegatum* the margin of the gills is quite entire.

**Tricholoma variegatum.** Scop.

Pileus 2–4 in. across, fragile, flesh thickish, whitish at first, then pale yellow; expanded when adult, very obtuse or with a trace of an umbo; more or less densely and entirely or in part covered with reddish-purple downy tufts on a

pale yellowish ground-colour, margin naked; gills rounded behind and emarginate, crowded, thin, margin always quite entire, acute, yellowish-white like the remainder of the gill; stem stuffed, rather hard and tough, 2–3 in. long, ½ in. thick, almost equal, curved, sometimes bulbous, yellowish-white, either variegated with reddish down, or almost naked, apex very indistinctly whitish pruinose, spores subglobose, 5–7 × 4–5 μ.

*Agaricus variegatus*, Scop., Carn., p. 434; Cke., Illustr., t. 642, Cke., Hdbk., p. 642 (very small).

On rotten wood.

Usually mixed up with *T. rutilans*, which the present closely resembles, differs in being usually smaller, paler, less showy, and especially in the pale yellow flesh. Fries says that he has not met the true *T. rutilans* growing on wood.

**Tricholoma luridum.** Fr.

Smell like fresh meal, taste mild. Pileus 1½–2 in. across, flesh rather thin, convex then plane, obtuse, rather wavy, deformed, quite dry, cuticle readily separating in fibrils, cracked and incised (as in *Inocybe rimosa*), yellowish-grey, sometimes yellow, never rufescent; gills emarginate, broad, closely crowded, watery white; stem solid or stuffed, 2–3 in. long. ½–1 in. thick, unequal, glabrous, white; spores 5–6 × 3–4 μ.

*Agaricus* (*Tricholoma*) *luridum*, Fries, Epicr., p. 31; Cke., Hdbk., p. 29; Cke., Illustr., pl. 214.

In dry pine woods, &c.

More or less resembling *T. saponaceum*, *T. portentosum*, and others, but clearly distinguished by the smell resembling new meal; flesh of pileus and stem fibrous, soft; pallid white, never reddish. (Fries.)

**Tricholoma guttatum.** Schaeff.

Smell and taste bitter, somewhat acrid. Pileus 2½–5 in. across, flesh thick, white; convex then expanded, cinnamon or with a pinkish tinge, becoming broken up into granulose or floccose innate scales; margin remotely sulcate, incurved and with white floccose down at first; gills emarginate, with a decurrent line down the stem, 1½ line broad, very

closely crowded, snow-white; stem 2–3 in. long, $\frac{1}{2}$ in. thick, about equal, white, mealy, solid.

*Agaricus guttatus*, Schaeffer, t. 240; Cke., Hdbk., p. 29; Cke., Illustr., pl. 59?

Borders of woods, &c.

Sometimes rather tufted. Differs from *T. tigrimum* in the persistently white gills and the sulcate margin of the pileus. Cooke's figures differs from the form described above in the smaller size, and in the pileus being ornamented with large, innate, dark brown patches, more or less concentrically arranged, and disappearing towards the margin.

**Tricholoma columbetta.** Fr.

Entirely pure white but here and there spotted with red. Pileus 2–4 in. across, flesh firm but not thick, convex then expanded, obtuse, wavy, dry, glabrous at first, then squamulose or cracked into squarrose particles, margin downy and incurved when young; gills slightly emarginate, almost free, 2–3 lines broad, persistently clear white; stem 3–4 in. long, almost 1 in. thick in large forms, usually unequal, at times quite short, solid; spores elliptical, 6–7 × 4–5 $\mu$.

*Agaricus* (*Tricholoma*) *columbetta*, Fries, Epicr., p. 32; Cke., Illustr., pl. 48; Cke., Hdbk., p. 29.

In woods.

Widely separated from every other species of *Tricholoma*. Solitary, inodorous; taste mild. The following are remarkable forms:—

(*A.*) In heathy birch woods among moss. Stem short, stout, somewhat rooting, moist, naked, not distinctly striate; pileus always wavy and more or less lobed, moist in damp weather, usually spotted with red, margin involute and downy:—

(*B.*) In damp bushy places. Stem elongated, base narrowest, pileus wavy, silkily-fibrillose, somewhat squamulose, sometimes with brownish spots:—

(*C.*) In very shady beech woods. Pure white, not spotted, but there are sometimes bluish spots in the flesh; stem equal, cylindrical, 4 in. long, $\frac{3}{4}$ in. thick, fibrillosely striate; pileus regular, flattened, obtuse, 4 in. across, evidently fibrillose when dry, margin naked, flesh thin, splitting.

This last appears to be quite a distinct species from *A.*, but *B.* is intermediate between the two. (Fries.)

Pileus 1½–4 in. broad, white at the margin, centre pale mouse-colour, sometimes spotted when touched with violet or yellow; stem 2 in. high, 3–6 lines thick. (Berk.)

**Tricholoma scalpturatum.** Fr.

Pileus 2–3 in. across, flesh very thin except at the disc, dingy, as is also that of the stem; conical then expanded, tomentose at first, then becoming broken up into umber or rufous scales on a yellowish-white ground; gills emarginate, adnexed, rather crowded, 2 lines broad. white then yellowish; stem 2–3 in. long, ½ in. thick, unequal, whitish, fibrillose or minutely squamulose, stuffed; spores 6–7 × 3·5 $\mu$.

*Agaricus* (*Tricholoma*) *scalpturatus*, Fries, Epicr., p. 31; Cke., Illustr., pl. 215; Cke., Hdbk., p. 29.

In woods.

Covered with floccose down like a *Lepiota* when young, then broken up into broad, discoloured scales on a yellowish-white ground. Allied to *T. terreum.* (Fries.)

*Var.* **argyraceus,** Bull.; Cke., Illustr., pl. 165.

Differing from the typical form in being more slender and graceful; pileus whitish or silvery; gills narrower and more crowded, whitish.

*Var.* **chrysites,** Jungh.; Cke., Illustr., pl. 947.

About the size of the typical form; very pale, pileus and gills becoming yellowish; spore subglobose, 4 $\mu$ diameter.

*Var.* **virescens,** Wharton; Cke., Illustr., pl. 641.

Somewhat resembling the typical form in colour, but turning yellowish-green in all parts when bruised, or during drying.

Slightly acrid, odour none. Spores elliptical, 6 × 3 $\mu$. According to the figure the gills are narrow and slightly sinuate, with a minute decurrent tooth.

** *Gills becoming tinged red or grey, edge often spotted.*

**Tricholoma vaccinum.** Fr.

Pileus 3–5 in. across, flesh rather thick, and like that of the stem, white and fibrous, then reddish; campanulate then

expanded, umbonate, becoming everywhere broken up into small floccose, squarrose scales, or torn into smaller adpressed scales, dry, rufous; margin at first involute and tomentose from the veil; gills very slightly sinuate, almost adnate, rather distant, 3–6 lines broad, whitish at first, then spotted with red, at length rufescent; stem about 3 in. long, 4–8 lines thick, hollow, equal, round, remarkably fibrillose, more or less evidently cortinated, apex naked, whitish with a rufescent tinge; spores subglobose, 6–7 $\mu$ diameter.

*Agaricus* (*Tricholoma*) *vaccinus*, Fries, Epicr., p. 33; Cke., Hdbk., p. 30; Cke., Illustr., pl. 60 (called *Ag. imbricatus*).

In pine, &c.

Allied to *T. imbricatum*, but differs in the stem being hollow, and its apex naked (*i.e.* not powdery), and in the flesh becoming reddish.

**Tricholoma imbricatum.** Fr.

Pileus 3–5 in. across, flesh thick, white; convex then expanded, obtuse, quite dry, rufous-umber, becoming broken up into minute innate squamules; margin at first incurved and downy; gills sinuate and adnexed, 2–3 lines broad, rather crowded, white then rufescent; stem 3–5 in. long, $\frac{1}{2}$–$\frac{2}{3}$ in. thick, paler than the pileus, apex with white pulverulent down, solid; spores 6 × 4 $\mu$.

*Agaricus imbricatum*, Fries, Obs., i. p. 27; Cke., Illustr., pl. 199; Cke., Hdbk., p. 30.

In pine and other woods.

Stem solid, firm (often riddled by larvae), sometimes short, conical, $1\frac{1}{2}$–2 in. long and up to 1 in. thick, sometimes drawn out, 3 in. long, almost equal, adpressedly fibrillose, apex white, pulverulent with white squamules. Pileus fleshy, compact, broadly convex then expanded, obtuse, very dry, umber or rufous-umber, very opaque, 3 in. and more broad, disc remaining smooth, the remainder broken up into squamules, fibrillose towards the margin. Margin thin, slightly incurved at first, downy, then almost naked. Gills slightly emarginate, almost adnate, rather crowded, 3 lines broad, entirely white when young, then rufous. (Fries.)

*T. vaccinum* somewhat resembles the present species, but differs in the distinctly corticate, hollow stem having the apex naked; umbonate pileus, &c.

**Tricholoma immundus.** Berk.

Pileus 2–3 in. across, rather fleshy at the disc, becoming very thin towards the inflexed margin, minutely silky or with very small scattered squamules visible only under a lens, when dry dingy white, with darker stains; gills very slightly rounded behind, rather close, about 1½ lines broad, pale grey with a pink tinge, in the larger specimens more especially becoming very dark with age, margin entire; stem about 2 in. long, 2 lines thick, nearly equal, dingy white, fibrillose, often broken up into squamules at the apex, solid; spores subglobose, apiculate, colourless, 4–5 $\mu$ diameter; every part of the fungus becomes blackish when bruised.

*Agaricus* (*Tricholoma*) *immundus*, Berk., Outl., p. 103; Cke., Hdbk., p. 31; Cke., Illustr., pl. 61 (not characteristic).

Among short grass in open places.

Caespitose or solitary; characterised by the very dark gills and thin pileus. The gills separate readily from the pileus during drying, a character taken along with the globose spores, that suggests the genus *Paxillus*.

**Tricholoma inodermeum.** Fr.

Pileus 1–2 in. across, flesh rather thin, white, then tinged red; conico-campanulate, acute, then becoming more convex and somewhat umbonate, the surface becoming broken up into fibrils and adpressed, radiating scales, rufous-brown; gills free or slightly adnexed, very broad and remarkably ventricose, almost semicircular, distant, rather thick, persistently white, but becoming spotted with reddish when bruised; stem about 3 in. long, 1½–2 in. thick, equal, hardly fibrillose, white with a rufous tinge, apex powdered with white, stuffed, hollow upwards, entirely fibrous, tough; spores elliptical, 7–8 × 4 $\mu$.

*Agaricus inodermeus*, Fries, in Vet. Ac. Förh., 1851; Cke., Hdbk., p. 364; Cke., Illustr., pl. 945.

In damp, dense pine woods, &c.

Not closely allied to any known species. Resembling *Inocybe pyriodora* in habit.

**Tricholoma hordum.** Fr.

Pileus about 3 in. across, flesh rather thick; campanulate then expanded, at length flattened, somewhat umbonate and

the margin upturned, dry, unequal, wavy, glabrous, surface soon cracking, and in dry weather the whole surface becomes broken up into squarrose scales, grey; gills emarginate, broad, rather distant, white then greyish; stem 3 in. long, $\frac{1}{2}$ in. and more thick, straight, glabrous, whitish, stuffed, equal.

*Agaricus* (*Tricholoma*) *hordum*, Fries, Epicr., p. 39.

Under beeches, &c.

Very distinct. Inodorous, mild, very rigid and fragile. Pileus sometimes covered with fibrils which soon disappear. (Fries.)

**Tricholoma murinaceum.** Bull.

Pileus 2–3 in. across, flesh thin, except the disc; campanulate then expanded, sometimes more or less umbonate, silky, becoming cracked into scales, or virgate, greyish sometimes becoming paler, especially at the disc; gills cut out behind and adnexed, broad, distant, undulate, grey; stem 2–3 in. long, $\frac{1}{2}$–$\frac{2}{3}$ in. thick, pale grey and with scattered, darker, minute scales, stuffed.

*Agaricus murinaceus*, Bulliard, t. 520; Cke., Hdbk., p. 31; Cke., Illustr., pl. 49.

In woods.

The gills in "Illustrations" should have been cinereous, but were left white by an error of the printer. (Cooke.)

Fries says that the scent is strong and nitrous; he however did not know the fungus, and quoted Persoon. Berkeley says the smell is slight and not at all nitrous, whereas Bulliard does not mention the smell at all. Somewhat resembling *T. terreum*, but differs in the black squamules on the stem.

Pileus 4$\frac{1}{2}$ in. across, at first campanulate, slightly umbonate, then expanded, thin, firm, but very brittle, mouse-coloured, cracked and virgate, silky, not the least viscid, flesh white. Taste bitter, unpleasant, rather acrid, Smell neither powerful nor nitrous. Stem 3 in. high, 1 in. thick at the top, cracked and streaked, silky, with minute black scales, solid but fibrous, not the least stuffed or hollow. Gills very broad, undulate, distant, having a tendency to become forked and anastomosing, brittle, often marked with raised lines, cinereous, powdery; interstices slightly veined;

edge at length black. Individuals occur much thicker and larger.

Having at length found this species, I am able to state positively that it is not the plant of Fries; the specific name refers to the colour, not to the scent, which is very slight, and by no means nitrous. It is not at all moist or viscid, but has a clothy feel, being virgate and silky. The gills are not olivaceous when rubbed. Its affinities are rather with *Ag. argyraceus* than with *Hygrophorus*. (Berk.)

Very variable in form and size, and more especially in the colour of the pileus; nevertheless it is easily recognised by the form and colour of the large, broad gills, and by the extremely fragile flesh. (Bulliard.)

**Tricholoma terreum.** Schaeff.

Pileus 2–3 in. across, disc fleshy, thin elsewhere; soft, campanulate, then expanded, umbonate, entirely covered with innate downy squamules, dark bluish-grey, sometimes with a tinge of brown; gills cut out behind and adnexed, with a minute decurrent tooth, 2 lines or more broad, margin crenulate, greyish-white; stem 1–3 in. high, $\frac{1}{4}$–$\frac{1}{2}$ in. thick, almost equal, adpressedly fibrillose whitish, stuffed; spores subglobose, 5–6 $\mu$.

*Agaricus terreus*, Schaeffer, t. 64; Cke., Hdbk., p. 31; Cke., Illustr,, pl. 50.

In woods, especially of fir.

Solitary or caespitose, almost without smell; sometimes large and with the pileus wavy and fibrillosely squamulose, sometimes small, regular, pileus papillate and also squamulosely punctate. Pileus grey, bluish, fuscous, &c. (Fries.)

*Var.* **orirubens**, Quelet; Cke., Illustr., pl. 90; Cke., Hdbk., p. 31.

About the size of the typical form; pileus fleshy, convex, fragile, smooth, grey, brownish in the centre; clad with blackish fibrils; stem solid, fibrous, white, streaked with rose at the base; flesh white; gills emarginate, undulated, white with the edge reddish or rose-colour; spores elliptical, 6–7 × 3·5 $\mu$.

On the ground. Smell like new meal.

*Var.* **atrosquamosus**, Chev.; Cke., Hdbk., p. 32; Cke., Illustr., pl, 51.

About the size of the typical form; pileus pale grey, covered with small black scales; gills emarginate, whitish.

On the ground.

## III. RIGIDA.

* *Gills white or pallid, not spotted.*

**Tricholoma macrorhizum.** Lasch.

Smell strong. Pileus 5–8 in. across, flesh thick, firm, white, becoming tinged with yellow when broken; convex then expanded and often more or less depressed at the disc, glabrous and even at first, then becoming cracked in an areolate manner, ochraceous, darker when old; gills deeply emarginate, almost free, hardly crowded, narrowed towards the front, 4–9 lines broad, pallid; stem solid, stout, ventricose, 2–3 in. long, 2 in. thick, very minutely granulated, whitish, ochraceous downwards, and continued downwards as a stout, elongated, rooting base; spores irregularly globose, 5–6 $\mu$ diameter.

*Agaricus macrorhizus*, Lasch, in Linnea, no. 240; Cke., Hdbk., p. 32.

Among grass under oaks, &c.

Smell strong, resembling that of *Tricholoma sulfureum*. (Schulzer.)

The figure in Cooke's Illustrations, pl. 278, cannot, I think, possibly be the present species, although it is called so; the gills are 1 line broad, somewhat decurrent, not at all sinuate or emarginate; what it does in reality represent, I do not know.

**Tricholoma saponaceum.** Fr.

Strong-scented, firm. Pileus 2–4 in. across, flesh thick, reddish when broken or sometimes when intact; convex then expanded, obtuse, often irregular, dry, glabrous, at length cracked into squamules or punctate, livid-brown, often with a tinge of olive; margin naked at first; gills uncinately emarginate, 2 lines broad, thin, distant, quite entire, white then pallid with a tinge of green; stem 2–4 in. long, about $\frac{1}{2}$ in. thick, whitish, glabrous, fibrillose, or

squamulose, unequal, solid, somewhat rooting; spores about $5 \times 4\ \mu$.

*Agaricus saponaceus*, Fries, Obs., ii. p. 101; Cke. Hdbk., p. 32; Cke., Illustr., pl. 91, 216.

In woods.

Smell altogether peculiar, more soapy than nitrous (very different to *Ag. alcalinus*, *Hygrophorus murinaceus*, &c.; always safely distinguished by the compact but not fragile substance, distant gills, pileus with a dry cuticle, glabrous, at length cracked into scales, flesh of pileus and stem becoming reddish when wounded. Stem solid, 2–3 in. long, $\frac{1}{2}$ in. and more thick, often unequal or curved; base attenuated, rooting, pallid; sometimes glabrous, sometimes squamulose when growing in leafy woods early in the season, sometimes in late autumn elegantly reticulated with black fibrils. Pileus fleshy, convex then plane, obtuse, 2–4 in. broad, entirely glabrous, moist in rainy weather, but never viscid, even, then when becoming dry more or less cracked and rivulose, punctate, or broken up into scales; normally livid-brown, but varying to cinereous, greenish-olive, or blackish; margin thin, very glabrous, incurved at first. Flesh whitish, becoming more or less red when cut. Gills uncinately emarginate, distant, thin, quite entire, pallid-white; in a remarkable variety, yellowish. Scarcely any other species is so much confused as the present, yet it is easily distinguished by the soapy smell and the reddish flesh. (Fries.)

**Tricholoma cartilagineum.** Bull.

Pileus 2–3$\frac{1}{2}$ in. across, flesh rather thick, rigid, white; convex when young, obtuse, margin incurved and downy then expanded and undulate or wavy, very obtuse, margin arched, bent down, and persistently incurved; always very dry, densely covered with minute black granules on a white ground; gills emarginate and sinuate, crowded, thin, 2 lines broad, white, then grey but not dingy; stem hollow, short and firm, but fragile, 1–2 in. long, almost 1 in. thick, pure white, surface even, glabrous, polished.

*Agaricus* (*Tricholoma*) *cartilagineum*, Fries, Icon., t. 33; Cke., Hdbk., p. 33; Cke., Illustr., pl. 166.

Among grass in damp places in pine woods, &c.

Smell none. Pileus minutely and very densely granulated from the first, but the granules are entirely innate, and are formed by the cuticle. The granules are at first in contact, and the pileus black, when adult these become true granules separated by white cracks. (Fries.)

Smell like new flour. (Berk.)

**Tricholoma tenuiceps.** Cke. & Mass.

Pileus 2–3 in. across, flesh except at the disc very thin, white; convex, obtuse or sometimes slightly gibbous, dry, granular, opaque, everywhere sooty-brown; gills adnexed and rounded behind, 2 lines broad, narrowed in front, ventricose, white; stem 2–3 in. long, $\frac{2}{3}$–1 in. thick, solid, tough, slightly thinner upwards, ochraceous-white, the entire surface minutely granular, base abrupt, furnished with long, spreading, cord-like mycelium; spores subglobose, 6–7 $\mu$ diameter.

*Agaricus* (*Tricholoma*) *tenuiceps*, Cke. and Massee, Cke., Hdbk., p. 398; Cke., Illustr., pl. 1166.

Among grass under trees.

A very distinct species, easily known by the very thin, blackish-brown pileus, and the spreading cord-like mycelium resembling that of *Collybia platyphylla*, var. *repens*.

Solitary or in clusters of 2–3.

**Tricholoma loricatum.** Fr.

Smell strong, unpleasant. Pileus 1–2 in. across, flesh thin, whitish; cartilaginous, tough, campanulate, then convex, somewhat undulate, slightly viscid when moist, somewhat papillose; cuticle thick, horny, separable; umber-brown or livid-brown, paler towards the margin; gills narrowed behind and almost free, closely crowded, ventricose, quite entire, watery pallid or whitish straw-colour, readily separating from the pileus; stem 2–3 in. long, 3–4 lines thick, equal or narrowed at the base, flesh fibrous, very tough, imperfectly hollow, often twisted or irregular, brownish brick-red, minutely fibrillosely striate under a lens.

*Agaricus* (*Tricholoma*) *loricatus*, Fries, Epicr., p. 37; Cke., Hdbk., p. 33.

In woods.

Smell strong, unpleasant. Tough; remarkable for the horny, separable cuticle. Stem sometimes pale.

**Tricholoma atrocinereum.** Pers.

Pileus 1½–2 in. across, flesh rather thick, dark and hyaline when moist, hygrophanous; convex then plane, glabrous, dry, opaque, grey, the prominent disc darker, at first even and entire, at length cracked and incised, margin upturned, but not becoming broken up into squamules; gills variable, sometimes free, sometimes with a decurrent tooth, or arcuately adnexed, more or less ventricose, thin, crowded, hyaline white; stem 2–3 in. long, 4 lines thick, equal, cylindrical; striate from adpressed, longitudinal fibres, apex naked, glabrous, whitish, stuffed,

*Agaricus atrocinerius*, Pers., Syn., p. 348; Cke., Hdbk., p. 33; Cke., Illustr., pl. 52A.

Among grass, &c.

Allied to a form of *T. cuneifolium*, but distinguished by the regular pileus not becoming broken up into scales, form of the gills, and naked apex of stem. (Fries.)

**Tricholoma cuneifolium.** Fr.

Smell strong, like meal. Pileus up to 1 in. across, flesh thin; convex then plane, dry, glabrous, soon broken up into squamules, brown, margin often upturned and split; gills broad and obliquely truncate, narrowed behind and adnexed, with a decurrent tooth, thin, crowded, white; stem up to 1 in. long, 1–1½ line thick, hollow, narrowed at the base, pallid, apex with white meal; spores subglobose, 3·5 $\mu$ diameter.

*Agaricus cuneifolius*, Fries, Obs., ii. p. 99; Cke., Hdbk., p. 33; Cke., Illustr., pl. 52B.

Among grass in sunny places, also in woods.

Readily distinguished by the small size, form of gills and strong smell of meal.

*Var.* **cinereo-rimosus**, Batsch; Cke., Hdbk., p. 34; Cke., Illustr., pl. 261.

Pileus up to 2 in. across, pale grey with a pink tinge, soon becoming concentrically cracked, interstices white; gills broad, rather distant.

Among grass.

** *Gills discoloured, spotted with rufous or grey.*

**Tricholoma crassifolium.** Berk.

Strong-scented. Pileus about 2–4 in. across, flesh white, thick at the disc, very thin elsewhere; somewhat campanulate, then expanded and generally wavy, umbonate, ochraceous; disc darker and tinged umber; gills sinuate and nearly free, thick, moderately distant, becoming yellowish and stained with brown; stem 1–1½ in. long, ¼ in. thick, sometimes more, nearly equal, solid, paler than the pileus, pruinose.

*Agaricus* (*Tricholoma*) *crassifolius*, Berk., Outl., p. 100; Cke., Hdbk., p. 34; Cke., Illustr., pl. 92.

In fir woods.

Recognised by the strong small, ochraceous pileus, and more especially the thick gills, which are very unusual in the present genus.

**Tricholoma tumidum.** Pers.

Pileus about 3 in. across, flesh rather thick, white; deformed and bullate or inflated, then expanded and wavy, at length cracking, damp in rainy weather, rather shining when dry, livid-grey, spotted and variegated, margin thin, more or less lobed, incurved at first: gills emarginate, ½ in. broad, thickest at the base, rather distant, pure white then grey with a rufescent tinge; stem solid, flesh fibrous, stout, 3 in. long, ¾ in. thick, sometimes inflated, glabrous, striate, pure white, base often attenuated and rooting; spores elliptical, 6 × 4 $\mu$.

*Agaricus tumidus*, Persoon, Syn., p. 350; Cke., Hdbk. p. 34; Cke., Illustr., pl. 93.

In pine woods, &c.

A tall species, somewhat cartilaginous, at length rigid and fragile, smell weak, not unpleasant. Dimensions very variable; sometimes, when growing among high moss, the stem is elongated and slender, and the pileus smaller. Allied to the *Difformes* section of *Clitocybe*. (Fries.)

*Var.* **Keithii**, Phil. & Plow.; Cke., Hdbk., p. 34.

This differs from the type in its cinero-rufescent pileus,

less turgid, dirty white stem, cuticle not so brown, innate fibres, and in being tinged with red, especially near the base. In some of these characters it agrees with *T. sudum*, from which it differs in its undulating pileus, distant gills, and often rooting stem. The whole plant is fragile, the gills have a cinereous tinge, usually at length becoming rufescent. It frequently has a powerful odour of new meal, and is intermediate between *T. sudum* and *T. tumidum*, but is nearer the latter. (Phil. & Plow.)

In pine woods.

**Tricholoma sudum.** Fr.

Pileus 2–3 in. across, flesh thickish, firm, white; convex then plane or even upturned, obtuse, dry, broken up into scales, rufous or brownish-rufous; gills deeply emarginate with a decurrent tooth, about 3 lines broad, crowded, whitish, margin rufescent, but not truly spotted with rufous; stem about 3 in. long, $\frac{1}{2}$ in. and more thick, slightly thinner upwards, punctate with minute squamules but not fibrillose, pallid with a slight tinge of rufous, base with white down, solid; spores elliptical, 6–7 × 3·5 $\mu$.

*Agaricus* (*Tricholoma*) *sudus*, Fries, Epicr., p. 38.

Among grass in woods, &c.

Somewhat resembling *T. arcuatum*; the latter differs in the bulbous stem.

**Tricholoma virgatum.** Fr.

Pileus 2–3 in. across, flesh thin, greyish-white, rigid; convex then expanded, somewhat umbonate, always very dry, glabrous and almost even, but elegantly virgate or streaked with fine black lines formed by innate fibrils; greyish, umbo often darker, broken up into squamules when old; margin straight and naked at first; gills broadly emarginate, 3–5 lines broad, crowded, at length greyish; stem about 3 in. long, $\frac{1}{2}$ in. and more thick, equal, or the base more or less swollen, striate, usually glabrous, sometimes squamulose, whitish both outside and inside, firm, solid; spores subglobose, 6–8 × 5–6 $\mu$.

*Agaricus* (*Tricholoma*) *virgatus*, Fries, Epicr., p. 39; Cke., Hdbk., p. 35; Cke., Illustr., pl. 167.

In pine and other woods.

Usually solitary. A well-marked species, being the only

one with a perfectly dry, virgate pileus; all the other virgate species, as *T. portentosum*, &c., having the pileus viscid. Taste bitter when young, but insipid at maturity.

The figure in "Illustrations" is too dark. The pileus is usually white with a slight cinereous tinge. (Cooke.)

## IV. SERICELLA.

* *Gills broad, rather distant. Smell strong.*

**Tricholoma sulphureum.** Fr.

Foetid. Pileus 1–3 in. across, flesh rather thick; subglobose, then soon convexo-plane, rather umbonate, at length depressed, slightly silky at first, soon almost glabrous and even, pale sulphur-colour, sometimes with a rufescent tinge; gills adnexed, narrowed behind, arcuately emarginate, rather thick, distant, distinct, bright sulphur-colour; stem 2–4 in. long, 3–6 lines thick, almost equal, often curved, almost glabrous, striate, sulphur-yellow; same colour inside, and fibrous; spores $9-10 \times 5$ $\mu$.

*Agaricus* (*Tricholoma*) *sulfureus*, Fries, Syst. Myc., i. p. 110; Cke., Hdbk., p. 35; Cke., Illustr., pl. 62.

In woods.

Gregarious. Distinguished by the sulphur-yellow colour of every part, and the strong, penetrating, unpleasant smell.

Pileus 1–2 in. broad, fleshy, obtuse, at length expanded or depressed with a slight appearance of an umbo, sometimes flexuous and irregular, dirty yellow, or ochraceous-umber, darker in the centre, the margin at first involute and minutely tomentose, the whole clothed with extremely minute silkiness or squamulae, so as to give it a pulverulent appearance, retaining the impression of the fingers; flesh yellow. Gills subdistant, rounded, flexuous, emarginate or acuto-adnate. Stem 2 in. or more high, 4 lines thick, occasionally subbulbous, stuffed, sometimes at length hollow, the surface of the cavity rather slimy, yellow within, furnished at the base occasionally with many rather strong yellow fibrous roots. Odour disagreeable, at first farinaceous, then like that of *Hemerocallis flava*. Taste unpleasant but acrid. (Berk.)

**Tricholoma opicum.** Fr.

Pileus 1–1½ in. across, flesh rather thin, becoming greyish; convex then expanded, obtusely-umbonate, at length usually upturned and split, very dry, even at first, then minutely squamulose. grey; gills broadly emarginate, ventricose, rather thick, scarcely distant, hoary; stem 2–3 in. long, 2–3 lines thick, equal, fibrillose, becoming almost glabrous, pallid then greyish, stuffed.

*Agaricus* (*Tricholoma*) *opicus*, Fries, Epicr., p. 39.

Among moss, in pine woods, &c.

Inodorous. Somewhat resembling *T. saponaceum*, but distinguished by the absence of smell. This same character, and difference in colour separate the present from *T. sulphureum*, with which it agrees in size and gill structure.

**Tricholoma bufonium.** Pers.

Pileus 1½–2½ in. across, flesh thick; convex then expanded or almost plane, somewhat umbonate or gibbous, silky at first, soon almost glabrous, punctately rugose, opaque, purplish-brown, blackish-umber, tan-colour, &c.; gills slightly sinuate, and more or less decurrent, rather distant, yellowish tan-colour then pallid; stem about 2–3 in. long, 3–4 lines thick almost equal or slightly ventricose towards the base, flocculose, coloured like the pileus, stuffed; spores subglobose, 4–5 $\mu$.

*Agaricus bufonius*, Persoon, Syn., p. 359; Cke., Illustr., pl. 181; Cke., Hdbk., p. 35.

In pine woods.

Distinguished by the tan-coloured gills and flocculose or downy stem.

**Tricholoma lascivum.** Fr.

Pileus about 2 in. across, flesh rather thin, persistently white; convex then plane, at length depressed, obtuse, indistinctly silky, dry, tan-colour becoming pallid; margin at first incurved; gills arcuately adnexed, at length arcuately decurrent, horizontal, thin and crowded; stem about 2 in. long, solid, rigid, entirely fibrous, equal, externally fibrillose, whitish, apex with white meal, base rooting and downy; spores 8–10 × 4–5 $\mu$.

*Agaricus* (*Tricholoma*) *lascivus*, Fries, Epicr., p. 110; Cke., Hdbk., p. 35; Cke., Illustr., pl. 94.

In mixed woods.

Agreeing in many points of structure, and in the strong smell, with *T. sulphureum* and *T. inamoenum*, but differing from both in the crowded gills, and in colour.

Odour of gas tar. (Berk.)

*Var.* **robustus**, Cke., Hdbk., p. 36; Cke., Illustr., pl. 217.

More robust than the type. Pileus almost white, silky, not viscid; scarcely any perceptible odour.

Pileus 2½ in. broad, convex, at length depressed, firm, fleshy, under the lens minutely adpresso-silky, margin at first involute; flesh white. Gills white, when young arcuato-adnate, nearly horizontal, when old sub-decurrent, very brittle, closer than in the last, but still not very close. Stem firm, solid, composed of fibres, more or less fibrillose or fibrillose squamose, the fibrillae curved up from below; paler than the pileus, rooting, downy at the base, not bulbose, apex pruinose. Odour in all respects like the last (*A. sulphureus*), only not quite so strong. (Berk.)

**Tricholoma inamoenum.** Fr.

Foetid. Pileus 1–2½ in. across, flesh thin but firm, pure white; convex then expanded, rather umbonate, very dry, slightly silky then even, dingy white; gills variously adfixed, normally emarginate with a decurrent tooth, but sometimes truly adnato-decurrent, plane, rather thick, very broad and very distant, distinct, pure white; stem 3–4 in. long, 3·6 lines thick, equal, almost glabrous, white, solid, firm, often rooting and downy when growing among moss; spores 9–10 × 6–7.

*Agaricus (Tricholoma) inamoenus*, Fries, Epicr., p. 44; Cke., Hdbk., p. 36; Cke., Illustr., pl. 77.

In pine woods, &c.

Our only white *Tricholoma* with a strong smell. The smell is something like that of *T. sulfureum*, but stronger and more disagreeable.

Pileus 1–3 in. broad, convex, with or without an umbo, fleshy, but not very thick on the margin, under the lens adpresso-silky; white with a slight tinge of ochre in the centre. Gills broad (½–¾ of an in.), distant, emarginate. Stem 2 in. or more long, 3–6 lines thick, equal, tough, composed of fibres, not rooting in my specimens. Odour like

that of *Trich. sulphurea.* I find a state of this with the pileus singularly compressed all round, minutely pitted and wrinkled, the epidermis cracked, so as to appear tesselated. Fries in his specific character describes it as smooth, but in his subjoined remark implies that it is "sericeo-adpressus." *Hygr. cossus*, Sow., with which Fries compares it in his Elenchus is certainly quite different, as stated above. My specimens have not so much the habit of that, as of *Trich. cinerascens*, Bull., or *Trich. columbetta.* (Berk.)

*Var.* **insignis**, Mass. Gills decurrent, truly distant.

The smell is so precisely like that of the normal *A. inamoenus*, that I follow Fries in considering it a mere variety. (B. & Br.)

** *Gills thin, crowded, narrow. Small; inodorous.*

**Tricholoma cerinum.** Pers.

Pileus 1–1½ in. across, flesh thin, firm, white; convex then expanded, obtuse, at length depressed, very opaque and remarkably dry, even and almost glabrous, dingy wax-colour or brownish; gills sinuate, adnexed, separating from the stem, horizontal, plane, very thin and crowded, 1 line broad, dark yellow or wax-colour; stem about 1 in. long, 2–3 lines thick, equal, naked, fibrillosely striate, yellow, base sometimes brown, stuffed.

*Agaricus cerinus*, Persoon, Syn., p. 321; Cke., Hdbk., p. 36; Cke., Illustr., pl. 95B.

In dry pine woods, &c.

Small, the structure of the stem inclines to that characteristic of *Clitocybe*, but the gills are sinuate when perfectly developed. (Fries.)

The yellow gills, contrasted with the brown pileus, make it a very pretty species. The pileus in our specimens is brown, which seems to be the more usual colour; but it is sometimes yellow. (B. & Br.)

**Tricholoma fallax.** Peck.

Pileus about 1 in. across, flesh thin; convex then expanded, rarely depressed at the centre, moist, smooth, yellow,

disc sometimes rufous; gills adnexed, rounded behind, crowded, white then yellowish; stem about 1 in. long, $1\frac{1}{2}$ line thick, smooth, pale yellow, stuffed then hollow, base sometimes narrowed; spores elliptical, 4–5 × 3 $\mu$.

*Agaricus* (*Tricholoma*) *fallax*, Peck, 25th Report, State Mus., N.Y., t. i. f. 5–8; Cke., Hdbk., p. 364; Cke., Illustr., pl. 1151A.

Under firs.

Distinguished among the small species of *Tricholoma* by the clear but pale yellow pileus and stem, and the yellowish gills.

**Tricholoma ionides.** Bull.

Pileus 1–2 in. across, disc fleshy, campanulate, then convex, at length plane, umbonate, even, almost glabrous, usually dingy violet, becoming pale; gills emarginate with a slight decurrent tooth, crowded, thin, margin eroded, $1\frac{1}{2}$ line broad, white then becoming pallid; stem 1–$1\frac{1}{2}$ in long, elastic, often curved at the base, fibrillose, coloured like the pileus, stuffed; spores pip-shaped, 6–7 × 3·5 $\mu$.

*Agaricus ionides*, Bull., Champ., t. 533, f. 3; Cke., Hdbk., p. 36; Cke., Illustr., pl. 95A.

In woods.

Pileus violet, lilac, or brownish-purple; distinguished from *T. humile* and *T. sordidum* by the white gills.

*Var.* **parvus**, Lasch, Cke., Hdbk., p. 37.

Reddish-brown, pileus somewhat fleshy, campanulate then expanded (slightly silky), stem stuffed, then hollow, floccose. attenuated downwards; gills adnexed with a tooth, eroded, powdered with white.

In a stove.

**Tricholoma carneum.** Bull.

Pileus about 1 in. across, flesh thin, tough, snow-white; hemispherical at first, then convex and regular, obtuse, at length expanded and upturned, often with an umbo, usually wavy and sometimes excentric, even, glabrous, dry, not at all hygrophanous, reddish flesh-colour, at length whitish; gills rounded behind and almost free, horizontal, closely crowded, broadest behind, 1–$1\frac{1}{2}$ line broad, pure white; stem up to

1 in. long, sometimes very short, 1–2 lines thick, apex thickest, and narrowing towards the base, pale reddish-pink becoming almost white, apex somewhat pruinose, tough and fibrous almost cartilaginous, rigid, stuffed then hollow; spores 3 × 2 $\mu$.

*Agaricus carneus*, Bull., t. 533; Cke., Hdbk., p. 37; Cke., Illustr., pl. 96A.

Among grass, by-paths in woods, &c.

In general habit and stem structure agreeing with *Collybia*, but placed here on account of its evident affinity with *T. paeonium* and *T. ionides*. (Fries.)

**Tricholoma caelatum.** Fr.

Pileus up to 1 in. across, flesh thin; convex but with the centre depressed, not striate, glabrous and brown when growing, but flocculose, cracked and pallid grey when dry; gills sinuate, adnate with a decurrent tooth, crowded, slightly arcuate, dingy white or greyish; stem up to 1 in, long, 1–1½ line thick, equal, or the apex slightly thickened, brown, apex obsoletely pruinose, tough, elastic, but not cartilaginous, stuffed in small specimens, often hollow when large; spores elliptical, 8 × 5 $\mu$.

*Agaricus* (*Tricholoma*) *caelatum*, Fries, Epicr., p. 42; Cke., Hdbk., p. 37; Cke., Illustr., pl. 96B.

On the ground, especially scorched places.

A very peculiar species, entire habit remarkable, and not to be compared with any other species of *Tricholoma*. From the constantly umbilicate pileus, at first sight resembling an *Omphalia*, but the stem is not at all cartilaginous, and the gills evidently sinuate behind. Somewhat agreeing with *Tricholoma putidum* in colour and stature, but in this species the pileus is umbonate, smell strong of new meal, and other points of difference. There are certain affinities with certain species of *Clitocybe*, as *C. hirneola* and *C. parilis*, with which the present species agrees in size, colour, and the dingy white spores, but again, these differ widely in the decurrent gills and many other points. (Fries.)

## V. GUTTATA.

### * *Gills whitish.*

**Tricholoma gambosum.** Fr.

Smell resembling fresh meal. Pileus 3-5 in. across, flesh thick, soft, fragile, white; hemispherical then convex, at length expanded, obtuse, wavy, even, glabrous, but marked with drop-like spots, at length cracking, but not becoming truly broken up into squamules, pallid-tan, margin incurved and downy at first; gills emarginate and adnexed, with a somewhat decurrent tooth, sinuate and decurrent when old, crowded, ventricose, 2–3 lines broad, whitish; stem 2–2½ in. long, ½–1 in. thick, almost equal, base often curved and ascending when growing in clusters, white, apex downy, solid; spores elliptical, 13–14 × 8–9 μ.

*Agaricus* (*Tricholoma*) *gambosus*, Fries., Epicr., p. 43; Cke., Hdbk., p. 37; Cke., Illustr., pl. 63.

In pastures, &c. Spring.

Often growing in circles, or tufted. Smell pleasant, like new meal.

### ** *Gills discoloured, rufous or smoky.*

**Tricholoma amethystinum.** Scop.

Pileus 1½–2 in. across, flesh thick, white; convex then expanded and often wavy or with the margin slightly upturned, obtuse or with a trace of an umbo, glabrous, even, moist, livid and more or less spotted or stained with blue, margin paler and wrinkled; gills somewhat adnate, 1½ line broad, crowded, white then rufescent; stem 1½–2 in. long, 3–5 lines thick, attenuated at the base, paler than the pileus, solid, often slightly bent.

*Agaricus amethystinus*, Scopoli, Carn., ii. p. 437; Cke., Hdbk., p. 38; Cke., Illustr., pl. 262.

In pine woods.

Pileus pale with a dingy olive tinge, and spotted with clear blue.

**Tricholoma albellum.** Fr.

Pileus 2–3 in. across, flesh thick at the disc, becoming thin towards the margin, soft, white, unchangeable; convex then

expanded and gibbous, white then pallid, greyish when dry, often mottled or with scale-like spots, margin naked; gills slightly adnexed, much narrowed behind, broadest in front, closely crowded, entire, white; stem ovately bulbous, cylindrical above, 1½–2 in. long, up to ½ in. thick, fibrillosely striate, white, solid; spores elliptical, 6–7 × 4 μ.

*Agaricus* (*Tricholoma*) *albellus*, Fries, Epicr., p. 43; Cke., Hdbk., p. 38; Cke., Illustr., pl. 299.

In woods, &c.

Appearing earlier in the season than *T. gambosum*, found in April. Sometimes solitary, large; sometimes densely caespitose and smaller. Smell and taste pleasant, weak. Pileus regular, not turning yellowish, white when fresh, then greyish-brown, spotted here and there. Often confounded with a small form of *A. gambosus*. (Fries.)

*T. gambosum* differs in the gills being attached by a decurrent tooth; stem downy at the apex; the pileus is usually very pale tan, but sometimes whitish.

**Tricholoma boreale.** Fr.

Pileus about 2 in. across, flesh thick at the disc and becoming gradually thin towards the margin, soft, white; irregular, somewhat umbonate, glabrous, rivulose or minutely downy when dry, flesh-colour then whitish; margin naked, even; gills emarginate, thin, crowded, white; stem 2–3 in. long, ½–⅔ in. thick, solid, elastic, glabrous, unequal, attenuated at the base, whitish; spores subglobose, 4–5 μ diameter.

*Agaricus* (*Tricholoma*) *borealis*, Fries, Epicr., p. 44; Cke., Hdbk., p. 365; Cke., Illustr., pl. 956? (differing widely from the figure and description of Fries in the very distant dingy gills).

Among grass in woods, &c.

Truly gregarious, somewhat caespitose, smell resembling new meal, taste pleasant, hence without doubt esculent, and with allied forms may be compared with *T. gambosum*. Stem solid, elastic, 2–3 in. long, ⅔ in. thick, attenuated downwards, often twisted and incurved, glabrous, apex indistinctly pruinose, always white. Pileus fleshy, variable in form, usually convex and umbonate, unequal, often wavy, not spotted, glabrous, minutely cracked when dry, about 2 in.

broad, flesh-colour at first, but becoming pale when old and whitish tan; margin thin, naked, involute. Flesh soft, white, soon infested with maggots. Gills emarginate, with a decurrent tooth, thin, crowded, whitish, colour not changing. Among the tribe *Guttata*, where the species are closely allied, and of which *T. gambosum* is typical, the present species is remarkable for the flesh-coloured, unspotted pileus. Most nearly allied to *T. albellum*, which however appears earlier in the season and differs in colour, &c. (Fries.)

**Tricholoma tigrinum.** Schaeff.

Pileus 1½–2 in. across, flesh thick at the disc, margin thin, white; convex then expanding and often wavy, glabrous, pale brown or greyish-white, with darker, crowded spots, but not broken up; gills rounded behind, crowded, narrow, white; stem about 1 in. long and nearly or quite as thick, tumid, firm, white, pruinose, solid.

*Agaricus tigrinus*, Schaeff., t. 89; Cke., Hdbk., p. 38; Cke., Illustr., pl. 64.

In fir woods, &c.

Stout, smell not remarkable, like fresh meal. Stem 1 in. long and thick, very compact, solid, pruinose, white. Pileus compactly fleshy, in my specimens convex then expanded, obtuse, wavy, 2 in. broad, pale brown, variegated with crowded, darker spots. Flesh thick, white, unchangeable, thin towards the involute margin. Gills rounded behind, at length with a decurrent tooth, crowded, narrow, white, at length becoming dark. (Fries.)

Odour foetid. (Cooke.)

The pileus is sometimes whitish or with a tinge of grey, and the spots almost black. Differs from *T. guttatum* in the pileus not being broken up, and the margin even.

**Tricholoma pes-caprae.** Fr.

Pileus fleshy at the disc, the rest thin, conical then expanded, umbonate, unequal, 1–2 in. across when young, entire; expanded when adult, and then 3–4 in. across, cracked, greyish-brown, variegated, margin thin, naked; gills emarginate, up to ¼ in. broad, at length distant, white then greyish; stem solid, about 3 in. long, scarcely ½ in. thick, equal or attenuated downwards, naked, white; spores elliptical, 8 × 5 $\mu$.

*Agaricus* (*Tricholoma*) *pes-caprae*, Fries, Epicr., p. 45 ; Cke., Hdbk., p. 365.

Among grass, leaves, &c.

Gregarious, subcaespitose, fragile, much more slender than neighbouring species. (Fries.)

*Var.* **multiformis**, Schaeff., t. 14 ; Cke., Illustr., pl. 946.

Form variable, caespitose, smaller and flesh of pileus thinner than in the typical form.

## VI. SPONGIOSA.

### * *Gills not discoloured.*

**Tricholoma patulum.** Fr.

Pileus 2½–4 in. across, flesh thin, not compact, white; firm, convex then plane, obtuse, often wavy, even, glabrous, not spotted, pale ashy-grey; gills constantly and equally emarginate, almost free, crowded, 2 lines broad, plane, sides veined, whitish; stem 2–4 in. long, ½–1 in. thick, equal, rather elastic, glabrous, pure white; flesh fibrous, solid, firm; spores elliptical, 7–8 × 4 $\mu$.

*Agaricus* (*Tricholoma*) *patulus*, Fries, Epicr., p. 47 ; Cke., Hdbk., p. 39 ; Cke., Illustr., pl. 279.

In mossy meadows, under birches, &c.

Solitary, or growing in troops. Inodorous. Cannot be compared with any other species of *Tricholoma*, but resembling certain caespitose species of *Clitocybe*, from which it is quite distinct in the remarkably emarginate, and almost free gills. The colour somewhat resembles that of *Collybia platyphylla*, but the two are not at all allied, the last-named differing in the thinner, virgate pileus and very broad gills.

Very luxuriant in rainy seasons, and when the weather is very dry it is entirely absent. In dry seasons it is solitary, whereas during rainy seasons it is densely caespitose. (Fries.)

**Tricholoma Schumacheri.** Fr.

Pileus about 3 in. across, flesh thick, spongy, white, compact; convex then expanded, obtuse, regular, even, glabrous, moist in rainy weather but not hygrophanous,

uniformly livid-grey, the extreme margin projecting beyond the gills and incurved; gills emarginate, closely crowded, plane, 3–4 lines broad, white; stem solid, stout, 3–4 in. long, up to ½ in. thick, equal, base downy, and sometimes ventricosely bulbous, naked, slightly striate, white, fibrous outside.

*Agaricus* (*Tricholoma*) *Schumacheri*, Epicr., p. 45; Cke., Hdbk., p. 38; Cke., Illustr., pl. 168.

In back woods, &c.

Stature of *Tricholoma personatum*, colour resembling *Clitocybe nebularis*. (Fries.)

**Tricholoma circumtectum.** C. & M.

Pileus 2–3 in. across, flesh thick, white; convex, dry, very obtusely umbonate at first, or quite obtuse, rarely becoming slightly depressed, margin incurved, downy, wavy; often cracking a little when old, disc dingy pale tan or ochraceous, greenish-olive towards the margin, at length altogether pale tan; gills slightly sinuate, adnexed, 1½–2 lines broad, scarcely crowded, persistently white; stem about 1 in long, ½–¾ in thick, usually more or less swollen near the base, but always tapering more or less to a point at the extreme base, striate, whitish, solid; spores subglobose, 4–5 $\mu$ diameter.

*Agaricus* (*Tricholoma*) *circumtectus*, Cooke & Massee; Cke., Hdbk., p. 382; Cke., Illustr., pl. 1182.

On the ground under trees.

A well-marked species, known by the pileus being dingy olive at first then tan-colour, the change starting at the disc, downy margin of pileus, and pointed base of stem.

**Tricholoma arcuatum.** Bull.

Pileus 2–3 in. across, flesh thick, soft, hygrophanous, brownish-white, at length usually tan-colour; at first compact, then very soft, convex then plane, obtuse, even, glabrous, moist in rainy weather, blackish-umber or rufous-brown, becoming pale and discoloured with age; gills rounded behind, sinuate and with a decurrent tooth, arcuate, at length plane, crowded, narrow, pure white; stem solid, firm, 1½ in long, ½ in. thick, incrassated below and more or less bulbous, at first squamulosely fibrillose, then naked and somewhat reticulated, pale brown, base blackish, spongy within.

*Agaricus arcuatus*, Bulliard, Champ. Fr., t. 589, f. 1; Cke., Hdbk., p. 39; Cke., Illustr., pl. 218A.

Among grass in pastures, &c.

Colour and size variable. Allied to *T. panaeolum* and *T. melaleucum;* the former differs in the greyish gills, and the latter in the white flesh.

**Tricholoma oreinum.** Fr.

Pileus about 1 in. across, flesh rather thick, white; convex then plane, obtuse, even, glabrous, fuscous then livid; gills rounded behind, free, crowded, plane, up to 1 line broad, white; stem about 1 in. long, and 1½ line thick, with a slight swelling at the base, otherwise equal, whitish, apex with white squamules, solid.

*Agaricus* (*Tricholoma*) *oreinus*, Fries, Syst. Myc., i. p. 52; Cke., Hdbk., p. 39; Cke., Illustr., pl. 218B.

On heaths, &c.

The gills are equally broad up to the margin, beyond which they project, a character that separates this species from *T. humilum*. (Fries.)

**Tricholoma album.** Schaeff.

Entirely white. Taste acrid. Pileus 3–4 in. across, flesh thick; convex then expanded, very dry, even, disc sometimes yellowish; gills emarginate, about 3 lines broad, somewhat crowded, not changing colour; stem about 3 in. long and ½ in. thick, attenuated upwards, almost naked, elastic, solid.

*Agaricus albus*, Schaeffer, t. 256 (slender form); Fries, Icon., p. 39, pl. 43; Cke., Hdbk., p. 39; Cke., Illustr., pl. 65 (too ochraceous).

In woods.

Size very variable, sometimes very robust, at others slender. Entirely pure white, sometimes becoming yellowish, especially the disc. Smell weak but taste bitter. (Fries.)

**Tricholoma leucocephalum.** Fr.

Pure white. Smell strong, pleasant, resembling new meal. Pileus about 1½ in. across, flesh thin, compact, tough; convex then plane, obtuse, even, moist, glabrous, but covered with pure white silky down when young; margin acute, spreading, glabrous; gills rounded behind and almost free, crowded thin, quite entire, clear white; stem up to 2 in.

long. 3 lines thick; hollow, fibrous but polished and somewhat cartilaginous externally, base solid, attenuated, rooting, twisted, even, glabrous; spores subglobose minutely echinulate, 9–10 × 7–8 $\mu$.

*Agaricus (Tricholoma) leucocephalus*, Fries, Epicr., p. 47; Cke., Hdbk., p. 40; Cke., Illustr., pl. 78.

On naked ground, also among grass, &c.

*T. album* somewhat resembles the present species, but differs in being inodorous. *T. inamoenum* differs in the very strong disagreeable smell, and the very broad gills.

** *Gills discoloured.*

**Tricholoma militare.** Lasch.

Pileus 4–7 in. across, flesh thick, firm, white; pileus at first convex and gibbous, with the margin incurved and furnished with white floccose down, then expanded and more or less plane or depressed and wavy, almost glabrous, viscid, cinnamon or yellowish, margin even; gills emarginate, slightly crowded, whitish, at length spotted, 2 lines broad, edge becoming torn; stem 3½–5 in. long, up to 1 in. thick at the somewhat bulbous or thickened base, squamulose or coarsely fibrillose, pallid, solid.

*Agaricus militaris*, Lasch, Linnea, no. 490; Cke., Hdbk., p. 40; Cke., Illustr., pl. 169.

In woods, &c.

Smell and taste unpleasant. Differs from *Tricholoma civile* in the strong smell and spotted gills.

**Tricholoma civile.** Fr.

Pileus about 3 in. across, flesh white, soft, rather thick; convex then almost plane, even, glabrous, cuticle separable, rather viscid, gilvous or pale yellowish brown; gills deeply emarginate, 2–3 lines broad, crowded, white then yellowish, not spotted; stem 2–2¾ in. long, 3–5 lines thick, solid, soft, fragile, whitish, fibrillosely squamulose.

*Agaricus (Tricholoma) civilis*, Fries, Icones, p. 38, t. 42; Cke., Hdbk., p. 40.

In pine woods.

Stem solid, soft inside, fragile, narrowed upwards from the incrassated base, 2 in. and more long, fibrillose or

squamulose, whitish. Pileus truly fleshy, very soft and fragile, convex then plane, obtuse, 3 in. broad, even, very glabrous, almost viscid when moist, gilvous then becoming pale, not becoming discoloured, never virgate, disc darker, pellicle separable. Flesh spongy, whitish. Gills deeply sinuate, almost free, crowded, 3 lines broad, very soft, white then pallid or yellowish. Inodorous. *Tricholoma militare* differs in the strong smell, margin of pileus at first involute and pruinose, gills spotted. (Fries.)

**Tricholoma duracinum.** Cooke.

Pileus 2–2½ in. across, disc very fleshy, margin thin, flesh nearly white, firm; convex, broadly gibbous, dry, smooth, shining, grey with an olive tinge, margin incurved; gills emarginate, 1 line broad, arcuate. crowded, grey; stem about 2 in. long, 1 in. thick near the base, attenuated upwards, striate below, reticulately squamose above, paler than the pileus, or greyish-white, solid.

*Agaricus* (*Tricholoma*) *duracinus*, Cooke, Grev., xii. p. 41; Cke., Illustr., pl. 640.

On the ground under cedars.

Pileus 3 in. diameter, stem 3 in. long, 1¼ in. thick at the base, nearly an inch at the apex. Fleshy disc nearly an inch thick. Gills little more than a line broad. Upper part of the stem minutely squamose in a peculiar reticulated manner. Whole fungus cinereous and firm. (Cooke.)

**Tricholoma personatum.** Fr.

Pileus about 3 in. across, flesh thick, white, firm then soft; convex then expanded, regular, glabrous, moist, margin slightly projecting beyond the gills, at first incurved and pruinosely downy, yellowish tan-colour, sometimes greyish or with a lilac tinge; gills rounded behind and almost free, 2 lines broad, crowded, violet then dingy; stem 2 in. long, ½–⅔ in. thick, rather bulbous, downy, coloured like the pileus, often with a violet tinge, solid; spores elliptical, 8–10 × 5–6 $\mu$.

*Agaricus* (*Tricholoma*) *personatus*, Fries, Syst. Myc., i. p. 50; Cke., Hdbk., p. 41; Cke., Illustr., pl. 66.

In pastures, woods, &c.

Allied to T. *nudum*, but differs in the downy margin of the pileus, downy stem, and thick flesh of pileus.

Gregarious, frequently in large rings. Pileus 2–6 in. broad, fleshy, firm, pale bistre or purple lilac, occasionally violet, convex, obtuse, very smooth and shining as if oiled but not viscid, margin involute, pulverulento-tomentose. Gills rounded, free, not distant, narrow in front, paler than the pileus, sometimes violet, turning to a dirty flesh-colour, especially when bruised. Stem 1–3 in. high, $\frac{3}{4}$ of an in. thick, firm, bulbous, solid, mottled within towards the apex with watery spots; clothed more or less with villous fibrillae, tinged with violet. Odour like that of *A. oreades*, but rather overpowering, taste pleasant. Sold, according to Sowerby, in Covent Garden Market under the name of Blewitts. (Berk.)

**Tricholoma nudum.** Bull.

Whole fungus tinted violet at first. Pileus 2–2½ in. across, convex then more or less depressed and often wavy, becoming pale, silky and shining when dry, flesh very thin except at the disc, tinted pale lilac, margin persistently incurved, naked; gills rather crowded, narrow, 2–3 lines broad, narrowest behind and subdecurrent, intermediate ones numerous, bright violet when young, brownish-lilac when old; stem 2–3 in. long, up to $\frac{1}{4}$ in thick, subequal, elastic, stuffed, longitudinally fibrillose, slightly powdered with a white bloom; spores elliptical, $7 \times 3{\cdot}5\ \mu$.

*Agaricus nudus*, Bulliard, t. 439; Cke., Hdbk., p. 41; Berk., Outlines, t. 4, f. 7. (It is doubtful whether Cke., Illustr., t. 67 is the right species; it is certainly too robust and yellow in the pileus for the typical form.)

On the ground among leaves, &c, Known from *Tricholoma sordida*, which the present species somewhat resembles, by the perfectly even, naked, incurved margin of the pileus.

Pileus about 2 in. broad, thin, obtuse, plane or subdepressed, at first amethyst-coloured, but changing to a pinky rufous; margin involute. Gills of the same colour as the pileus, rounded behind though sometimes decurrenti-adnate, connected and traversed by veins. Stem 2 in. high, 3–4 lines thick, stuffed with spongy fibres, subequal, at first fibrillose, at length nearly smooth, more or less of the colour of the pileus. (Berk.)

Altogether more slender than *T. personatum*, becoming

very much discoloured, brownish-violet at first, then rufescent, gills darker. Smell acid. (Fries.)

*Var*, **major**, Cke., Hdbk., p. 41 ; Cke., Illustr., pl. 133.

Larger and more robust than the typical form. Pileus 4–5 in. across; stem 4–6 in. high, 1 in. thick, spores $5 \times 2 \cdot 5$ $\mu$.

Among dead leaves.

The figure by Cooke looks very much more like a very large *T. personatum;* the gills are pallid, without a trace of lilac.

**Tricholoma cinerascens.** Bull.

Pileus 2–3 in. across, rather fleshy, convex, then expanded, obtuse, smooth, even, white becoming greyish, margin thin, naked, slightly striate; gills rounded behind, not distinctly sinuate, rather close, white then reddish-grey, finally dingy yellow, easily separating from the pileus; stem stuffed, fibrous, elastic, subequal, smooth ; spores elliptical.

*Agaricus* (*Tricholoma*) *cinerascens*, Bull., Champ., t. 48, f. 2 ; Cke., Hdbk., p. 41 ; Cke., Illustr., t. 170.

In woods.

Caespitose; pileus 2–3 in. across, convex, of a dirty pale ochre, slightly streaked with watery lines, firm but not brittle, clothed with very obscure matted down ; flesh thin, white. Stem curved, slightly streaked, tinged like the pileus, paler above and slightly pulverulent, solid, stringy. Gills moderately distant, at first attenuated behind, at length rounded and easily separating, as in *Paxillus involutus*, white or very slightly ochraceous, stained like the pileus when old and bruised, very slightly anastomosing behind. Spores certainly not cinereous. Smell rather disagreeable, pungent; the stem, however, when broken, smells like new meal. (B. & Br.)

**Tricholoma panaeolum.** Fr.

Pileus about 3 in. across, flesh not thick, and like that of the stem, spongy and absorbing moisture, but the pileus is not by any means hygrophanous, white when dry, convex then flattened or often depressed, obtuse, usually wavy and often excentric, even, sooty-grey, covered with an almost innate grey bloom; gills emarginate or rounded behind, at

length slightly decurrent, closely crowded, quite entire, plane, 2 lines broad, white then grey; stem 1–1½ in long, ½ in. thick, solid, tough, elastic, fibrous outside, spongy within, glabrous, naked not polished, greyish-white; spores subglobose, 5–6 $\mu$. diameter.

*Agaricus* (*Tricholoma*) *panaeolus*, Fries, Epicr., p. 49; Cke., Hdbk., p. 42; Cke., Illustr., pl. 97.

On the ground.

Small, but firm, tough, elastic, smell and taste not unpleasant; colour of pileus sooty, and with a broken up bloom on the surface. (Fries.)

Colour of the pileus dingy or smoky-grey, the gills separate readily from the pileus. (Cooke.)

**Tricholoma cnista.** Fr.

Pileus 2–3 in. across, flesh rather thick, soft, white, unchangeable; convex then plane, obtuse, even, glabrous, moist, not viscid, pale tan or whitish, disc darker, margin incurved, naked, even; gills adnexed, rounded behind, inclined to separate from the pileus, broad, crowded, 3 lines broad, transversely veined, crisped when dry, white, pallid-yellow when bruised; stem 1½–2 in. long, 4 lines thick, equal, even, glabrous, white, tough, solid; spores 9–10 × 4 $\mu$.

*Agaricus* (*Tricholoma*) *cnista*, Fries, Epicr., p. 50.

Among grass in open places, &c.

Similar to *T. panaeolum*, but white, not becoming grey; smell resembling cooked flesh. Stem fleshy, 1½–2 in. long, ½ in. thick, even. Pileus 2–3 in. across, white, somewhat tan-colour, disc rather darker, flesh white. (Fries.)

## VII. HYGROPHANA.

* *Gills whitish, not spotted.*

**Tricholoma melaleucum.** Pers.

Pileus 1½–3 in. across, flesh thin; convex then plane, obsoletely umbonate, glabrous, moist, sooty brown, hygrophanous and passing through various shades of colour as it dries, dingy tan when dry; gills adnexed and emarginate, ventricose, crowded, white; stem 2–3 in. long, 2–4 lines thick,

almost glabrous, whitish, striate with smoky fibrils, stuffed, base thickened; spores elliptic-oblong, 10 × 4–5 μ.

*Agaricus melaleucus*, Persoon, Syn., p. 355; Cke., Hdbk., p. 42; Cke., Illustr., pl. 119.

On the ground in woods, &c.

Distinguished by the sooty black pileus, thin flesh, and white gills. The smaller forms resemble *T. oreinum* in general appearance, the latter is however readily separated by the whitish squamules at the apex of the stem.

Stem stuffed, then hollow, rigid and fragile, elastic when young, 2–3 in. long, 2–3 lines thick (sometimes more), base somewhat incrassated; naked (not pulverulent), but fibrillosely striate, whitish, striae darker. Pileus fleshy, soft, convex then expanded, obsoletely umbonate, 1½–3 in. broad, even, glabrous, usually sooty-blackish when moist, then livid brown, becoming pale when dry; gills emarginate, adnexed, crowded, horizontal, straight (not arcuately falcate as in *A. arcuatus*), broad, more or less ventricose, quite entire, white. Flesh soft, white, not hygrophanous, not yellowish as in *A. arcuatus*. There are several remarkable varieties: (1) *adstringens*, Pers., pileus rigid, gills becoming tinged flesh-colour; (2) *polioleuca*, stem short, firm, apex pruinose, pileus livid grey, gills dingy white; (3) *porphyroleuca*, firm, pileus rufescent, stem solid, fibrillose. (Fries.)

*Var.* **polioleucus**, Fr.; Cke. Illustr., pl. 957.

About the size of the typical form; pileus obtusely umbonate, livid grey; stem almost equal, apex pruinose with white meal; gills whitish; spores elliptical, 10 × 5 μ.

*Var.* **porphyroleucus**, Fr., Cke., Illustr., pl. 119B.

Not half the size of the typical form; firm; pileus fleshy, umbo darker and evanescent, stem solid, fibrillose; gills white.

**Tricholoma grammopodium.** Bull.

Pileus 3–6 in. across, disc thickish, margin thin, flesh-coloured when moist, white when dry, soft, fragile; campanulate then convex, obtusely umbonate, even, glabrous, pellicle moist in rainy weather but not viscid, brownish or livid when moist, whitish when dry; sometimes entirely white; gills adnate with a sinus, or emarginate, narrowed

at both ends, closely crowded, quite entire, shorter intermediate ones numerous, somewhat branched behind, white; stem 3–4 in. long, $\frac{1}{2}$ in. and more thick, base thickened, remainder equal, cylindrical, firm, glabrous, distinctly longitudinally grooved, whitish, solid, elastic; spores subglobose, 5–6 $\mu$ diameter.

*Agaricus grammopodius*, Bull., Champ., Fr., t. 585; f. 1; Cke., Hdbk., p. 42; Cke., Illustr., pl. 98.

In pastures, &c.

Distinguished by the grooved stem and crowded gills, which are adnate when the pileus is expanded. Often growing in rings.

**Tricholoma brevipes.** Bull.

Pileus $1\frac{1}{2}$–$2\frac{1}{2}$ in. across, flesh thick, brown when moist, whitish when dry, rigid, then soft; convex then flattened, the umbo soon disappearing, blackish-umber or brown, becoming paler, glabrous; gills emarginate, 1–$1\frac{1}{2}$ line broad, crowded, ventricose, at first with a brown tinge, then whitish; stem up to 1 in. long, firm, rigid, somewhat thickened at the base, $\frac{1}{2}$ in. thick above, brown both outside and inside, solid; spores elliptical, 7–4 $\mu$.

*Agaricus brevipes*, Bull., Champ., t. 521, f. 2; Cke., Hdbk., p. 43; Cke., Illustr., pl. 68.

On the ground.

Distinguished by the very short, more or less bulbous stem, which is brown both inside and outside. In Cooke's figures the pileus and stem are dingy lavender colour.

Stem solid, very rigid, at length fibrous, apex pruinose, brown both outside and inside; for the rest very variable, sometimes not more than 2–3 lines high and thick, attenuated below; usually 1 in. long, sometimes bulbous, sometimes equal, and slender. Pileus fleshy, soft, convex then flattened, glabrous, moist (opaque when dry), about 2 in. across, umber becoming pale, often stained with soil. Flesh of pileus brownish when moist, becoming white when dry. Gills emarginate and almost free, crowded, ventricose, disappearing within the margin of the pileus, quite entire, whitish. Inodorous. (Fries.)

**Tricholoma humile.** Pers.

Pileus 2–3 in. across, flesh rather thin, soft, greyish when

moist, whitish when dry; convex at first, soon expanded, wavy, sometimes umbonate, at others depressed, even, glabrous, blackish, brown, livid or pallid, depending on the amount of moisture and age, margin thin, extending beyond the gills; gills adnexed, rounded behind, and with a slight decurrent tooth, or sometimes arcuately decurrent, crowded, 2–3 lines broad, whitish; stem 1–2 in. long, about $\frac{1}{2}$ in. thick, almost equal, greyish-white, entirely covered with a very delicate down, stuffed, sometimes becoming hollow, soft, fragile; spores broadly elliptical, 7–8 × 5 $\mu$.

*Agaricus humilis*, Pers., Myc. Eur., iii. p. 218; Cke., Hdbk., p. 43; Cke., Illustr., pl. 99 and 263A.

In gardens, among cinders, grass, &c.

Very variable in form, usually tufted. Allied to *T. brevipes*, but distinguished by being caespitose, stem softer and thinner.

Allied to *T. brevipes*, but stem thinner, longer and softer. Pileus greyish brown then passing through paler tints and becoming pale, often entirely pulverulent.

*Var.* **blandus**, Berk.; Cke., Hdbk., p. 43; Cke., Illustr., pl. 263B.

About the size of the typical form; pileus thin, greyish-lilac; gills broad, rounded behind and nearly free, pure white; stem slender, somewhat broken up into fibrils, rather bulbous, the base brown.

**Tricholoma exscissum.** Fr.

Pileus 1–1$\frac{1}{2}$ in. across, flesh thin, white; campanulate then expanded, at length umbonate, even, greyish-brown, hoary when dry; gills emarginate, 1$\frac{1}{2}$–2 lines broad, crowded, clear white; stem about 1 in. long, and 2 lines thick, almost equal, whitish, polished and shining, stuffed then hollow; spores elliptical, 6–7 × 4 $\mu$.

*Agaricus* (*Tricholoma*) *exscissus*, Fries, Syst., i. p. 114; Cke., Illustr., p. 171; Cke., Hdbk., p. 43.

In pastures.

A small but pretty species. Stem solid when young, hollow when adult, thin, even, glabrous, shining, 1–2 in. long, 1–2 lines thick, equal, pure white. Pileus rather fleshy, campanulate when young, soon expanded, umbo prominent, at length often undulate, even, glabrous, mouse-

colour or greyish-brown when young, at length hoary but not becoming discoloured when dry, but shining. Flesh thin, white. Gills emarginately adnexed, crowded, 1–2 lines broad, clear white. Sometimes the pileus is pulverulent but never silky. (Fries.)

**Tricholoma subpulverulentum.** Pers.

Pileus about 1½ in. across, flesh rather thick, hygrophanous; convex then plane and depressed at the disc, even, livid but innately pruinose, becoming whitish and hoary, margin slightly projecting beyond the gills, and this portion incurved; gills rounded behind, without a decurrent tooth, crowded, 1 line broad, white; stem 1–2 in. long, 2–3 lines thick, often ascending, solid, equal, glabrous, slightly striate, whitish; spores 5 × 3 $\mu$.

*Agaricus subpulverulentus*, Persoon, Myc. Eur., iii. p. 221; Cke., Illustr., pl. 219; Cke., Hdbk., p. 43.

In pastures.

Pileus 2 in. across; dirty white or greyish, with a white lustre. (Cooke.)

** *Gills violet, grey, or smoky.*

**Tricholoma sordidum.** Fr.

Pileus 1–3 in. across, rather fleshy; campanulately convex then plane or slightly depressed, more or less umbonate, glabrous, undulating when old; livid lilac, brownish or flesh-coloured violet when young, becoming discoloured when old, and the entire fungus squalid and brownish, becoming pale when dry; margin slightly striate when adult; gills at first rounded behind, then sinuate and slightly decurrent, rather crowded, at length truly distant, violet then pallid or smoky; stem about 2 in. long, 3–4 lines thick, base usually thickened, slightly incurved, fibrillosely striate, coloured like the pileus; spores elliptical, 7–8 × 3–4 $\mu$, minutely rugulose.

*Agaricus sordidus*, Fries, Syst. Myc., i. p. 51; Cke., Illustr., pl. 100; Cke., Hdbk., p. 44 (small).

On the ground; among manure, &c.

Allied to *Tricholoma nudum*, but much smaller and more slender, very tough, hygrophanous. (Fries.)

**Tricholoma paedidum.** Fr.

Pileus about 1½–in. across, flesh very thin, tough, becoming whitish; campanulate then convex, at length expanded, umbonate, at length depressed round the conical, prominent umbo, moist, virgate or streaked with innate fibrils radiating from the centre, otherwise almost even, smoky-mouse-colour, opaque, margin naked; gills adnexed with a slight decurrent tooth, slightly sinuate, crowded, narrow, white then grey; stem about 1 in. long and 2 lines thick, base slightly bulbous, tough, slightly striate, naked, dingy grey; spores elliptic-fusiform, 10–11 × 5–6 $\mu$.

*Agaricus* (*Tricholoma*) *paedidus*, Epicr., p. 53; Cke., Hdbk., p. 44; Cke., Illustr., pl 120A.

In gardens, on dung-hills, &c.

Small, tough, colour dingy, without a trace of violet tinge, distinguish this species from *T. sordidum*, to which it is most allied. *T. lixivium* differs in the free, truncate gills.

**Tricholoma lixivium.** Fr.

Pileus 2–3 in. across, flesh thin, convex then plane, umbonate, never depressed, even, glabrous, greyish-brown when moist then umber, margin membranaceous, at length slightly striate, sometimes wavy; gills rounded behind and adnexed, at first appearing as if free, distant, soft, 3 lines broad, becoming narrower from the stem towards the margin, sometimes crisped, grey; stem 2 in. long, 3–4 lines thick, entirely fibrous, often flexuous, fragile, grey, at first covered with white down, stuffed then hollow; spores 7 × 4–5. $\mu$.

*Agaricus* (*Tricholoma*) *lixivius*, Fries, Epicr., p. 54; Cke., Hdbk., p. 44; Cke., Illustr., pl. 120B.

In woods.

Readily distinguished by the umbonate pileus, and broad, grey, nearly or quite free gills.

**Tricholoma putidum.** Fr.

Pileus about 1 in. across, rather fleshy, hemispherical, umbonate, soft, even, margin straight, not striate, but here and there with a white silkiness, somewhat olive-grey, hoary when dry; gills slightly adnexed but appearing as if free, crowded, ventricose, 2–3 lines broad, distinct, grey; stem about 1½ in. long, 2–3 lines thick, equal, slightly compressed, soft, rather fragile, slightly striate, grey, with a

very delicate white bloom, hollow; spores elliptical, 8–10 × 3·5 μ.

*Agaricus* (*Tricholoma*) *putidus*, Fries, Epicr., p. 54; Cke., Hdbk., p. 44; Cke., Illustr., pl, 172.

Among pine leaves, &c.

Smell strong, rancid. Resembling *Collybia rancida* in habit and smell, but at once known by the soft stem being entirely fibrous, and not at all cartilaginous, and not rooting.

## ARMILLARIA. Fries.

Pileus symmetrical, more or less fleshy; gills adnate or slightly decurrent, stem central, passing continuously into the flesh of the pileus, furnished with a ring; spores white, elliptical, smooth.

*Armillaria* (as a subgen. of *Agaricus*), Fries, Syst. Myc., i. p. 26; Cke., Hdbk., p. 21.

The principal points to be observed in the present genus are, gills more or less attached to the stem, and the presence of a ring. In a few species the ring disappears at an early period, when the species somewhat resemble those of *Tricholoma*, but are distinguished by the gills not being sinuate; whereas the gills are generally sinuate, more or less, in those species having a permanent ring. In fact but for the presence of a ring, the species of *Armillaria* would fall naturally into three sections, belonging respectively to *Tricholoma*, *Clitocybe*, and *Collybia*.

### *ANALYSIS OF THE SPECIES.*

* Gills sinuately adnexed; stem fleshy, substance equal throughout, furnished with a ring (resembling *Tricholoma* with a ring).

** Gills narrowed behind, more or less decurrent, not sinuate; stem solid, with a ring (resembling *Clitocybe*, but with a ring).

*** Gills equal behind, adnate; stem cartilaginous outside (resembling *Collybia*, but with a ring).

* *Gills sinuate, adnexed.*

**Armillaria bulbigera.** A. & S.

Pileus 3–4 in. across, flesh thick, soft; convex then expanded, obtuse, glabrous but fibrillosely squamulose, especially near the margin, from fragments of the veil, soft, brownish, or yellowish brick-red, dry; gills broadly emarginate, broad, at first rather crowded then distant, becoming coloured; stem 2–3 in. long, about ½ in. thick, cylindrical, base with a distinctly marginate bulb, pale with blackish fibrils, stuffed; ring soon disappearing.

*Agaricus* (*Armillaria*) *bulbiger*, Alb. & Schw., Consp., p. 150; Cke., Hdbk., p. 21; Cke., Illustr., pl. 20.

In pine woods, &c.

Readily distinguished by the distinctly marginate bulb at base of stem.

**Armillaria focalis.** Fr.

Pileus 3–5 in. across, flesh soft, thick at the disc, thin towards the margin, convex then expanded, obtuse, dry, rather shining, smooth, silky-fibrillose, reddish-tawny; gills emarginate and almost free, crowded, narrow, white then pallid; stem about 3 in. long, up to 1 in. thick, equal, not at all bulbous, pale tawny, more or less torn into fibrils, solid; ring rather large, median on the stem, oblique.

*Agaricus* (*Armillaria*) *focalis*, Fries, Epicr., p. 20: Cke., Hdbk., p. 21; Cke., Illustr., pl, 245.

On the ground in pine woods, &c.

Pileus 4 in. across, pale fawn-coloured; darker above, slightly virgate, extreme margin involute; stem 5 in. high, 1½ in. thick at the base, variously lacerated; mycelium white, fibrillose, ring very broad (to which the specific name alludes), superior; odour farinaceous; substance tender. Almost agreeing in dimension with the Var. *Goliath*. (B. & Br.)

*Var.* **goliath**, Fries, Monogr., i. p. 5; Cke., Hdbk., p. 21; Cke., Illustr., pl. 31.

Stem fibrous, solid, up to 8 in. long, 1 in. thick, usually recumbent from the weight of the pileus, equal or attenuated into a rooting base, white outside and inside, but tawny

or with tawny fibrils below. Ring median, fugacious, often quite obliterated. Pileus fleshy, but becoming very thin towards the margin, convex then expanded, at length gibbous, margin revolute, 5–8 in. across, moist, not viscid, disc even, rufous-bay, towards the margin paler and fibrillose, cuticle torn, becoming whitish. Flesh spongy and soft, elastic, white. Gills rounded and almost free, ½ in. and more broad; cuticle of pileus and stem torn into fibrils and separable.

On the ground in woods.

Intermediate between *A. focalis* and *A. robusta*.

**Armillaria robusta.** A. & S.

Pileus about 3 in. across, flesh up to 1 in. thick at the centre, hard; convex then expanded, obtuse, dry, glabrous or becoming more or less broken up towards the margin, rufous-bay; gills broadly emarginate, almost free, up to 2 in. wide, crowded, whitish; stem 1–2 in. long, up to 1 in. thick, base thinner, often ventricose, solid, firm, reddish-white and persistently flocculosely fibrillose below the ample, distant ring, above which the stem is white and flocculose.

*Agaricus* (*Armillaria*) *robusta*, A. & S., Consp., p. 147; Cke., Hdbk., p. 22; Cke., Illustr., pl. 33 (called *Agaricus* (*Armillaria*) *aurantius*, Schaeff.).

In woods.

Distinguished from *A. aurantia* by the deeply emarginate, very broad, whitish gills, and absence of orange-tawny, more or less concentrically arranged wart-like squamules on the stem up to the imperfect ring; and stem attenuated at the base.

*Var.* **minor.** Fries, Hym. Eur., p. 41; Cke., Hdbk., p. 22; Cke., Illustr., pl. 86.

Smaller than the typical form, ring and gills very narrow, pileus smooth.

On the ground.

**Armillaria aurantia.** Schaeff.

Pileus 2–3 in. across, flesh thick at the disc, becoming very thin towards the margin, convex then almost plane, obtuse, obsoletely innately squamulose, deep orange, disc often darker; gills emarginate, adnexed, about 2 lines broad,

white then tinged with rufous; stem about 3 in. long, ½–1 in. thick, equal or slightly attenuated upwards, with tawny-orange, concentrically arranged squamules up to the obsolete ring, shining white and exuding drops of water in damp weather above the ring.

*Agaricus (Armillaria) aurantius*, Fries, Hym. Eur., p. 41; Cke., Hdbk., p. 22.

*Agaricus aurantius*, Schaeffer, Ic., t. 27.

In pine woods.

Varying a good deal in the nature and frequency of the scales.

This is doubtful as a British species. We have only heard of the Scotch specimens (Illustr., t. 33), which belong to *Ag. robustus*. (Cke.)

**Armillaria ramentacea.** Bull.

Pileus 2–3 in. across, fleshy; convex then expanded, becoming almost plane, obtuse or gibbous, at length depressed and revolute, dry, whitish, or yellowish, cuticle broken up into darker, floccose, adpressed scales; gills emarginate, adnexed, seceding and becoming free, 3–4 lines broad, thin, crowded at first then rather distant, white then yellowish; stem 1–2 in. long, about ½ in. thick, base often thickened, white, pruinose; below the oblique, narrow, fugitive ring, variegated with brown, depressed squamules, solid.

*Agaricus ramentaceus*, Bulliard, Champ. France, t. 595, f. 3; Cke., Hdbk., p. 22; Cke., Illustr., pl. 71.

On the ground, under pines, &c.

Colour of pileus variable, pallid, whitish, or with a yellowish or rufescent tinge, squamules and the punctate disc darker. Smell unpleasant. (Fries.)

**Armillaria haematites.** B. & Br.

Pileus about 1 in. across, fleshy; hemispherical then more or less expanded, liver-coloured, rather hispid when dry; gills adnato-decurrent, narrow, whitish with a red tinge; stem 1–2 in. long, 1–2 lines thick, thickened at the base. solid, coloured like the pileus, whitish above the superior, spongy ring.

*Agaricus (Armillaria) haematites*, B. & Br., Ann. Nat. Hist., n. 1635; Cke., Hdbk., p. 22; Cke., Illustr., pl. 45.

Among fir leaves.

Distinguished by its peculiar colour. Stem sometimes $\frac{1}{4}$ in. thick at the base, scaly below the ring. Flesh of pileus and stem reddish.

**Armillaria constricta.** Fr.

Entirely white; pileus up to 2 in. across, flesh not thick, but compact, convex then plane, obtuse, dry, glabrous, but covered with a delicate silkiness from the veil when young, never broken up into squamules; gills emarginate or rounded, sometimes adnexed or altogether free, very much crowded and narrow, unequal; stem $1\frac{1}{2}$–2 in. long, up to $\frac{1}{2}$ in. thick, equal or thickened at the base, solid, fibrous, squamulose or fibrillose, ring narrow, near the apex.

*Agaricus* (*Armillaria*) *constrictus*, Epicr., p. 22; Cke., Illustr., pl. 46; Cke., Hdbk., p. 23.

Among grass in sunny places: especially where the grass has been scorched by urine.

Margin of pileus incurved and downy when young, every part becoming pallid when old; firm; smell resembling new meal. (Fries.)

A much stouter fungus than *Armillaria subcava*.

** *Gills more or less decurrent.*

**Armillaria mellea.** Vahl.

Pileus 2–5 in. across, disc fleshy, remainder thin, convex then expanded, often becoming more or less depressed at the centre, often sooty or covered with olive down when young, soon becoming paler, usually ochraceous with a tinge of honey-colour, sprinkled all over with small, spreading, blackish-brown scales, margin striate; gills adnate then becoming more or less decurrent, rather distant, white with a flesh tinge, then brownish and powdered with the white spores; stem 3–5 in. long, 3–6 lines thick, rigid, more or less grooved, dingy ochraceous, floccose or almost naked below the ring, base often covered with yellowish down, stuffed then hollow, elastic; spores elliptical, 9 × 5–6 $\mu$.

*Agaricus* (*Armillaria*) *mellea*, Cke., Hdbk., p. 23; Cke., Illustr., pl. 32.

At the base of trunks or on the ground.

Exceedingly variable; usually densely caespitose when growing at the base of trunks; larger when solitary or almost so, among leaves on the ground. Sometimes the stem and pileus are suffused with a yellow or orange tint, which at other times is entirely absent, leaving the pileus dingy ochraceous; stem and pileus sometimes almost or quite glabrous, especially when old.

Tufted. Pileus 1–5 in. in breadth, hemispherical in its young state, at length nearly plane, except in the centre, where it is usually, but not invariably, more or less umbonate, slightly striated, and often somewhat uneven at the margin; surface unequally covered with dark or black-pointed scales composed of bristly hairs, most numerous in the centre; the colour of the pileus is otherwise variable,—dull yellow, brownish-yellow, or reddish. Lamellae narrow, whitish, at length partly reddish, rather distant, eight in a series, adnate or even slightly decurrent. Stipes 2 to 8 in. high, robust, firm, somewhat fibrillose, generally incrassated at the base, some shade of yellow, changing in age to a reddish or olivaceous colour, solid, white and spongy within. Annulus always present, spreading, large and tumid. Spores white, copious, and when shed from the uppermost pilei upon those below them giving them the appearance of having been sprinkled with white powder. There is scarcely a plant more apt to assume different aspects under different conditions than the present one, and yet, to an experienced eye, there is always a peculiarity about it not easily expressed in words, which is sufficient to distinguish it. (Grev.)

**Armillaria subcava.** Schum.

Pileus 1–1½ in. across, rather fleshy at the disc, thin elsewhere, convex then expanded, striate to the middle, viscid, umbonate, white except the umbo, which is brownish; gills decurrent, rather close; plane below, white; stem about 2 in. long, 2 lines thick, equal, punctulate, smooth above the distant, torn ring, hollow towards the apex, white.

*Agaricus* (*Armillaria*) *subcavus*, Schum., in Flora Danica, t. 1843; Cke., Hdbk., p. 23; Cke., Illustr., pl. 46.

On the ground in pine woods, &c.

Wholly white except the brownish umbo. Distinguished

from *A. constrictus* by the longer, thinner stem, and the striate pileus.

**Armillaria mucida.** Schrad.

Pileus 1½–3 in. across, flesh thin and almost diaphanous, hemispherical then expanded, obtuse, often rugulose, glutinous, whitish or tinged with grey; gills rounded behind and broadly adnexed with a line-like decurrent tooth, distant, broad, white; stem 1½–4 in. long, 3–5 lines thick, base thickest, ascending, glabrous, white but base often with sooty squamules, rigid, stuffed; ring near apex of stem, white, tumid; spores elliptical, 15–16 × 8–9 $\mu$.

*Agaricus* (*Armillaria*) *mucida*, Schrader, Spic., p. 116; Cke., Hdbk., p. 23; Cke., Illustr., pl. 16.

Very variable in size. Readily known by the very shiny pileus, which is usually whitish, but sometimes sooty or olive-brown. Solitary or caespitose.

**Armillaria denigrata.** Fr.

Pileus 1–2 in. across, sometimes even more; flesh not thick but firm, not flaccid, convex then plane, obtuse, slightly viscid when moist, not fibrillose but looking as if covered with minute drops of water due to the presence of elevated warts, dark fuscous-brown; margin always even; gills decurrent, rather distant, 1–1½ line broad, at first pale brown, then darker, scarcely powdered with the spores; stem solid, firm, up to 2 in. long, sometimes equal, ½ in. thick, sometimes rather ventricose near the base and attenuated below the swelling, fibrously striate, pallid fuscous; dingy within and fuscous towards the base; ring attached near the apex, narrow, entire, readily falling away, paler.

*Agaricus* (*Armillaria*) *denigratus*, Fries, Vet. Ac. Förh., 1861; Cke., Hdbk., p. 24.

On the ground in damp, shady places.

Gregarious or solitary. The species is considered by Berkeley to be identical with *Ag.* (*Pholiota*) *erebius.*

**** Gills adnate, not sinuate.*

**Armillaria citri.** Inzenga.

Pileus about 1 in. across, flesh thin, convex then plane, rather umbonate, smooth, even, sulphur-yellow, margin

crenulate, becoming white; gills adnate, narrow, crowded, white; stem 2–3 in. long, about 1 line thick, whitish, pallid, rufescent at the base, ring superior, rather large. spreading; spores subglobose, 5 × 4.

*Agaricus (Armillaria) citri*, Inzenga, Sic., t. 3, f. 1; Cke., Hdbk., p, 381; Cke., Illustr., pl. 1181.

On stumps.

Smell resembling fresh meal. Caespitose. The general habit is that of a cluster of small-sized specimens of *Hypholoma fasciculata*.

**Armillaria Jasonis.** Cke. & Mass.

Pileus 1–2 in. across, rather fleshy, especially at the disc, campanulate then expanded, with a distinct rounded umbo, granularly papillate, granules innate, golden yellow, tinged with tawny at the disc; margin appendiculate with the fibrous veil; gills adnate, scarcely crowded, thin, white, then pallid; stem 2–3 in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. thick, equal or a little thickened below, coloured like the pileus, squamulose below the distant, torn, squarrose ring; spores elliptical, 8 × 5 $\mu$.

*Agaricus (Armillaria) Jasonis*, Cke. & Mass., Grev., xvi. p. 77; Cke., Hdbk., p. 363; Cke., Illustr., pl. 955.

On stumps.

Resembling in habit and appearance, several species ot *Pholiota*, but with white gills and spores.

## HIATULA. Fries.

Pileus symmetrical, very thin, without a distinct pellicle, formed by the union of the backs of the gills, splitting when expanded; gills almost or quite free, white; stem central; spores white.

Fries, Nov. Symb., p. 11; Cke., Hdbk., p. 224.

Allied to *Lepiota* in the thin pileus and free gills, but differing in the entire absence of a ring. Not at all deliquescent as in the genus *Coprinus*, near to which it was at one time placed by Fries.

**Hiatula Wynniae.** B. & Br.

Pileus $\frac{2}{3}$–$1\frac{1}{2}$ in. across, exceedingly thin, campanulate then

plane, with a trace of an umbo, striate, pulverulent, whitish, disc more or less tinged with brown; gills free or very slightly adnexed at first, rather distant, about 1 line broad, white; stem about 1½ in. long, 1 line thick, slightly striate, hollow; spores white, smooth, 5 × 4 μ.

*Hiatula Wynniae*, B. & Br., Ann. Nat. Hist., n. 1772; Cke., Hdbk., p. 224; Cke., Illustr., pl. 688.

In a stove at Kew.

Undoubtedly an introduced species, and in all probability an Australian species, as I have seen specimens from Queensland that agree exactly with Berkeley's type. In Queensland it is said to be luminous, emitting a greenish light.

## LEPIOTA. Fries. (figs. 6, 7, p. 3.)

Pileus regular, usually scaly, due to the presence of the concrete universal veil and the breaking up of the cuticle; gills free, often very remote from the stem and attached to a cartilaginous collar, stem central, its substance distinct from the flesh of the pileus; ring at first continuous with the cuticle of the pileus, often movable, sometimes soon disappearing; volva absent.

*Lepiota*, Fries, Syst. Myc., i. p. 19; Cke., Hdbk., p. 11 (as a subgenus of *Agaricus*).

The present genus differs from *Amanita* and *Amanitopsis* in the absence of a volva, and from every other genus in the Leucosporeae in the free gills.

In many species—but not in all—the flesh of the stem is of a different texture to that of the pileus, and its apex terminates in a socket-like depression of the flesh of the pileus, a peculiarity clearly evident in a vertical section through pileus and stem. The remains of the universal veil is thoroughly connate with the cuticle or the pileus, and not in the form of removable warts or flakes as in *Amanita* and *Amanitopsis*.

The species grow on the ground; several are met with in hothouses, melon beds, &c., and are in all probability introduced species.

## *ANALYSIS OF THE SPECIES.*

### A. *Cuticle dry.*

#### I. Proceri.

Ring movable, distinct from the volva.

When young the fungus is entirely enclosed in the universal veil, which splits in a circumscissile manner, the basal portion not distinct from the bulb, the upper portion being concrete with the cuticle of the pileus, which is usually scaly. Stem not peronate or sheathed with stocking-like continuation of the volva, as in the following section; apex of stem with a cartilaginous ring, to which the free, remote gills are attached.

#### II. Clypeolarii.

Ring fixed, homogeneous with the universal veil that sheaths the stem.

Stem floccose or squamulose with the universal veil up to the ring; cartilaginous collar at the apex close to the stem, hence the gills are usually not so remote. Flesh soft, smell and taste unpleasant, somewhat resembling radishes.

#### III. Annulosi.

Ring superior, fixed, somewhat persistent; universal veil adnate with the pileus.

Collar at apex of stem absent, or similar in texture to the flesh of the stem.

#### IV. Granulosi.

Universal veil at first contiguous with pileus and stem, and when ruptured forms the inferior ring.

Pileus granular or warted. The stem is not so distinctly differentiated from the pileus as in the other sections.

#### V. Mesomorphi.

Small, slender, stem fistulose; pileus dry, cuticle entire. Not granular nor torn, as in the section Clypeolarii.

### B. *Cuticle of pileus viscid; not at all broken up.*

## A. *Epidermis dry.*

### I. PROCERI.

**Lepiota procera.** Scop.

Pileus 4–9 in. across, flesh rather thick, very soft and cottony, tough, permanently white; cylindrical ovate at first then campanulate, finally expanded; umbo prominent, broad, and obtuse; cuticle brown, becoming broken up into broad, flat, thick scales, interstices whitish; gills terminating behind in a broad, plano-depressed, cartilaginous collar that carries them away from the stem, crowded, ventricose, broadest in front, soft, whitish, edge sometimes brownish; stem 5–8 in. long, ½ in. thick, base swollen, the remainder cylindrical, firm, somewhat cartilaginous, variegated with adpressed brown scales, apex inserted into a deep socket in the flesh of the pileus; internal cavity distinct, at first stuffed with delicate fibrils; ring ample, persistent, becoming free and slipping down to the base of the stem; spores elliptical, 12–15 × 8–9 $\mu$.

*Agaricus procerus*, Scop., Carn., p. 418; Cke., Hdbk., p. 11; Cke., Illustr., pl. 21.

Pileus 3–7 in. broad, at first obtusely conic, at length campanulate, strongly umbonate, fleshy, epidermis velvety, red-brown, broken into subreflexed scales, the whole resembling brown shaggy leather; margin white or pinkish, silky; flesh soft cottony except in the centre when young. Gills perfectly free, separated by a considerable space from the point of insertion of the stipes, ventricose, margin serrated, pale pinkish yellow or white. Spores white elliptic. Stem 8–12 in. high, ½ in. thick, attenuated upwards, sunk deep into the flesh of the pileus as into a socket, very bulbous, scaly, hollow but stuffed with a cottony web. Ring coriaceous, thick and spongy, convex below, movable. Taste and smell pleasant. (Berk.)

*Var*, **rachodes**; *Agaricus rachodes*, Vittadinsi, Fung. Mang., p. 158, t. 20; Cke., Hdbk., p. 11; Cke., Illustr., pl. 22.

Habit, and about same size as the typical form; differing more especially in the stem being quite even and not at all

squamulose; flesh of pileus thicker, white, but becoming more or less evidently tinged with red when broken.

Among grass.

*Var.* **puellaris**, *Agaricus rachodes*, var. *puellaris*, Fries, Monogr., ii. p. 285; Cke., Hdbk., p. 11.

Smaller than the typical form, white, pileus floccosely squamulose.

**Lepiota excoriata.** Schaeff.

Pileus 2–3 in. across, flesh rather thick, white, soft, unchangeable; globose then expanded, at length flattened, more gibbous than umbonate, sometimes altogether whitish, disc sometimes brownish, cuticle very thin, sometimes even and persistently silky, sometimes broken up into scales, more or less peeling off towards the margin; gills free but not distant from the stem, soft, white; stem about 3 in. long, 4–5 lines thick, quite equal or very slightly bulbous, hollow, even, almost glabrous, not spotted, very distinct from flesh of pileus, white; spores 14–15 × 8–9 $\mu$.

*Agaricus excoriatus*, Schaeffer, t. 18, 19; Cke., Hdbk., p. 12; Cke., Illustr., pl. 23.

In pastures.

Pileus 2½ in. across, expanded, often a little irregular, carnose, umbonate, flesh spongy; epidermis cracked into small areolae, silky between them, especially on the margin, pale fawn, the umbo dark. Gills ventricose, free, so as to leave a broad space round the top of the stem, which is sunk into the substance of the pileus, dull white, slightly watery, imbricate when old; sometimes much broader on one side than on the opposite side of the pileus and sometimes stained with claret-coloured blotches. Spores white, elliptic, with an evident transparent border. Stem 1½–2 in. high, ¼–⅓ in. thick, attenuated regularly upwards without a decided bulb, minutely fibrillose, hollow but stuffed with a beautiful cottony web, ring deflexed, movable, but not so free as that of *A. procerus*. (Berk.)

**Lepiota gracilenta.** Kromb.

Pileus 2–3 in. across, flesh rather thick at the disc; campanulate then expanded, obtusely umbonate, brownish when

quite young, whitish when expanded and spotted with the adpressed, broken up patches of the brown cuticle; gills free, remote from the stem, very broad, pallid; stem 5–6 in. long, 3–5 lines thick, more or less bulbous at the base, whitish, hollow; ring thin, floccose, disappearing.

*Agaricus gracilentus*, Krombholz, t. 24, figs. 13, 14; Cke., Hdbk., p. 12; Cke., Illustr., pl. 28.

In pastures, also in woods.

Resembling *L. procera*, but more delicate. Stem 5–6 in. long, 4–5 lines thick, obsoletely scaly. Pileus at first ovate, then campanulate, and at length flattened, spotted with brownish scales. (W. G. Smith.)

**Lepiota mastoidea.** Fr.

Everywhere whitish. Pileus 1–1½ in. across, flesh thin, soft; ovate or campanulate then expanded, acutely umbonate, the cuticle breaking up into warts which eventually disappear; gills free, very distant from the stem, 1½ line broad, pallid; stem 2–3 in. high, 1½–2 lines thick, equally narrowing upwards from the bulbous base, glabrous, hollow; ring entire, movable.

*Agaricus* (*Lepiota*) *mastoideus*, Fries, Syst. Myc., i. p. 20; Cke., Hdbk., p. 12; Cke., Illustr., pl. 24?

In woods, &c.

The most slender of the present section; entirely whitish. (Fries.)

Distinguished from species in other sections which it somewhat resembles, in the gills being very distant from the stem, movable ring, and glabrous stem. Cooke's figures quoted above, if the right species, differ in having the prominent umbo dark brown, and the remainder of the pallid pileus ornamented with small brown patches more or less concentrically arranged.

## II. CLYPEOLARII.

**Lepiota acutesquamosa.** Weinm.

Pileus 4–5 in. across, flesh thick, firm, pure white; hemispherical when young, then expanded and convex, very obtuse, pale ferruginous, adpressedly downy, and rough

with minute, pointed brown warts that fall away, leaving areolate marks on the pileus, margin rather fringed when young and sometimes furnished with fragments of the veil; gills free and attached to a collar, but very close to the stem, lanceolate, 3–4 lines broad, much crowded, white; stem up to 4 in. long and nearly 1 in. thick, elastic, base rather swollen, attenuated upwards, white and silky-fibrillose above, but with rusty fibrils below, and also with spirally arranged scales, ring large, persistent, thin; spores elliptical, 7–8 × 4 $\mu$.

*Agaricus (Lepiota) acutesquamosus*, Weinm., Syll., i. p. 70; Cke., Hdbk., p. 12; Cke., Illustr., pl. 14.

On the ground.

Universal veil floccose, pale ferruginous, forming pointed warts on the pileus which fall away readily, leaving areolate scars on the fundamental floccose surface, as in *Lycoperdon gemmatum*. (Fries.)

Distinguished from *L. Friesii* by the rigid, deciduous warts of the pileus, and in the broad gills being very close to the stem.

**Lepiota Friesii.** Lasch.

Pileus 3–5 in. across, flesh thick, white, not changing colour to any appreciable extent; convex then expanded, sometimes slightly umbonate, soft, yellowish-brown, becoming torn into adpressed, tomentose scales; gills free, rather distant from the stem, closely crowded, narrow, branched, whitish; stem 4–5 in. long, 4–6 lines thick at the apex, base somewhat bulbous, coloured like the pileus, scaly, hollow, with a web-like pith; ring superior, fixed, pendulous; spores elliptical or pip-shaped, 8–9 × 5 $\mu$.

*Agaricus Friesii*, Lasch, Linnea, vol. iii. no. 9; Cke., Hdbk., p. 361; Cke., Illustr., pl. 941.

In gardens, &c.

Odour strong. Differs from *L. procera* in the fixed ring, and from *L. acutesquamosa*, to which it is most nearly allied, in the branched gills and adpressed scales of the pileus.

**Lepiota Badhami.** Berk.

Pileus 2–4 in. across, flesh thick, and like that of the stem becoming saffron-red when cut; campanulate then expanded, obtuse, or depressed and more or less umbonate,

sooty brown, velvety or broken up into scales; gills free, distant, ventricose, 2–3 lines broad, white at first; stem 2–4 in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. thick, base bulbous, slightly attenuated upwards, whitish, silky or floccose, stuffed then hollow; ring firm, slightly loose; spores elliptical, 5 × 3 $\mu$.

*Agaricus* (*Lepiota*) *Badhami*, Berk., Outl., p. 93; Cke., Hdbk., p. 13; Cke., Illustr., pl. 25.

Under yew trees, &c.

*L. emplastrum* agrees with the present in becoming red when wounded, but differs in the thick, smooth cuticle becoming broken into large patches as the pileus expands.

Pileus 2–4 in. across, at first campanulate obtuse, at length expanded, often depressed and umbonate, hispid, with minute, velvety, fuliginous scales, but sometimes entirely fuliginous without any distinct scales. Stem 2–3 in. high, $\frac{1}{4}$–$\frac{1}{2}$ in. or more thick, attenuated above, bulbous below, white, silky or floccoso-squamose, stuffed with cottony threads; ring firm, erect and deflexed, more or less movable beneath, frequently clothed with dingy granules; gills truly remote, ventricose, rather broad; spores elliptic, ·0003 in. long, flesh tolerably compact. The whole plant when wounded assumes a rich red tint. A splendid Agaric, resembling some forms of *A. clypeolarius*, but more robust. In some specimens the surface is decidedly scaly, in others simply velvety. The margin often projects beyond the gills and is delicately silky and fimbriated. The stem, though bulbous, is by no means marginate. Smell rather disagreeable. (B. & Br.)

Lepiota emplastra. Cke. & Mass.

Pileus 2–3 in. across, flesh thick, firm, white, but like that of the stem becoming pink or reddish when cut; convex, then expanded, when young covered with a thin, smooth, dark brown cuticle that becomes broken up into large, irregular, persistent patches as the pileus expands, and is then entirely absent from the even margin, pallid and silky below the cuticle; gills free, remote from the stem, crowded, $1\frac{1}{2}$–2 lines broad, narrowed behind, whitish; stem about 3 in. long, $\frac{1}{2}$ in. thick slightly thickened at the base, otherwise equal, more or less striate, pallid, hollow; ring rather distant, erect, externally brown at the margin; spores elliptical or pip-shaped, obliquely apiculate, 18–20 × 10–12 $\mu$.

*Agaricus* (*Lepiota*) *emplastrum*, Cke. & Mass., Grevillea, vol. xviii. p. 51; Cke., Hdbk., p. 361; Cke., Illustr., pl. 1164.

Among grass under trees.

Allied to *Lepiota Badhami*, but distinguished by the glabrous cuticle of the pileus and the much larger spores.

**Lepiota meleagris.** Sow.

Pileus $\frac{2}{3}$–$1\frac{1}{2}$ in. across, flesh thin, becoming red; convex then expanded and almost or quite plane, cuticle broken up into minute black scales on a pale ground, disc darker; gills nearly or quite free, $1\frac{1}{2}$–2 lines broad, whitish; stem $1\frac{1}{2}$–3 in. long, swollen at the base or higher up, blackish below, pale with black squamules upwards, stuffed; ring obsolete; spores elliptical, 6–7 × 4 $\mu$.

*Agaricus meleagris*, Sowerby, Fung., t. 171; Cke., Hdbk., p. 13; Cke., Illustr., pl. 26.

In hot-beds, greenhouses, &c.

It has a solid stem, and a curious, somewhat reticulated root, in drying it becomes of a blush-red all over, except the lower part, which retains the darker hue. (Sowerby.)

This species came up abundantly in a hot-house at Coed Coch, Denbighshire, amongst spent tan, and is certainly a Lepiota closely allied to *Lep. clypeolarius*. Two forms occur which run into each other, the less typical of which has a campanulate, obtuse pileus, and is of a darker tint when dry. Pileus at first ovate or hemispherical, very obtuse, fawn-coloured, minutely tomentose and warty, then expanded, subcampanulate, about 2 in. across, dotted with minute brown scales; stem at first fusiform, then nearly equal, of the same colour, here and there tinged with yellow, most minutely squamulose, stuffed with cottony threads; ring soon ruptured, very fugacious; gills remote, distant rounded behind, sometimes connected, white. The whole plant changes in drying, or when cut, to a beautiful red. In the variety the gills are sometimes lemon-coloured. (B. & Br.)

**Lepiota biornata.** B. and Br.

Pileus 1–2 in. across, flesh thick at the disc, very thin elsewhere, with a faint yellow tinge; convex or broadly campanulate, silky, white, sprinkled with minute dark red scales that are most numerous at the disc; gills free, ventricose, 2 lines broad, rather crowded, white then with a pale

yellow tinge; stem 3–4 in. long, 3–5 lines thick, slightly ventricose near the base, then attenuated and rooting, whitish and spotted with red, reddish within, stuffed then hollow; ring rather distant; spores elliptical, 8–9 × 6 $\mu$.

*Agaricus (Lepiota) biornatus*, B. & Br., Journ. Linn. Soc., vol. xi. p. 502; Cke., Hdbk., p. 13; Cke., Illustr., pl. 37.

In melon and cucumber frames, &c.

The present distinct species was first described from Ceylon specimens, and is probably an introduced species in this country.

**Lepiota hispida.** Lasch.

Pileus 2–3 in. across, flesh thin, white, unchangeable; hemispherical then expanded, umbonate, tomentose or downy at first from the remains of the universal veil, during expansion the down becomes broken up into small spreading scaly points which eventually disappear, umber brown, sometimes with a tawny tinge; gills free but near to the stem, the collar of the pileus prominent, and sheathing the stem, crowded, ventricose, simple, white; stem about 3 in. long, 3–5 lines thick, attenuated upwards, densely squamosely-woolly up to the superior, membranaceous, reflexed ring, fuscous, stem tubular but fibrillosely stuffed; spores 6–7 × 4 $\mu$.

*Agaricus hispidus*, Lasch, n. 407; Cke., Illustr., pl. 1180; Cke., Hdbk., p. 13.

In shady woods; among pine leaves, &c.

Intermediate between *L. clypeolaria* and *L. acutesquamosa*, agreeing in size with the former, and with the latter in the spinulose pileus. Smell somewhat like radishes.

**Lepiota clypeolaria.** Bull.

Pileus 2–3 in. across, flesh thickish, soft, white; at first obtusely cylindrical, even, apex tawny, surface silky and soft but not at all broken up, then campanulately expanded, umbo tawny, the remainder entirely broken up into very soft, yellowish tan-coloured squamules; gills free but close to the stem, up to 3 lines broad, soft, crowded, white or yellowish; stem about 3 in. high, 2–3 lines thick, soft, fragile, equal or slightly thickened at the base, at first squarrosely scaly from the breaking up of the yellowish veil, becoming

almost naked and pallid, fibrillose; striate above the ring, stuffed then hollow; spores elliptical, 6 × 4 $\mu$.

*Agaricus clypeolarius*, Bull., Champ. Fr., t. 405, f. 2; Cke., Hdbk., p. 14; Cke., Illustr., pl. 38.

In woods, hothouses, &c.

Distinguished from *L. cristata* by the squamulose stem, and more especially by the gills being very close to the stem behind. Smell weak or absent.

Fries mentions the following forms:—(*B*). In shady pine woods; stem covered with a white, floccose woolliness; disc of pileus not broken up, remainder woolly, yellowish red or becoming pale. (*C*). In densely shaded beech woods on damp, rotten leaves, a slender form with a floccosely squamulose stem; pileus white, ornamented with concentric brown scales. (*D*). In swampy places; pileus rosy, squamulose.

Stem 2–3½ in. high, 2 lines thick, hollow but stuffed with cottony fibres, whitish, pale brownish or rufescent, the whole clothed with fibrillose scales. Ring sometimes remaining on the stem, but more generally attached to the margin of the pileus or evanescent. Inodorous and insipid. Bearing some resemblance to *A. procerus*, but smaller and more delicate. (Berk.)

Variable in colour, white, yellow, pink, rufous, brown, &c. Pileus 1½ in. broad, whitish, with reddish scales; stem 2–3½ in. high, 2 lines thick. Inodorous and insipid (Cooke.)

It is very desirable that the spores of this species and allied forms should be carefully observed, as they seem to be the surest distinction between this species and *Lep. cristata*. (B. & Br.)

**Lepiota felina.** Pers.

Pileus 1–1½ in. across, flesh thin; ovate-campanulate then expanded, more or less umbonate, black when quite young, after expansion there is a black patch at the disc, the rest white, scaly, each minute scale tipped with black, scales arranged more or less concentrically, as indicated by the delicate, black, broken rings; gills free, rather distant, 1½ line broad margin serrulate; stem 2 in. long, 1 line thick at the apex, becoming thickened downwards, white, sometimes

with black specks below, hollow; ring superior, large, soon disappearing; spores elliptical, 10 × 5 μ.

*Agaricus felinus*, Pers., Syn., p. 201; Cke., Hdbk., p. 362; Cke., Illustr., pl. 943A.

Among moss in fir woods, &c.

Readily known by the white pileus having a black disc, and delicate concentric ring of black on the remaining portion. Sometimes smaller than the measurements given above.

**Lepiota metulaespora.** B. & Br.

Pileus ⅔–1 in. across, flesh thin; campanulate then expanded and having the margin sometimes turned up, margin coarsely and distantly striate; whitish, with small pallid scales; gills almost free, ventricose, 1½–2 lines broad, white; stem 2–2½ in. high, 1½ line thick, nearly equal or slightly clavate, smooth, pale lemon-yellow, fistulose; ring superior, spreading, whitish; spores fusiform or obliquely clavate, 15–16 × 6 μ.

*Agaricus* (*Lepiota*) *metulaesporus*, Berk. & Broome, Ceylon Fungi, n. 67; Cke., Hdbk., p. 14; Cke., Illustr., pl. 39.

On the ground in shady places.

This species, in external characters, approaches *Lep. clypeolaria*, but is at once distinguished by the length of its spores, which is ·0006 in. (= 15–16 μ). (B. & Br.)

**Lepiota cristata.** A. & S. (figs. 6, 7, p. 3.)

Smell and taste strong. Pileus ¾–1½ in. across, flesh thin; campanulate then plane or with the margin slightly upturned, obtuse, or slightly gibbous, cuticle at first continuous, then broken up into reddish-brown, glabrous, somewhat granulose scales that are generally more or less concentrically arranged, ground colour whitish, minutely silky; gills free, at length remote from the stem, 1½ line broad, pallid; stem about 2 in. long, 1½ line thick, equal or slightly thickened at the base, silky-fibrillose, whitish or tinged brown, fistulose; ring distant, entire, soon falling away; spores elliptical.

*Agaricus cristatus*, Alb. & Schw., p. 145; Cke., Hdbk., p. 14; Cke., Illustr., pl. 29.

In fields, &c.

Plant scattered, having a taste and smell strong and unpleasant. Pileus obtusely conical when young, gradually expanding, and at length becoming quite plane or even

somewhat turned upwards at the margin, the centre remaining umbonate. The epidermis cracks into a great number of minute reddish scales, which vanish towards the edge, leaving that part nearly quite white, while towards the centre the scales being smaller and more contiguous, it is of a deeper hue. Flesh very thin, white. At its full growth, the pileus is from $\frac{3}{4}$ in. to 2 in. in breadth. Lamellae moderately numerous, white, 2–4 in a set, rather narrow, their edge uneven, often splitting, free, and leaving a channel between them and the stipes. Stipes 1 to near 2 in. in height, about 2 lines in diameter, often less, whitish or pinkish, fistulose, smooth. Veil separating early from the pileus, and forming a more or less imperfect ring, which is subfugacious. Root a mass of white, branching fibres, and of considerable tenacity, and generally retaining a quantity of soil. From *Agaricus clypeolarius* (= *Lepiota clypeolaria*), it is chiefly distinguished by its peculiar taste and smell, and smooth stipes. (Grev.)

**Lepiota erminea.** Fr.

White. Pileus 2–3 in. across, flesh thin, soft, white, taste resembling radishes; campanulate, soon expanded; disc even, prominent or slightly gibbous, sometimes tinged with colour, dry, glabrous and even, the cuticle broken up into fibrils near the margin; gills free but very close to the stem, very obtuse at both ends, rather crowded, 3 lines broad, clear white; stem 3 in. long, 2–3 lines thick, equal, very fragile, dry, rather fibrillose; ring membranaceous, soon torn and disappearing; spores elliptical, 11–12 × 4–5 $\mu$.

*Agaricus* (*Lepiota*) *ermineus*, Fr., Syst. Myc., i. p. 22; Cke., Hdbk., p. 14; Cke., Illustr., pl. 40.

Among grass, &c.

Somewhat gregarious, very fragile, white; smell none, taste that of radishes. (Fries.)

**Lepiota micropholis.** B. & Br.

Pileus about $\frac{1}{2}$ in. across, flesh very thin; conical then plane, white, clad with minute, radiating, dark grey or blackish squamules, margin slightly striate; gills free, $\frac{2}{3}$ line broad, crowded, ventricose, white, stem up to 1 in. long, $\frac{1}{2}$ line thick, slightly thicker below, curved, white, hollow; ring spreading; spores elliptical, 5 × 3 $\mu$.

*Agaricus* (*Lepiota*) *micropholis*, Berk. and Broome, Journ. Linn. Soc., vol. xi. p. 505; Cke., Hdbk., p. 362; Cke., Illustr., pl. 943B.

On cocoa-nut fibre in a stove.

First described from Ceylon specimens, and probably introduced into this country.

**Lepiota citrophylla.** B. & Br.

Pileus up to $\frac{3}{4}$ in. across, flesh thin; convex then expanded, obtuse or broadly umbonate, at length depressed, lemon-yellow, clad with rufous scales; gills free or slightly adnexed, rounded behind or attenuated, lemon-yellow; stem 1–1½ in. long, 1–1½ line thick, equal, squamulose, lemon-yellow, stuffed then hollow; ring almost obsolete; spores elliptical, 7–8 × 4 $\mu$.

*Agaricus* (*Lepiota*) *citrophyllus*, Berk. & Broome, Linn. Journ., vol. xi. p. 509; Cke., Hdbk., p. 362; Cke., Illustr., pl. 639.

On the ground.

Somewhat resembling *L. amianthina*, but distinguished by the free or only very slightly adnexed gills and the white flesh.

## III. ANNULOSI.

**Lepiota Vittadinii.** Fr.

Pileus 3–4 in. across, flesh 4–6 lines thick at the disc, becoming very thin at the margin, white; convex then plane, obtuse, or gibbous, densely covered with small, erect, wart-like scales, altogether whitish; gills free but rather close to the stem, 3–4 lines broad, rounded in front, thickish, ventricose, with a greenish tinge; stem 2½–3½ in. long, up to $\frac{2}{3}$ in. thick, cylindrical, with numerous concentric rings of squarrose scales, up to the superior, large ring; whitish, or the edges of the scales often tipped with red, solid.

*Agaricus* (*Lepiota*) *Vittadinii*, Fries, Epicr., p. 16; Cke., Hdbk., p. 15; Cke., Illustr., pl. 36 (after Krombholz).

In pastures, &c.

Intermediate between *Lepiota* and *Amanita*. (Fries.)

Differs from *L. nympharum* in the solid stem and superior ring.

**Lepiota nympharum.** Kalchbr.

Pileus about 3 in. across, flesh thick, soft, white; convex then expanded, umbonate, white or with a fuscous tinge at the disc, everywhere covered with somewhat overlapping, more or less spreading, concentrically arranged scales; gills free but close to the stem, without a cartilaginous collar, crowded, ventricose, soft, white; stem 3–4 in. long, 4–5 lines thick, inserted into a deep socket of the flesh of the pileus, white, somewhat equal, smooth and glabrous below the ring, minutely floccose above, hollow; ring very distant, narrow, persistent, fixed, reflexed; spores globose.

*Agaricus* (*Lepiota*) *nympharum*, Kalchbrenner, Icon. Sel. Hymen. Hung., p. 10, tab. 2, fig. 1.

Among grass, &c.

The flesh of the stem becomes rufous near the outside. Differs from *L. Vittadinii* in the hollow stem.

**Lepiota holosericea.** Fr.

Pileus 3–4 in. across, flesh thick, soft, white; convex then expanded and almost plane, obtuse, silkily floccose and somewhat fibrillose, even, fragile, whitish or with a tinge of tan-colour, disc not at all gibbous and coloured like the remainder, margin incurved when young; gills quite free, broad, ventricose, crowded, pallid white; stem solid, 2½–4 in. long, ¼ in. and more thick, soft, fragile, silkily-fibrillose, whitish, base bulbous, not rooting; ring superior, membranaceous, large, soft, pendulous, margin turned up; spores elliptical, 7–8 × 5 $\mu$.

*Agaricus* (*Lepiota*) *holosericeus*, Fries, Epicr., p. 16; Cke., Hdbk., p. 15; Cke., Illustr., pl 41.

In gardens, &c.

Large, inodorous, very soft.

**Lepiota naucina.** Fr.

White. Pileus 2–4 in. across, flesh thick, soft; spherical then expanded and almost plane, somewhat umbonate and smooth at the centre, cuticle thin, glabrous, then breaking up into evanescent granules; gills free but very close to the stem, 2–3 lines broad, narrow in front; stem 2 in. long, ½ in. thick at the apex, becoming thicker downwards to the swollen base, imperfectly hollow; ring superior, thin, delicate, usally soon disappearing; spores subglobose, 6–7 $\mu$ diameter.

*Agaricus* (*Lepiota*) *naucinus*, Fries, Epicr., p. 16; Cke., Hdbk., p. 15; Cke., Illustr., pl. 15.

In fields, cucumber frames, &c.

Somewhat caespitose. Resembling *L. excoriata* in general appearance, but differing in the superior, thin ring, &c. In Cooke's figure the pileus is slightly depressed at the disc, and no indication of an umbo.

**Lepiota cepaestipes.** Sow.

Pileus 1–3 in. across, flesh thin; ovate then expanded, disc fleshy and broadly umbonate, mealy and squamose with evanescent plumose scales, pale sulphur-yellow or white, disc often brownish, margin plicate; gills free, at length distant from the stem, 1–2 lines broad, rather distant, whitish or with a yellow tinge; stem 3–6 in. high, $1\frac{1}{2}$ line thick at the apex, swollen, often very considerable at the middle or near the base, floccose, white or pale yellow, hollow; ring distant; spores elliptical, 7–8 × 4 $\mu$.

*Agaricus cepaestipes*, Sowerby, Fungi, t. 2; Cke., Hdbk., p. 15; Cke., Illustr., pl. 5, also pl. 942 (as *Agaricus* (*Lepiota*) *cepaestipes*, var. *cretaceus*, Bulliard).

On tan in hothouses, melon beds, &c.

Gregarious or tufted. Probably an introduced species.

Gregarious or tufted. Whole plant white, pale sulphur-colour or yellow. Pileus 1–3 in. broad, ovate-conical when young, then campanulate, and finally nearly or quite plane, darker in the centre, and more or less covered with small scattered fibrous scales, the flesh thin, and vanishing entirely towards the margin, which is plicate and semi-transparent; the substance is however tough, and bears folding between the fingers without laceration. Lamellae numerous, thin, in no regular series, the extremities next the stipes broad and rounded, and separated from it by a circular space. Stipes 3–6 in. high, straight or crooked, firm, even, smooth, narrow at the top, but ventricose below, and then narrower again at the very bottom, somewhat pruinose, the centre at first fitted with delicate silky fibres, at length hollow. Annulus perfect, erect, persistent. Sporidia white, copious, elliptical.

In decay the pileus turns brownish, and, according to its situation, either dries up, or becomes covered with little globules of fluid, and gradually dissolves. (Grev.)

**Lepiota licmophora.** B. & Br.

Entirely pale lemon-colour. Pileus about 1 in. across, flesh very thin; coarsely grooved, up to the disc, margin crenate, subcylindrical, then campanulate, at length plane, gills free, very remote from the stem, distant, slightly ventricose, thin, 1½ line broad, interstices veined; stem 3–4 in. high, 1–1½ line thick above, becoming thickened downwards, base abrupt, smooth, hollow; ring distant, persistent; spores lemon-shaped, 9–10 × 5 $\mu$.

*Agaricus* (*Lepiota*) *licmophorus*, Berk. & Broome, Ceylon Fungi, n. 20; Cke., Hdbk., p. 20 & 381; Cke., Illustr., pl. 1179.

On soil in hot-houses, stoves, &c.

First described from Ceylon specimens, and undoubtedly an introduced species. Distinguished from *L. cepaestipes* by the glabrous pileus. Perhaps only a variety of the last-named species.

## IV. GRANULOSI.

**Lepiota cinnabarina.** A. & S.

Pileus 2–3 in. across, flesh rather thick, pallid; convex soon expanded, obtuse or more or less gibbous, granulosely scurfy, persistently brick red; gills free, 1½–2 lines broad, lanceolate, white; stem 1½–2 in. long, 2 lines thick, base thickened, clothed with red scales up to the imperfect ring, pale and smooth above, stuffed; spores 6–7 × 5 $\mu$.

*Agaricus cinnabarinus*, Alb. & Schw., p. 147; Cke., Hdbk., p. 16; Cke., Illustr., pl. 43.

In pine woods.

Distinguished from *L. granulosa* by the larger size and persistently brick-red, or red-lead colour of the pileus.

*Var.* **Terreyi**, Berk. & Broome, Ann. Nat. Hist., n. 1183; Cke., Hdbk., p. 16.

Pileus subhemispherical, bright tawny red, rough with minute warts; stem subequal, clad with furfuraceous scales of the same colour; ring at length torn; gills white, narrow, remote; spores 7 × 4 $\mu$.

Pileus 1–2 in., bright tawny; scales on the stem of the same colour, often cylindrical; gills not branched. Spores ·0002 in. long by ·00015 wide (= about 7 × 4 $\mu$).

This species, which appears quite distinct, approaches *L. granulosa* on one side, and *L. acutesquamosa* on the other, but is nearer to the latter than the former. The spores of *L. granulosa* are slightly larger, those of *L. acutesquamosa* are rather longer, and at the same time narrower. (B. & Br.).

**Lepiota carcharias.** Pers.

Smell strong, unpleasant; taste bitter. Pileus $\frac{3}{4}$–$1\frac{1}{2}$ in. across, flesh rather thin, white; convex then almost plane, more or less umbonate, granulose, pale flesh-colour or yellowish-pink, sometimes whitish; gills adnexed, about $1\frac{1}{2}$ line broad, clear white, rather crowded; stem about $1\frac{1}{2}$ in. long, $1\frac{1}{2}$–2 lines thick, slightly thickened at the base, granulose and coloured like the pileus up to the ring, pale and smooth above, stuffed then hollow.

*Agaricus carcharias*, Pers., Syn., p. 263; Cke., Hdbk., p. 15; Cke., Illustr., pl. 42.

On the ground, often under firs.

Distingnished from allied forms by the strong smell and bitter taste.

**Lepiota granulosa.** Batsch.

Pileus $\frac{2}{3}$–1 in. across, flesh thin except at the disc, with a reddish tinge; convex then expanded obtusely umbonate, granulosely scurfy, rusty or brownish, sometimes nearly white, often wrinkled, hoary and pallid when dry, margin often fringed with fragments of the veil; gills slightly adnexed, crowded, $1\frac{1}{2}$–2 lines broad, white; stem 1–$2\frac{1}{2}$ in. long, 2 lines thick, almost equal, floccosely squamulose and coloured like the pileus up to the ring, smooth and pale above, stuffed then hollow.

*Agaricus granulosus*, Batsch, t. 6, f. 24; Cke., Illustr., pl. 18; Cke., Hdbk., p. 16.

Woods, heaths, &c.

Somewhat gregarious. Distinguished from *L. cinnabarina* by the adnexed gills and the pileus becoming pale. *L. carcharia* differs in the strong smell. *L. amianthina* is separated by the adnate gills and yellow flesh, especially that of the stem.

Subgregarious. Pileus $\frac{1}{2}$–1 in. broad, in general dull reddish-yellow, but occasionally ferruginous, pink, vermilion or white. Fleshy in the centre, at first convex, or

obtusely umbonate, at length often plane or depressed, somewhat wrinkled, covered with furfuraceous scales. Gills white or yellowish white, fixed to the stem, ventricose and nearly free in depressed specimens. Stem 1–3 in. high, 1–4 lines thick, slightly incrassated at the base, when young solid, but in age hollow, with a core occasionally running down from the centre of the pileus, and the base stuffed, sometimes slightly compressed, with a subfugacious flocculose ring about the middle, above which it is slightly fibrillose and beneath it scaly, like the pileus. In the white variety above mentioned the pileus and stem were mealy rather than scaly and the ring attached in fragments to the edge of the pileus. (Berk.)

*Var.* **rufescens**, B. & Br., Ann. Nat. Hist., n. 1834; Cke., Hdbk., p. 16; Cke., Illustr., pl., 213A.

This curious form was found near Bristol, by Mr. Bucknall, pure white at first, then partially turning red, and in drying acquiring everywhere a rufous tint.

I have not seen the variety indicated above, but judging from the figure in Cooke's "Illustrations," it is about the size of the typical form, ring obsolete or nearly so, and the stem almost smooth throughout.

**Lepiota amianthina.** Scop.

Pileus ½–1 in. across, flesh thin, yellow; convex then plane, more or less umbonate, granulosely scurfy, pale ochraceous; gills adnate, crowded, about 1½ line broad, white then with a yellow tinge; stem 1½–2 in. long, about 1 line thick, equal, squamulose up to the ring, smooth above, pale, fistulose, flesh yellow.

*Agaricus amianthinus*, Scopoli, Carn., xi. p. 434; Cke., Hdbk., p. 17; Cke., Illustr., pl. 213B.

In woods, pastures, &c.

Distinguished from allied species by the adnate gills and yellow flesh, especially that of the stem.

*Var.* **Broadwoodiae**, B. & Br.; Cke., Hdbk., p. 17.

Pileus hemispherical, yellow, delicately tomentose, margin incurved; stem equal, and, as well as the ring, mealy; gills white, adnate, sometimes decurrent.

A very distinct variety, if not species. (B. & Br.)

**Lepiota polysticta.** Berk.

Pileus about 1½ in. across, flesh thick, firm, white; convex then expanded, obtusely umbonate or quite obtuse, reddish or yellowish brown, usually broken up into minute adpressed scales, margin often fringed with fragments of the veil; gills free, rounded at both ends, crowded, 2–3 lines broad, with a yellowish tinge; stem 1–1½ in. long, 3–4 lines thick at the apex, base narrowed, scaly and coloured like the pileus up to the imperfect ring, smooth and pale above, stuffed.

*Agaricus* (*Lepiota*) *polystictus*, Berk., Engl. Flora, vol. v. p. 9; Cke. Hdbk., p. 17; Cke., Illustr., pl. 30.

Among short grass by road sides, &c.

Pileus 1½ in. broad, not at all campanulate, expanded, and broadly and obtusely umbonate; flesh thick in the centre, firm and tough, the epidermis broken into minute flat scales of a rich red-brown. Gills numerous, unequal rounded before and behind, broad, ventricose, quite free, the margin serrulate, white with a slight yellowish tinge. Stem 1 in. high, ⅜ in. thick in the middle, divided into two distinct portions, the upper one silky of a pinkish hue, the lower scaly like the pileus, but the scales browner; attenuated at the base where it is furnished with many branched fibrous roots, hollow, stuffed with fine silky filaments. Ring furfuraceous, attached in minute portions to the edge of the pileus. Inodorous and insipid, (Berk.)

## V. MESOMORPHI.

**Lepiota sistrata.** Fr.

Pileus ⅔–1½ in. across, flesh thin; campanulate then expanded, obtuse or at times obtusely umbonate, whitish, disc often darker, tinged with yellow or flesh-colour, pruinose with shining particles; gills almost free, ascending, clear white, crowded, 1½–2 lines broad; stem 1½–2 in. long, about 1 line thick, equal, silky-fibrillose, white, fistulose, loosely stuffed with loose fibrils; ring torn, fibrillose, attached to the edge of the pileus in the form of delicate fibrils, fugacious.

*Agaricus* (*Lepiota*) *sistratus*, Fries, Syst. Myc., i. p. 24; Cke., Hdbk., p. 17; Cke., Illustr., pl. 85A.

Among grass, in gardens, &c.

Allied to *L. seminuda* and to *L. mesomorpha*; the former differs in the mealy stem, the latter in the glabrous pileus and stem and in the entire ring.

This pretty species is remarkable for the filamentous ring. (B. & Br.)

**Lepiota parvannulata.** Lasch.

Pileus up to $\frac{1}{2}$ in. across, disc rather fleshy, remainder almost membranaceous, campanulately convex, umbonate or gibbous, even, at first appearing to be glabrous, but slightly pruinose when young, white with more or less of a yellow tinge; gills free but close to the stem, ventricose, crowded, white, not united to a collar round the stem; stem 1–2 in. long, not a line thick, fistulose, equal, ascending or slightly wavy, white, fibrillose below the ring, naked and glabrous above; ring small, distant, entire, rather persistent, spreading; spores $4 \times 2 \cdot 5$ $\mu$.

*Agaricus parvannulatus*, Lasch, Linnaea, iii. n. 12; Fries, Icon., p. 14, pl. 16, fig. 3.

In pastures, &c.

In woods the specimens are often larger than the measurements given above, but the pileus rarely reaches to 1 in. across.

The only species with which *L. parvannulata* can be confounded is *L. erminia*, which agrees in colour, and is found in similar places, but the latter is much larger, and differs in the superior, torn ring, glabrous pileus, radishy smell, &c. (Fries.)

**Lepiota mesomorpha.** Bull.

Pileus about $\frac{3}{4}$ in. across, flesh thin; campanulate then expanded, the margin sometimes slightly turned up, often more or less umbonate, dry, even, glabrous, yellowish or pale yellow-brown; gills free, about 1 line broad, ventricose, clear white; stem 1–$1\frac{1}{2}$ in. long, about 1 line thick, equal, dry, even, glabrous, paler than the pileus, fistulose; ring superior, erect, persistent, whitish.

*Agaricus mesomorphus*, Bulliard, t. 506, fig. 1; Cke., Hdbk., p. 18; Cke., Illustr., pl. 85B.

On the ground.

Distinguished by the entire, erect ring, and the even and glabrous pileus and stem.

**Lepiota seminuda.** Lasch.

Pileus about 1 in. across, flesh thin; campanulate then expanded, umbonate, floccosely mealy then naked, whitish or flesh-colour, margin often fringed with the torn veil; gills touching the stem, thin, $\frac{3}{4}$ line broad, white; stem 1–2 in. long, not a line thick, equal, whitish, mealy; ring small, imperfect, superior; spores elliptical, $5 \times 3$ $\mu$.

*Agaricus seminudus*, Lasch, Linn., iii. no. 17; Cke., Hdbk., p. 18; Cke., Illustr., pl. 19A.

In woods, &c.

Inodorous. Very slender and delicate. *L. sistrata* differs in the pileus being covered with glistening particles, and in the stem being fibrillose downwards. *L. Bucknalli* differs in the strong smell and the violet powder on the pileus and stem.

**Lepiota Bucknalli.** B. & Br.

Smell strong, resembling gas tar, Pileus $\frac{1}{2}$–$\frac{3}{4}$ in. across, flesh thin; campanulate then convex, white, sprinkled with lilac powder, which is densest at the disc; gills touching the stem, about 1 line broad, white; stem $1\frac{1}{2}$–3 in. high, 1 line thick, more or less dilated at the base, otherwise equal, straight, white, basal half sprinkled with violet powder, fistulose; spores $7 \times 3{\cdot}5$ $\mu$.

*Agaricus* (*Lepiota*) *Bucknalli*, Berk. & Broome; Cke., Hdbk., p. 18; Cke., Illustr., pl. 19B.

On the ground.

Smell strong, like gas tar. (B. & Br.)

**Lepiota ianthina.** Cooke.

Pileus about $\frac{3}{4}$ in. across, flesh thin; campanulate then expanded, umbonate, whitish at the even margin, disc dark violet, fibrillose, rest of pileus streaked with innate, radiating, violet, hair-like squamules; gills free, about 1 line broad, lanceolate, scarcely crowded, whitish; stem about 1 in. long, 1 line thick, nearly equal, somewhat flexuous, whitish, soon hollow; ring distant, narrow deciduous.

*Agaricus* (*Lepiota*) *ianthinus*, Cke., Grevillea, vol. xvi. p. 101; Cke., Hdbk., p. 363; Cke., Illustr., pl. 944A.

In a stove.

Possibly an introduced species.

**Lepiota martialis.** Cke. & Mass.

Pileus up to 1 in. across, flesh thin, white; campanulate then plane, minutely silky, clear deep pink, disc darker, with an ochraceous tinge when old, margin striate; gills free, up to 1 line broad, rather crowded, somewhat lanceolate whitish; stem 1–1½ in. long, 1½ line thick at the base, thinner upwards, pinkish red below the ring, pale ochraceous above; ring broad, pendulous, rather distant, persistent; spores elliptical, 8 × 4 μ.

*Agaricus* (*Lepiota*) *martialis*, Cooke & Mass., Grevillea, vol. xvi. p. 77; Cke., Hdbk., p. 363; Cke., Illustr., pl. 944B.

On the trunk of a tree fern.

Readily distinguished by the clear pinkish-red pileus. Probably introduced.

B. *Cuticle viscid, not broken up.*

**Lepiota medullata.** Fr.

Smell resembling radishes. Every part pure white. Pileus 1½–2½ in. across, flesh rather thin, watery; convex then expanded, even, glabrous, viscid, disc sometimes greyish, fragments of the veil often fringing the margin; gills free, crowded, ventricose, broadest in front, about 1½–2 lines broad; stem 2½–3 in. long and 3 lines thick, equal, dry, silky-squamulose below the veil, apex striate, the thick external cortex readily separable from an internal tube, at length fistulose; ring incomplete, torn, usually remaining in fragments at the margin of the pileus and scarcely evident on the stem, rarely distinct and entire or nearly so on the stem and almost absent from the pileus.

*Agaricus* (*Lepiota*) *medullatus*, Fries, Epicr., p. 19; Cke., Hdbk., p. 18; Cke., Illustr., pl. 44.

On the ground.

Agrees with *L. illinita* in colour, but differs in the dry stem and distinct veil. Differs in colour from *L. delicata*. (Fries.)

**Lepiota delicata.** Fr.

Pileus about 1 in. across, flesh thin; convex then plane,

somewhat umbonate, even, glabrous, viscid, but granular, rufescent or yellowish; gills free, crowded, thin, pure white; stem 1 in. long, 1 line thick, equal, dry, whitish, covered with floccose down; ring usually entire, membranaceous, dry.

*Agaricus* (*Lepiota*) *delicatus*, Fries, Syst. Myc., i. p. 23; Cke., Hdbk., p. 19; Cke., Illustr., pl. 18B.

In woods, also in hothouses.

Certainly distinct from *L. glioderma*, although the distinctive features are not very pronounced. Differs in being only about one-third the size; pileus not campanulate; stem floccose, not squamose. (Fries.)

Pileus hemispherical, obtuse, rivulose, viscid, smooth, pallid, 1 in. across; stem $\frac{1}{2}$ in. high, $\frac{1}{4}$ in. thick, transversely punctate, squamulose, stuffed with flocci, white above; veil floccose, slightly appendiculate; gills free, rounded behind, approximate, pallid. The veil is really double, floccose, covered with scaly particles. Taste like that of *Polyporus squamosus*. This is clearly a stout form of *Lepiota delicata*, of which we have a figure, from the author, closely corresponding with our species. (B. & Br.)

Fries mentions two varieties:—**pallida**; pileus yellowish or pale rose; in woods and uncultivated places; **vaporaria**; pileus rufescent.

**Lepiota illinita.** Fr.

Pileus 2–3 in. across, flesh rather thin, white, soft; ovate-campanulate, then expanded; somewhat umbonate, viscid, glabrous, margin slightly striate and often fimbriate, usually clear white, sometimes tinged with ochraceous or tan-colour; gills free, crowded, at length remote from the stem, white; stem 2–3 in. long, 2–3 lines thick, white, equal, glutinous, ring obsolete, stuffed then hollow.

*Agaricus* (*Lepiota*) *illinitus*, Fries, Obs. Myc., xi. p. 8; Fries, Icon., pl. 16, f. 1; Cke., Hdbk., p. 19.

In woods.

Entire fungus glutinous from the universal veil, which forms an incomplete ring on the stem, when the pileus expands; partial veil not evident. Stem stuffed when young, soon hollow, 2–3 in. long, 2–3 lines thick, equal, fragile, not at all floccose or scaly, but glutinous and slimy, but dry

above the ring. Pileus with the flesh thin, 1½–3 in. across, glabrous, viscid, soft, at length fragile, umbo with a fuscous tinge, margin slightly striate. Gills free, at length distant from the stem, crowded, soft, often connected by veins. The entire fungus is usually clear white, but forms occur having the pileus clay-colour or tan-colour, margin even, fimbriate. (Fries.)

Readily distinguished by the very imperfect ring, and the glutinous pileus and stem. *L. medullata* differs in having the stem quite dry.

**Lepiota glioderma.** Fr.

Pileus 1–2 in. across, flesh thin, soft, white; campanulate then convex, broadly gibbous or obtuse, even, glabrous, reddish-bay or yellowish-brown, viscid; gills free but close to the stem, ventricose, broad, pure white, not spotted; stem about 3 in. long, 2–3 lines thick, equal, dry, soft, whitish, covered with floccose squamules as far up as the incomplete, torn ring, quite naked above the ring, whitish or with a rufous tinge.

*Agaricus* (*Lepiota*) *gliodermus*, Fries, Vet. Ac. Förhandl., 1852; Cke., Illustr., pl. 118A; Cke., Hdbk., p. 19.

In pine woods, &c.

Readily distinguished by the dark-coloured, viscid pileus, that does not become at all broken up at the surface, as usual in the genus.

Analogous in many respects with *L. clypeolaria*, but very distinct in the even, glabrous, viscid pileus. (Fries.)

**Lepiota lenticularis.** Lasch.

Pileus 3–4 in. across, flesh rather thick, soft, spongy, white; globose when young, then campanulate and convex, even, glabrous, naked, tan-colour with a tinge of red; gills entirely free, but close to the stem, ventricose, broadest in front, closely crowded, whitish; stem 4–6 in. high, ½ in. and more thick, base slightly swollen, or altogether equal, solid but very spongy and soft, more or less squamulose or almost glabrous; ring superior yet distant from the pileus, even, large; stem above the ring exuding large drops of water in damp weather which dry up and leave spots.

*Agaricus lenticularis*, Lasch, Linn., iii. n. 18; Cke., Illustr., pl. 17; Cke., Hdbk., p. 19.

In damp woods.

Remarkable for the great development of the ring, and the smooth pinkish tan pileus. Stem 4–6 in. long. Pileus 3–4 in. broad. Fries places it in *Amanita*. (Cooke.)

**Lepiota Georginae.** W. G. Smith.

Pileus $\frac{1}{2}$–1 in. across, flesh rather thin, white, changing to crimson when broken; fragile, campanulate then plane, covered with a dense, viscid mealiness, white, changing instantly to crimson when touched, margin at length striate; gills free, very thin, moderately distant, somewhat ventricose, about $1\frac{1}{2}$ line broad, white, the edge becoming crimson when touched; stem 1–2 in. long, up to 1 line thick, slightly attenuated upwards, clothed with white, viscid meal which becomes crimson when touched, fistulose; ring evanescent, spores elliptical, 10–12 × 6–7 $\mu$,

*Agaricus* (*Lepiota*) *Georginae*, W. G. Smith, Seeman's Journ. Bot., vol. ix. p. 1, t. 112 (1871); Cke., Hdbk., p. 20; Cke., Illustr., pl. 132 (after Smith).

On mosses in a cool fernery.

Readily distinguished by being white at first, and every part turning crimson at once when touched. An introduced species.

## AMANITOPSIS. Roze.

Stem with a volva at the base; ring absent; remainder as in *Amanita*.

*Amanitopsis*, Roze, in Karst., Hattsv., i. p. 6; Sacc., Syll., vol. v. p. 20.

*Amanita*, Pers., Syn., p. 246; Cke., Hdbk., p. 6 (as a subgenus of *Agaricus*).

The present genus differs from *Amanita* in the absence of a ring, and from *Lepiota* in the presence of a volva.

**Amanitopsis vaginata.** Roze.

Pileus 2–5 in. across, flesh rather thin, whitish; campanulate then expanded, obtuse, glabrous, naked or rarely with fragments of the volva attached, moist in rainy weather, somewhat shining when dry, margin quite membranaceous and coarsely striate; colour variable, lead-colour, orange-rufous, whitish, &c.; gills free, ventricose, not much crowded,

white or pallid; stem 4–5 in. high, $\frac{1}{2}$ in. thick at the base, equally attenuated upwards, very soft and at length fragile, the entire surface broken up into squamules, hollow or with fine fibrils more or less occupying the cavity; volva entirely free from the stem, except a point at the extreme base, sheathing, lax, fragile; spores elliptical, 10 × 7–8 $\mu$.

*Amanitopsis vaginata*, Roze, in Karsten, Hattsv., i. p. 7.

*Agaricus* (*Amanita*) *vaginatus*, Cke., Hdbk., p. 10; Cke., Illustr., pl. 12, & 18.

*Agaricus vaginatus*, Bull., t. 98, 512.

*Agaricus nivalis*, Grev., Scot. Cr. Fl., t. 18 (the white form).

Among grass, in woods, &c.

Pileus 4 in. or more broad, plane, slightly depressed in the centre, scarcely umbonate, fleshy except at the extreme margin, which in consequence is elegantly grooved; viscid when moist, beautifully shining when dry; at first there are a few broad scales, the remains of the volva, but these soon vanish; the epidermis easily peels off. Gills free, ventricose, broadest in front, often imbricated, white. Spores white, round. Stem 6 in. or more high, $\frac{1}{2}$–1 in. thick, attenuated upwards, obtuse at the base, where it is furnished with a volva which is adnate for about an inch and then, in general, closely surrounding it like a sheath, but sometimes the margin is expanded, marked within at the base, with the groves of the pileus, brittle, sericeo-squamulose, scarcely fibrillose, but splitting with ease longitudinally, hollow, or rather stuffed with fine cottony fibres, the very base solid, not acrid, insipid; smell scarcely any. The volva is easily overlooked if care be not taken to dig up the very base of the stem, as it is apt to be entangled in the grass. It occurs of various colours; the more general one is a mouse-grey. Bolton figures a tawny variety agreeing with *A. fulvus*, Schaeff., t. 95. Others are figured by Schaeffer of a bluish and bay hue. Batsch has a white and Haller a green variety. (Berk.)

White. Pileus 2–3 in. broad, ovate in the volva, then convex, at length plane and subumbonate, the centre sub-ochraceous, at first warty then quite smooth. Flesh white, very thin on the margin. Gills subdistant, broad in front, narrow behind, entire. Stem 3–5 in. high, 3–4 lines thick,

naked, stuffed with spongy fibres, bulbous at the base, with a constriction where the volva becomes free. Volva loose, persistent. (Grev.) This applies to *Ag. nivalis*, Grev.

**Amanitopsis strangulata.** Fr.

Pileus 3–4 in. across, flesh rather thick, whitish, not changing colour; campanulate then expanded, plane when adult, margin striate when young, then sulcate, slightly viscid, glabrous, livid-bay, becoming pale, with numerous wart-like fragments of the volva; gills free, without a decurrent line on the stem, crowded, ventricose, 3 lines broad, clear white; stem 4–6 in. long, up to 1 in. thick at the base and gradually attenuated upwards, pale, stuffed then hollow; volva adnate, becoming broken up into 1–3 irregular rings owing to increase in length of the base of the stem.

*Agaricus* (*Amanita*) *strangulatus*, Fries, Epicr., p. 6; Fries, Icones, p. 11, t. 11; Cke., Hdbk., p. 10; Cke., Illustr., pl. 13.

In woods.

Colour mouse-grey; smell none; taste sweet, (Cke.)

**Amanitopsis adnata.** W. G. Smith.

Pileus about 3 in. across, flesh rather thick, whitish, firm; convex then expanded, rather moist, pale yellowish-buff, often furnished with irregular, woolly patches of the volva; margin even, extending beyond the gills; stem 2–4 in. long, ½ in. thick, cylindrical, rough, fibrillose, pale buff, flesh distinct from that of the pileus, stuffed then hollow; base solid slightly swollen, volva adnate, white, downy, margin free and lax, sometimes almost obsolete; gills truly adnate, crowded, with many intermediate, shorter ones, white; spores subglobose with an oblique apiculus, 7–8 $\mu$.

*Agaricus* (*Amanita*) *adnatus*, W. G. Smith. Saund. & Smith, t. 20; Cke., Hdbk., p. 10; Cke., Illustr., pl. 35.

Woody places, under oak and holly.

## AMANITA. Fries. (figs. 4, 5, p. 3.)

The universal veil at first completely enclosing the whole fungus, becoming ruptured by the increase in length of the stem, one portion remaining as a volva or sheath at the base of the stem, the remainder usually forming separable

scales or patches on the pileus; stem central, its substance usually distinct from the flesh of the pileus, furnished with a ring; gills free.

*Amanita*, Fries, Syst. Myc., i. p. 12 ; Cke., Hdbk., p. 6 (as a subgenus of *Agaricus*).

The universal veil is quite distinct from the pileus. Most nearly allied to *Amanitopsis*, which differs only in the absence of a ring. *Lepiota* differs in the absence of a volva.

All the species grow on the ground.

## *ANALYSIS OF THE SPECIES.*

* Volva splitting at the apex or circumscissile, limb free, persistent. Pileus naked or with broad membranaceous fragments of the pileus.

** Volva distinctly circumscissile, margin persistent, the upper portion broken up into thick warts by the expansion of the pileus.

*** Volva very friable, entirely broken up into wart-like scales. Pileus with unequal mealy patches which soon disappear, or with small, hard, polygonal warts.

**** Volva almost obsolete, flocculose, entirely disappearing.

### * *Volva splitting or circumscissile; pileus naked or with irregular patches.*

**Amanita virosa.** Fr.

Foetid. Entirely pure white; rarely with a tinge of yellow on the pileus. Pileus 3–4 in. across, fleshy, at first acutely conical, then campanulate, at length expanded, naked, viscid in moist weather, shining when dry, margin always even, but often unequally waved and incurved; gills free, thin, 2 lines broad, slightly broader in front, not decurrent, crowded, margin minutely flocculose; stem 4–6 in. long, $\frac{3}{4}$ in. thick at the base, slightly attenuated upwards, apex often compressed, surface torn into squamules, entirely stuffed, almost solid, ring near apex of stem, lax, silky, torn,

fragments often adhering to the gills and margin of the pileus; volva large, lax, irregularly splitting at the apex; spores subglobose, 8–10 $\mu$ diameter.

*Agaricus* (*Amanita*) *virosus*, Fries, Epicr., p. 3; Cke., Illustr., pl. 1,

In damp woods.

Distinguished by the strong, disagreeable smell, white colour, and large, lax volva.

**Amanita phalloides.** Fr.

Pileus 3–4 in. across, flesh rather thick, white; ovate then campanulate, at length expanded, obtuse, covered with a pellicle that is viscid when moist, but not glutinous, rarely with one or more fragments of the volva attached, margin regular, even; colour very variable, usually white or pale yellow when exposed to light, greenish or with an olive tinge, or often spotted when in shady places; gills free, ventricose, 3–4 lines broad, pure white; stem 3–5 in. long, $\frac{1}{2}$–$\frac{2}{3}$ in. thick, almost glabrous, white, bulbous, solid at the base, hollow and slightly attenuated upwards, often curved; ring superior, large, reflexed, slightly striate, tumid, usually entire, white; volva more or less buried in the ground, bulbous, nearly free, margin torn, lax; spores subglobose, 7–8 $\mu$ diameter.

*Agaricus* (*Amanita*) *phalloides*, Fries, Epicr., p. 4; Cke., Hdbk., p. 6; Cke., Illustr., pl. 2.

*Agaricus vernus*, Bull., t. 108; Cke., Hdbk., p. 7; Cke., Illustr., pl. 3.

Smell not strong but unpleasant. Distinguished by the ample, nearly free volva and the large ring. Fries says that he has met with this species in late autumn having the disc of the pileus almost black and becoming whitish towards the margin.

Pileus 2–3 in. broad, fleshy subhemispherical, then expanded or even slightly depressed, sometimes slightly umbonate, irregularly scaly from the fragments of the volva adhering to the shining surface, which is slimy when moist; the margin quite even and free from striae; white, straw-coloured, olive-green with brown markings, &c. Gills numerous, unequal, ventricose, broader in front, pure white, subadnexed, sometimes quite free; when young covered

with a membrane which in course of expansion either falls off or forms a deflexed ring.

Stem 3–4 in. high, half an inch thick, fibrillose with a few adpressed scales arising from the partial ring which was at first in contact with it, attenuated upwards, bulbous below and there furnished with a variously lobed volva, which is adnate with the base of the stipes, but has the margin free and more or less expanded, in general hollow at the apex or for some distance down, though occasionally the inner substance is only a little more spongy than the outer, varying much in size and colour and degree of scaliness, and according to Fries in the manner of adherence of the volva. When fresh it has a powerful but not disagreeable smell; when past maturity, its odour becomes almost insupportable. (Berk.)

**Amanita mappa.** Fr.

Pileus 2–3 in. across, rather fleshy; convex then plane, obtuse or depressed, orbicular, dry, usually white or yellowish, margin for the most part even; gills adnexed, crowded, narrow, clear white; stem 2–3 in long, 3–5 lines thick, white; ring superior, soft, lax, usually torn; volva splitting in a regularly circumscissile manner, a portion remaining on the pileus in the form of broad, irregular, seceding scales, base globosely-bulbous, connate with the stem, margin acute, distinct and distant; spores subglobose, 7–9 $\mu$ diameter.

*Agaricus* (*Amanita*) *mappa*, Fries, Epicr., p. 4; Cke., Hdbk., p. 7; Cke., Illustr., pl. 4.

In woods.

Smell strong; colour variable. Somewhat resembling *A. phalloides*, but differing in the shorter, equal stem.

** *Volva circumscissile; pileus warted.*

**Amanita pantherina.** Fr.

Pileus 3–4 in. across, flesh thin except at the disc, persistently white; convex then almost or quite plane, margin striate, reddish-yellow or brownish, cuticle viscid, usually ornamented with pale, flat, mealy warts; gills narrowed behind and free but close to the stem, broad in front, white; stem 4–5 in. long, $\frac{1}{2}$ in. thick, bulbous, more or less silky or

broken up into scales, whitish, stuffed then hollow; ring distant, usually oblique; volva adnate, the extreme margin only free; spores elliptical.

*Agaricus* (*Amanita*) *pantherinus*, Fries, Syst. Myc., i. p. 16; Cke., Hdbk., p. 8; Cke., Illustr., pl. 6.

In woods and in pastures under trees.

Solitary. Pileus 4 in. broad, at first convex with many flat mealy warts, which rub off with difficulty; then expanded and slightly depressed, glutinous when moist, when dry soft to the touch like kid leather; beneath the gluten are minute fasciculato-pilose scales, but quite adpressed and innate, reddish grey or brown, according to Fries sometimes livid, margin sulcate and tubercled. Gills broad in front, free, white. Spores round, pure white. Stem 5 in. high, $\frac{1}{2}$ in. thick, stuffed, at length more or less hollow, bulbous, either silky and even or torn into reflexed scales; ring deflexed; volva quite smooth, connate, the extreme margin only free all round. (Berk.)

**Amanita muscaria.** Fr.

Pileus 4–8 in. across, flesh rather thin in proportion, white, yellowish just under the cuticle; globose then plane, margin striate, pellicle viscid, usually deep scarlet, but sometimes orange, lemon-yellow, or brownish, becoming whitish; gills approaching the stem, down which they form decurrent lines, 3–5 lines broad, white or with a tinge of yellow; stem 4–7 in. high, up to 1 in. thick, base ovately bulbous, stuffed then hollow, whitish, ring superior, lax; volva adnate, broken up into concentric scales; spores elliptical.

*Agaricus* (*Amanita*) *muscarius*, Syst. Myc., i. p. 16; Cke., Hdbk., p. 7; Cke., Illustr., pl. 117.

In woods, especially birch and fir.

Pileus 3–6 in. broad, convex at first, at length nearly or quite plane, striated at the margin, mostly bright red or orange, but varying sometimes to liver-colour, yellowish, or even whitish, warty. Warts white or yellowish, prominent, pretty regularly scattered over the surface, sometimes wanting. Lamellae adnate with the stipes, very numerous, broad, white. Flesh thick, white, partaking to a small depth of the colour of the pileus. Stipes smooth, white, very straight, subsolid, 4–8 in. high, nearly an inch thick,

bulbous at the base. Veil annular, white. Volva perfect only in extremely young plants, cracking immediately into pyramidal warts, which become less elevated, and generally leaving a few traces upon the bulb at the base of the stem.

This most splendid chief of the agaricoid tribe really deserves the name of *imperial*, applied to it by Batsch, for the most indifferent person must be attracted by the glowing hues of its ample pileus, its regular form, and tall pillar-like stipes; eminently conspicuous, even at a distance, in the shaded recesses of its native woods. In the Highlands of Scotland it is impossible not to admire it, as seen in long perspective between the trunks of the straight fir-trees; and should a sunbeam penetrate through the dark and dense foliage, and rest on its vivid surface, an effect is produced by this chief of a humble race which might lower the pride of many a patrician vegetable. (Grev.)

**Amanita excelsa.** Fr.

Pileus 4–5 in. across, flesh thick, everywhere white, unchangeable; soft, globose, expanding until quite plane, viscid in damp weather, then the surface often becomes wrinkled into wart-like projections or variously cavernous and lacunose; warts or fragments of the volva friable, irregular, angular, greyish-white, readily separating and disappearing, colour of pileus brownish-grey, centre darker; margin even at first, but when fully expanded and developed, evidently striate; gills free, not striately decurrent down the stem, ventricose, $\frac{1}{2}$ in. and more broad; pure white, with many intermediate short ones; stem at first stuffed, almost solid, but becoming hollow, 4–6 in. long, 1 in. thick, base a depressed sphere, above which the stem is attenuated upwards, the epidermis broken up into dense, concentric scales up to the ring or near the base only; apex striate; bulb somewhat marginate when young, but not at all separable, margin scaly, immersed in the ground, somewhat rooting, having irregularly concentric grooves below the margin; ring superior, large, becoming free or torn; spores 8–9 × 5–6 $\mu$.

*Agaricus* (*Amanita*) *excelsa*, Fries, Epicr., p. 8; Cke., Illustr., pl. 6; Cke., Hdbk., p. 8.

Grassy places in woods.

Solitary. Pileus 4 in. broad, umber-grey, slightly viscid, smooth, easily rubbed off; epidermis tough and clammy, easily peeling off; margin not striate. Gills obtuse before and behind, but much broader in front, truly free, ½ in. broad, the margin slightly uneven. Stem 6 in. or more high, 1 in. thick, going deep into the earth; scaly below the ring, scales thick and squarrose; above the ring the scales are closely adpressed, their interstices finely silky, apex striate, tolerably firm, juicy, of an unchangeable white, distinct from the pileus, though nearly of the same substance; ring half way down, large, substriate within, externally downy. Taste pleasant. (Berk.)

**Amanita strobiliformis.** Vitt.

Pileus 5–8 in. across, flesh thick at the disc, thin towards the margin, firm, white, convex then expanded, with a distinct pellicle, margin even, extending slightly beyond the gills, white, greyish, or yellowish-brown, warts large, angular or pyramidal, hard, closely adnate and persistent; gills rounded behind and free, broad, whitish; stem 5–7 in. long, up to 1½ in. thick, solid. Floccosely scaly, expanding at the base into a subterranean bulb having 1–2 concentric, acutely marginate rings; ring superior, large, torn.

*Agaricus* (*Amanita*) *strobiliformis*, Vittadini, Fung. Mang., t. 9; Cke., Hdbk., p. 8; Cke., Illustr., pl. 8, and 277.

Borders of woods, &c.

Pileus when young subglobose, bulb of the stem conical below, rooting, its border sometimes incised all round, sometimes even, floccose above to the edge of the pileus; scales of the pileus large, wart-like, with a brown disc and white floccose border, at length falling off. Pileus when expanded 8 or 9 in. across, at length quite smooth; margin extending beyond the gills. Stem 6–7 in. high, 1½ in. thick, firm, solid; bulb not properly scaly; veil large; gills rounded behind, the shorter ones denticulate at the base. Smell and taste at first slight, at length disagreeable.

This is undoubtedly the species of Vittadini and Bulliard. Too much stress must not be laid upon the incision of the bulb or its scales, for neither character is constant. (B. & Br.)

**Amanita solitaria.** Bull.

Pileus 3–5 in. across, flesh rather thin, persistently white, compact; convex then almost plane, with a distinct pellicle, margin almost even, whitish or with a rufous tinge, with rather small, scattered, floccose, angular warts that are easily removed; stem solid, equal, 3–4 in. long, 1 in. thick, clothed with imbricated scales below, coloured like the pileus, bulb campanulate, rooting, marginate; ring superior, torn; gills narrow behind and adnexed, broad, white.

*Agaricus solitarius*, Bulliard, Champ. Fr., t. 48; Cke., Hdbk., p. 361; Cke., Illustr., pl. 939.

On the ground, in damp places.

Distinguished by the scaly stem and rooting base of the stem.

*** *Volva entirely friable.*

**Amanita rubescens.** Fr.

Pileus 3–5 in. across, flesh thick, white, becoming dingy red when broken; convex then expanded, dingy flesh-colour, reddish-brown, or tan-colour, sprinkled with small, adnate warts; gills narrowed behind and touching the stem, down which they pass as decurrent lines, whitish; stem about 3 in. long, 1 in. thick at the base, conically attenuated upwards, stuffed, more or less scaly, whitish then stained with red, flesh turning red with age or when broken; ring superior, large, entire, drooping; volva nearly obliterated, bulbous base of stem more or less concentrically grooved; spores elliptical, $8 \times 6$ $\mu$.

*Agaricus* (*Amanita*) *rubescens*, Fries, Syst. Myc., i. p. 18; Cke., Hdbk., p. 8; Cke., Illustr., pl. 9 and 1163.

In woods, &c.

Very variable, but readily distinguished from every other species by the flesh becoming red when broken. Stem and pileus usually becoming red when bruised. In very rainy weather the warts of the pileus are often washed off. A form with a short, subequal stem, and smaller, crowded, firmly adhering warts, requires to be carefully distinguished from *A. aspera*. (Fries.)

Pileus convex, reddish, unequally warty, warts flat; smooth and even on the margin; in old specimens there is sometimes an appearance of striae on the margin in consequence of its becoming transparent, slightly viscid, flesh

turning red when cut, more or less completely. Gills broad in front, narrow behind, adnexed by a fine prominent line. Spores subelliptic. Stem stuffed at length more or less hollow, bulbous, the bulb more or less smooth, above the ring clothed with flat adpressed scales; below the ring the scales have their upper margin free and patent; ring large, deflexed, striate. Smell strong, taste not unpleasant. Such is the form which occurs not unfrequently in the South of England. The discoloration of the flesh is by no means strongly marked. Indeed I find specimens in which it is very slight, and the change is rather to brown than red; the stem furfuraceous below the ring, and above striate and pulverulent; the volva thick and smooth. (Berk.)

**Amanita spissa.** Fr.

Pileus 3–4 in. across, flesh rather thick, white, unchangeable; convex then plane, obtuse, glabrous, even, but more or less covered with small, angular, adnate, greyish warts, umber, sooty, or grey; margin even but often torn into fibrils; gills approaching very close to the stem, down which they run in fine decurrent lines, broad, crowded, clear white, stem 2–3 in. long, nearly 1 in. thick, clear white, solid; bulb globoso-depressed, not marginate, slightly rooting; stem at length concentrically cracked and squamulose; ring superior, large; spores rather pear-shaped, 9–10 × 6 $\mu$.

*Agaricus* (*Amanita*) *spissus*, Fries, Epicr., i. p. 9; Cke., Hdbk., p. 9; Cke., Illustr., pl. 69.

In woods.

Pileus often torn and fibrillose at the magin; warts thin, adnate, mealy, grey.

**Amanita nitida.** Fr.

Pileus about 4 in. across, flesh rather thick, white, almost unchangeable, somewhat compact, hemispherical, covered with the thick floccose volva which becomes broken up into thick, adherent, brownish, angular warts as the pileus expands, dry, shining, whitish, without a viscid pellicle, margin always even; gills free, crowded, up to $\frac{1}{2}$ in. broad, ventricose, crowded, clear white; stem almost 3 in. long, 1 in. thick, conically attenuated upwards, solid, base bulbous, squamulose, white; ring superior, thin, torn, rather striate, white, downy below, at length disappearing.

*Agaricus (Amanita) nitida*, Fries, Epicr., p. 8; Cke., Hdbk., p. 9; Cke., Illustr., t. 70.

In shady woods.

Readily known by the whitish pileus bearing large, hard, thick, angular warts.

Amongst several specimens, some exactly agree with the definition of Fries in the thick indurated angular warts, while others approach so near to *A. mappa* that it is difficult to distinguish them. (B. & Br.)

**Amanita aspera.** Fr.

Pileus 2–3 in. across, flesh rather thick at the disc, whitish, reddish or brownish under the cuticle; convex then plane, margin thin and even, rough with firmly adnate, minute, closely crowded, angular warts, reddish brown or livid brownish, not pure white, unchangeable; gills free and rounded behind, not striately decurrent, ventricose, white; stem stuffed, short at first, ovate, then elongating to 2–3 in., attenuated upwards from a rugulose bulb, squamulose, white without and within; ring superior, entire; spores 8 × 6 $\mu$.

*Agaricus (Amanita) asper*, Fries, Epicr., p. 9; Cke., Illustr., pl. 10; Cke., Hdbk., p. 9.

In woods, especially beech.

Free margin of volva obsolete and pileus densely crowded with innate, minute, sharp warts distinguish this species. Pileus sometimes with an olive tinge, stem up to 4 in. long, $\frac{1}{2}$ in. thick.

Pileus 2–3 in. broad, at first convex, then expanded, scarcely umbonate, reddish, with various tints of livid and grey, clothed with small acute warts, margin not striate; flesh thick, permanent white, except immediately beneath the epidermis. Gills white, broad in front, with sometimes a little tooth behind running down the stem, at length more or less imbricate. Stem 2–3 in. high, sometimes $1\frac{1}{2}$ in. thick at the base, but often much less, bulbous, the bulb rather rough, striate above the ring, diffracto-squamulose, or silky below, stuffed; ring broad striate. Flesh of the stem when eaten by maggots and bulb when old, red. The delicate surface of the ring and stipes is brick-red when touched, or from the pressure of the surrounding grass. Odour strong, taste not unpleasant. (Berk.)

**** *Volva almost obsolete.*

**Amanita magnifica.** Fr.

Pileus 3–5 in. across, flesh rather thick, white, then like that of the stem reddish; convex then almost plane, almost naked or with scattered mealy patches of the pileus that do not form warts, reddish-brown or liver-colour, margin striate; stem 4–5 in. long, up to $\frac{3}{4}$ in. thick, almost equal or more or less bulbous at the base, scaly and coloured like the pileus up to the superior, large, drooping, seceding ring, pale above. stuffed then hollow; volva obliterated; gills narrowed behind and slightly decurrent, rather narrow, whitish.

*Agaricus* (*Amanita*) *magnificus*, Fries, Epicr., p. 10; Cke., Hdbk., p. 9; Cke., Illustr., pl. 34.

Under beech-trees, &c.

The whole fungus is sometimes more slender than indicated above. Allied to *A. rubescens*, but differing in the decurrent gills, absence of warts on the pileus, stem becoming hollow, &c.

In fir woods. Our plant differs from the figure in Fl. Dan., t. 2146, in having a bulbous base. Pileus campanulate, even, with scattered mealy patches; stem attenuated upwards, transversely scaly. Whole plant dark liver-red, with the exception of the white, adnexed gills. Allied to *A. rubescens*, but quite distinct, though variable. Fl. Danica, tab. 2148, fig. 2, which is referred by Fries to this species, has, like the Agaric before us, a bulbous base. (B. & Br.)

**Amanita megalodactyla.** Berk.

Strong scented. Pileus 2–2$\frac{1}{2}$ in. across, flesh rather thick, white; convex then expanded, somewhat gibbous, soft, smooth, reddish-grey, cuticle not broken up, margin even; gills free, 2–3 lines broad, pallid, becoming tinged with red; stem 4–5 in. long, $\frac{1}{2}$ in. thick, slightly bulbous, solid, fibrillose, white; ring superior, large, spreading; volva floccose, almost obsolete, entirely adnate; spores elliptical, 5 × 3 $\mu$.

*Agaricus* (*Amanita*) *megalodactylus*, Berk.. Outl., p. 91; Cke., Hdbk., p. 9; Cke., Illustr., pl. 11.

In woods.

In Cooke's figure the pileus is bright ochraceous, and

altogether recalls to mind *Lepiota lenticularis;* the latter is, however, more robust and differs in the squamulose stem, and absence of smell.

## HYPHOMYCETES. Corda (in part).

Saprophytes or parasites, generally superficial, or nearly so on the matrix; rarely internal parasites in the bodies of insects; hyphae typically septate, more or less abundantly developed, and bearing naked conidia.

*Hyphomycetes*, Corda (in part), Icones Fung., i. p. 10.

*Hyphomyceteae*, Saccardo, Syll., vol. iv. p. 1.

The members of the present group are mostly individually minute, and come under the designation of microscopic fungi, and are known in popular language as "moulds." Most species are gregarious, and form white or coloured, cottony or velvety patches on decaying or dead plants and animals, although some species are true parasites. The *conidia*, as the minute spores or reproductive bodies are called, are always borne naked, on the hyphae, and are never contained in asci, or enclosed in sporangia, as in the *Phycomycetes*, which include *Mucor* and other genera, which are also frequently included under the term "moulds."

In a few species the heads of conidia are involved in mucus, which may, under superficial examination be mistaken for a membrane. Again in some groups the hyphae are also more or less viscid, and are hence more or less horny when dry.

When mature, the conidia fall away very readily, and this is especially the case when placed in water, hence when the general habit, mode of branching, &c., of a specimen has been first observed under a low power of the microscope, it is best to remove a small portion with a pair of forceps, and place it in a drop of absolute alcohol or acetic acid on a slide; by this means many of the conidia are retained in their natural position; specimens treated in this way can be stained, and afterwards mounted in Canada balsam or glycerine jelly.

Many forms included in the present family, that were at one time considered as distinct species, have been shown by recent researches to be only forms in the life-cycle of more

highly developed fungi belonging to other families, more especially to the various orders of the Ascomycetes. All such form-species are included in the present arrangement, and their true relationship indicated where known.

In dealing with the *Hyphomycetes* I have followed the arrangement given by Saccardo in "Sylloge Fungorum," vol. iv.

## *KEY TO THE FAMILIES.*

### I. Mucedineae.

Hyphae pallid or bright-coloured, collapsing, lax, crowded, but not cohering in regular fascicles to form a stem-like structure; conidia similar in colour.

### II. Dematieae.

Hyphae dark coloured, brown or blackish, rather rigid, crowded, but not fasciculate; rarely somewhat hyaline, but then the conidia are dark-coloured.

### III. Stilbeae.

Hyphae pallid or brownish, densely coherent in elongated, stem-like fascicles (= *stipes*).

### IV. Tuberculariеae.

Hyphae pallid or brownish, densely conglutinated into a wart-like tuft (= *sporodochium*), often seated on a compact, stroma-like base.

## Fam. I. MUCEDINEAE. Link.

Hyphae white, pallid, or bright-coloured (rarely brownish), forming cottony, or downy patches, soon collapsing, lax;

never agglutinated together in a definitely fasciculate manner.

*Mucedineae*, Link, Berl. Mag., iii. p. 10; emended by Saccardo, in Mich., ii. p. 13; Sacc., Syll., vol. iv. p. 2.

The leading characters of the present family consist in the white or bright colour of the hyphae and conidia; the hyphae are comparatively flaccid and soon collapsing, forming dense cottony or downy tufts, but never agglutinated together to form compound stem-like structures.

### Sect. I. **Amerosporae.** Sacc.

Conidia continuous (= 1-celled, hence not septate), hyaline or brightly coloured, subglobose or shortly cylindrical, not elongated.

#### Subsect. 1. **Micronemeae.** Sacc.

Hyphae very short, scarcely to be distinguished from the conidia.

##### Tribe 1. *Chromosporieae.* Sacc.

Conidia not concatenate.

##### Tribe 2. *Oosporeae.* Sacc.

Conidia catenulate.

#### Subsect. 2. **Macronemeae.** Sacc.

Hyphae elongated, distinct from the conidia.

##### Tribe 3. *Cephalosporieae.* Sacc.

Conidia produced in a head or cluster, not catenulate.

##### Tribe 4. *Aspergilleae.* Sacc.

Conidia capitate and catenulate.

Tribe 5. *Botrytideae.* Sacc.

Conidia not capitulate, but vaguely inserted on simple or branched (not verticillate) hyphae.

Tribe 6. *Verticillieae.* Sacc.

Conidia terminal on branches or branchlets arranged in a verticillate manner.

Tribe 7. *Gonatobotryteae.* Sacc.

Conidia springing from scattered, intercalary, swollen cells of the hyphae.

Sect. II. **Didymosporae.** Sacc.

Conidia elliptical, oblong, or shortly fusoid, 1-septate. hyaline or brightly coloured.

Sect. III. **Phragmosporae.** Sacc.

Conidia oblong, fusoid, elongated, or vermicular, 2 or many-septate, hyaline or brightly coloured.

Subsect. 1. **Macronemeae.** Sacc.

Hyphae evident, distinct from the conidia.

Tribe 8. *Dactylieae.* Sacc.

Saprophytes.

Tribe 9. *Ramularieae.* Sacc.

Parasites.

Subsect. 2. **Micronemeae.** Sacc.

Hyphae very short, scarcely distinct from the conidia.

Tribe 10. *Fusomeae.* Sacc.

Conidiophores not inflated or only indistinctly so.

Tribe 11. *Milowieae.* Sacc.

Conidiophores about 3-celled, the upper cell broadly inflated.

Tribe 12. *Septocylindrieae.* Sacc.

Conidia catenulate.

Sect. IV. **Staurosporae.** Sacc.

Conidia stellate, radiate or 3-furcate, hyaline or brightly coloured, septate or continuous.

Sect. V. **Helicosporae.** Sacc.

Conidia spirally coiled, cylindrical, more or less perfectly septate, hyaline or brightly coloured.


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Fam. I. **MUCEDINEAE.** Link.

Sect. I. AMEROSPORAE. Sacc.

Subsect. 1. **Micronemeae.** Sacc.

Tribe 1. *Chromosporieae.* Sacc.

CHROMOSPORIUM. Corda. (fig. 15, p. 313.)

Hyphae at first creeping on the substratum, thin, soon disappearing; conidia forming an effused, powdery layer, bright coloured (not brown or blackish).

*Chromosporium*, Cda.; Sturm, Deutsch. Crypt., iii. 2, p. 119; Sacc., Syll., vol. iv. p. 6.

When mature consisting of an effused powdery stratum of bright-coloured conidia, with only traces of hyphae or none. Analogous to the genus *Coniosporium* in the *Dematieae.*

**Chromosporium lateritium,** Sacc. (fig. 15, p. 313). Effused and forming a powdery bright brick-red layer,

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FIGURES ILLUSTRATING THE *MUCEDINEAE.*

Fig. 1, *Oospora favorum*;—Fig. 2, *Monilia aurea*;—Fig. 3, *Cylindrium Cordae*;—Fig. 4, *Oedocephalum laeticolor*, fertile head and free conidium;—Fig. 5, *Oedocephalum Preussii*, fruiting heads and a free conidium;—Fig. 6, *Rhinotrichum niveum*;—Fig. 7. *Botrytis corolligenum*;—Fig. 8, *Ovularia veronicae*;—Fig. 9, *Verticillium distans*;—Fig. 10, *Spicaria elegans*;—Fig. 11, *Mycogone cervina*;—Fig. 12, *Gonatobotrys flava*;—Fig. 13, *Nematogonium aurantiacum*;—Fig. 14, *Trichothecium roseum*;—Fig. 15, *Diplosporium album*;—Fig. 16, *Arthrobotrys rosea*, and free conidium;—Fig. 17, *Didymaria Ungeri*;—Fig. 18, *Bostrichonema alpestre*;—Fig. 19, *Helicomyces tubulosus*, showing coiled septate conidium;—Fig. 20, *Aspergillus glaucus*;—Fig. 21, section of head of same;—Fig. 22, *Penicillium glaucum*;—Fig. 23. *Cephalosporium acremonium*, twining round a black mould;—Fig. 24, *Dactylaria orchidis*;—Fig. 25, *Dactylella implexa*;—Fig. 26, *Dactylium dendroides*;—Fig. 27, *Ramularia pratensis*;—Fig. 28, *Ramularia hellebori*. (The figures are highly magnified.)

conidia globose or broadly obovate; wall thick, pale red, 6–7 or 6 × 8 μ.

*Chromosporium lateritium*, Sacc., Syll., v. iv., n. 5.

*Gymnosporium lateritium*, B. & Br., Ann. Nat. Hist., n. 1903.

On bark. Rare.

When mature the conidia are globose, but are at first, as is always the case, obovate, and sometimes in this condition break away with a portion of the supporting hypha. (Described from type in Herb. Berk., Kew.)

**Chromosporium rubiginosum**, Cke. & Mass.

Rust-coloured, in effused patches, pulverulent, conidia profuse, elliptical, smooth, pale orange, 10 × 7–8 μ.

*Chromosporium rubiginosum*, Cke. & Mass., Grev., vol. xvi. p. 78 (188).

*Gymnosporium rubiginosum*, Carm. MS.

Forming orange-rust-coloured scattered patches on dead leaves. Distinguished from *C. lateritium* by the larger spores. (Described from type in Herb., Kew.)

MICROSTROMA. Niessl. (fig. 29, p. 313.)

Forming effused, plane, thin patches, fertile hyphae very short, erect, densely crowded, colourless, aseptate; conidia acrogenous, elliptical, one-celled, colourless.

*Microstroma*, Niessl, Mähr., Crypt. Fl., p. 163; Sacc., Syll., iv. 9.

Mycelium creeping, giving origin to erect, densely crowded, short, simple, or slightly branched conidiophores.

Forming scattered or effused exceedingly thin patches on fading leaves.

**Microstroma album.** Sacc. (fig. 29, p. 313.)

Patches minute, scattered or becoming confluent, very thin, hypophyllous; conidiophores subclavate, sometimes with a tendency to become lobed at the apex, 20–25 μ long; conidia colourless elliptic oblong, sometimes slightly oblique, 5–7 × 2·5–3 μ

*Microstroma album*, Sacc., F. Ital., t. 863; Sacc., Syll., n. 17.

On fading oak leaves. Not uncommon.

The present species appears to have been confounded with *Fusidium griseum*, Link so hopelessly that it is impossible to give synonyms.

Forming very delicate whitish, filmy patches on the under surface of the leaves.

## Tribe 2. *Oosporeae.* Sacc.

### OOSPORA. Wallr. (emend. Sacc.) (fig. 1, p. 274.)

Tufts effused or pulvinate, lax or rather compact; fertile hypha short, slender, simple or sparingly branched; conidia regularly concatenate, globose or elliptical, bright-coloured or colourless.

*Oospora*, Wallr., Fl. Crypt., p. 182; Sacc., Syll., iv. p. 11.

Characterised by the globose or broadly elliptical, bright-coloured or colourless conidia being arranged in a concatenate or moniliform manner. Analogous with the genus *Torula* in the *Dematieae*.

* *Conidia colourless.*

**Oospora fasciculata.** Sacc. & Vogl.

Tufts at first distinct, becoming confluent, white, then greyish, fertile hyphae branched, ascending; conidia concatenate, broadly elliptical.

*Oospora fasciculata*, Sacc., Syll., iv. 23.

*Oidium fasciculatum*, Berk., Eng. Fl., p. 349; Cke., Hdbk., n. 1813.

On decaying oranges. Rare.

**Oospora epilobii.** Sacc. & Vogl.

Tufts white, effused, conidia broadly elliptical or globose, forming long concatenate chains, colourless, 4 $\mu$ or 4 $\times$ 5 $\mu$.

*Oospora epilobii*, Sacc., Syll., iv. 24.

*Torula epilobii*, Cda., Ic. Fung., iv. p. 23, ser. vi. f. 75.

On living stems and leaves of various species of *Epilobium*. Rare.

Forming very delicate bloom-like patches.

**Oospora lactis.** Sacc.

Tufts snow-white, velvety, membranaceous, sterile hyphae

densely interlaced, fertile ascending; conidia concatenate, elliptic-oblong, 18–21 × 5–7, sometimes shorter subglobose conidia occur in the chains.

*Oospora lactis*, Sacc., Syll., iv. 45.

*Oidium lactis*, Fres., Beitr., p. 23.

On milk, cheese, &c. Not common.

Forming membranaceous, snow-white velvety patches that sometimes spread for a considerable distance.

**Oospora porriginis.** Sacc.

Tufts rather effused, whitish, hyphae much interlaced, aseptate; conidia colourless, concatenate, very irregular, elliptical, triangular, cuboid, 3–7 $\mu$.

*Oospora porriginis*, Sacc., Syll., iv. 46.

*Oidium porriginis*, Berk. & Mont., Ann. Nat. Hist., n. 546; Cke., Hdbk., n. 1814.

On *Porrigo lupinosa*. Not uncommon. (Type in Herb. Berk., Kew.)

**Oospora pulmonea.** Sacc.

Hyphae branched, septa rare, variable in thickness, 5–10 $\mu$; conidia concatenate, elliptical or subglobose, 5–10 $\mu$, colourless.

*Oospora pulmonea*, Sacc., Syll., iv. 47.

*Oidium pulmoneum*, Bennett. In the sputum of people affected with consumption.

**Oospora aequivoca.** Sacc. & Vogl.

Tufts very minute, chains of conidia simple, erect, conidia elongated, pointed at each end, colourless, 11–12 $\mu$ thick.

*Oospora aequivoca*, Sacc., Syll., iv. 53.

*Odium aequivocum*, B. & Br., Ann. Nat. Hist., n. 821; Cke., Hdbk., n. 1816.

On *Polyporus Schweinitzii*. Rare. Tufts almost invisible to the naked eye.

**Oospora candidula.** Sacc.

Tufts effused, pure white, thin; sterile hyphae creeping, filiform; fertile erect, simple or forked, 30 × 3 $\mu$, continuous, hyaline; conidia in long chains, ovate-oblong, 5–6 × 3 $\mu$, hyaline.

*Oospora candidula*, Sacc., Fung. Ital., 880.

On *Tubercularia vulgaris*, *Nectria cinnabarina*, and the adjacent bark. (Grove.)

** *Conidia yellow.*

**Oospora favorum.** Sacc. & Vogl. (fig. 1, p. 274.)
Tufts minute, white, unconspicuous, hyphae branched, intertwined, septate, fertile branches erect bearing short chains of yellow, subglobose conidia, 4–5 $\mu$.
*Oospora favorum*, Sacc., Syll., iv. 83.
*Oidium favorum*, B & Br., Ann. Nat. Hist., n. 762, t. 16, f. 14; Cke., Hdbk., n. 1815.
On honey-comb. Rare. (Type in Herb. Berk., Kew.)
An examination of type specimen shows the conidia subglobose and concatenate in short chains. When quite young the conidia are filiform.

**Oospora microsperma.** Sacc. & Vogl.
Tufts minute, scattered, equal, yellowish-ochre, hyphae branched, septate, radiating, conidia in chains, subglobose, pale yellow, 4–5 $\mu$.
*Ooespora microsperma*, Sacc., Syll., iv. 84.
*Oidium microspermum*, B. & Br., Ann. Nat. Hist., n. 1387.
On bark of fir. Rare.
Tufts about $\frac{1}{2}$ line across, gregarious, numerous. (Type in Herb. Berk., Kew.)

*** *Conidia rose-colour, red, or orange.*

**Oospora rosella.** Grove.
Hyphae fasciculate, at length effused, long, erect, then effused, branched, 2–3 $\mu$ thick, aseptate, hyaline; conidia concatenate in rather long simple chains, rosy, elliptical, apiculate at both ends, 10 × 4 $\mu$.
*Oospora rosella*, Grove, Journ. Bot., n.s., vol. xiv. p. 163; Sacc., Syll., iv. 63.
On horse-dung. Rare.
Tufts $\frac{1}{3}$–1 mm. high, becoming confluent. Allied to *O. fasciculata*, but distinguished by the colour of the conidia.

**Oospora aurantia.** Sacc. & Vogl.

Tufts irregular, scattered, becoming confluent, thick and spongy, pale orange; hyphae branched, septate, 6–8 $\mu$, thick, conidia concatenate, chains simple or branched, conidia broadly elliptical, 7 × 5 $\mu$ or 6–7 $\mu$, pale orange.

*Oospora aurantia*, Sacc., Syll., iv. 81.

*Oidium aurantium*, Cke., Grev.

On spent hops. Rare.

Forming broadly extending patches formed by the blending of several originally independent tufts; clear pale orange, becoming much paler when old. (Type in Herb., Kew.)

**Oospora crustacea.** Sacc.

Tufts at first orbicular, becoming confluent, velvety, bright orange or vermilion; chains of conidia long, often curved, orange-vermilion, conidia cuboid globose, 6–8 $\mu$.

*Oospora crustacea*, Sacc., Syll., iv. 72.

*Torula sporendonema*, Cke., Hdbk., n. 1426.

On cheese, glue, &c. Not uncommon.

Often forming broadly effused orange-vermilion patches that become crustaceous when old.

******** *Conidia fulvous or brownish.*

**Oospora fulva.** Sacc. & Vogl.

Tufts dense, often broadly effused, velvety, at first whitish, becoming fulvous; conidia concatenate, fusiform, fulvous, 8–11 × 5 $\mu$.

*Oospora fulva*, Sacc., Syll., iv., 85.

*Oidium fulvum*, Link.

On rotten wood. Rare.

Often forming patches extending for several inches.

**Oospora fusca.** Grove.

Forming a clear brown powder, which often covers the whole exterior and disc of the host; chains of conidia at first erect, but soon becoming depressed and intricate; conidia fusiform, clear ochraceous-brown, 6–8 × 3·5–4 $\mu$, reaching even 10 × 5 $\mu$.

*Oospora fusca*, Grove, Journ. Bot. (1885), p. 164, tab. 257, f. 1.

*Atysidium fuscum*, Bor., Hdbk., p. 35, f. 13.

On *Bulgaria inquinans*, the spores are not only much smaller, but also paler and more hyaline than those of *Oidium fulvum*, Link, and of a different colour. (Grove.)

***** *Conidia grey or blackish.*

**Oospora inaequalis.** Cke. & Mass.

Effused, like a very thin pale grey bloom; conidia very unequal in size and form, globose to elliptical, united in short, simple or branched curved threads, hyaline, from 5 $\mu$ diameter, to 10 × 5 $\mu$.

On culms of bamboo. Kew.

**Oospora abortifaciens.** Sacc. & Vogl.

Spots at first very minute and scattered, becoming effused and often confluent; mycelium thin, fertile hyphae erect, very slender, unbranched; conidia in chains, broadly elliptical, grey, 5–6 × 4 $\mu$, falling away and forming a dark grey powder.

*Oospora abortifaciens*, Sacc., Syll., iv. 101.

*Oidium abortifaciens*, Berk., Ann. Nat. Hist., n. 545.

In the upper portion of the ovary of various grasses, said to occur also in the ovary of *Silene gallica*.

## FUSIDIUM. Link. (fig. 18, p. 313.)

Hyphae short, simple. Conidia fusiform, concatenate, bright coloured or colourless.

*Fusidium*, Link, Berl. Mag. (1809), iii. p. 8; Sacc., Syll., iv. p. 25. Forming usually exceedingly thin films; the chains of fusiform conidia with pointed ends mark the genus.

**Fusidium viride.** Grove. (fig. 18, p. 313.)

Forming bright deep green elliptical spots; mycelium white, thinly effused; conidia concatenate, chains long, variously intertwined; conidia exactly fusiform, straight, both ends acute, pale green, 10 × 3 $\mu$.

*Fusidium viride*, Grove, Journ. Bot. (1885), p. 164, t. 257, f. 2; Sacc., Syll., iv. n. 103.

On dead stems of *Heracleum*. Spots sub-elliptical, 1–1½ cm. long, of a pleasing saturated green like a Conferva. (Grove.)

**Fusidium griseum.** Link.

Forming small isolated patches, which usually combine to form broadly extending, extremely thin films, mycelium very thin, evanescent; conidia concatenate, fusiform, colourless, 6–7 × 1·5 μ.

*Fusidium griseum*, Link., Obs., i. p. 6; Sacc., Syll., iv. 105.

On dead dry oak and beech leaves. Not common.

Sometimes covering the greater part of the under surface of the leaf. Care must be taken not to confound the present species with *Cylindrinum griseum*, Bon., a much commoner mould on dead leaves, and presenting a similar superficial appearance.

**Fusidium asteris.** P. & P.

Tufts crowded in the centre, scattered at the margin; conidia emerging from the leaves in clusters, cylindrical, 25 μ long, intermixed with mycelial threads.

*Fusidium asteris*, Plow. & Phill., Grev.; Sacc., Syll., n. 125.

On both sides of dying leaves of *Aster tripolium*.

**Fusidium deutziae.** Cooke.

Forming small, powdery, convex, flesh-coloured tufts on under surface of the leaves; conidia fusiform, straight hyaline, continuous, 18–20 × 3–4 μ, seated on very short conidiophores.

*Fusidium deutziae*, Cke., Grev., v. 16, p. 48.

On fading leaves of *Deutzia*.

*Fusidium sulphureum*, Link, is stated in Cooke's list of British Hyphomycetes to have occurred at Appin, N.B. An examination of Carmichael's specimen, now in the Kew Herbarium, shows it to be *Cylindrium flavo-virens*, Ditm.

**Fusidium lycotropum.** Pr.

White, thinly effused; conidia curved like a horse-shoe, hyaline, fusiform, obtuse at each end, 2–4 guttulate, 18–20 × 3 μ, the two inner guttulae almost always very large.

*Fusidium lycotropum*. Pr., St. Deutschl. Fl., xxix. 57, t. 29; Grove, Journ. Bot. (1886), p. 10.

On rotten stem of *Carduus palustris*.

The conidia are bent so as sometimes to form nearly a complete circle, 7–8 $\mu$ diameter. I was unable to observe them concatenate, so that the genus is rather dubious. (Grove.)

## MONILIA. Pers. (emended). (fig. 2, p. 274.)

Hyphae erect, irregularly branched, generally forming dense tufts, rarely effused, producing here and there sub-erect, minutely toothed conidiophores giving origin to conidia arranged in a moniliform or concatenate manner.

*Monilia*, Pers., emended by Saccardo, Mich., ii. p. 17 (not of Fries).

Usually forming dense tufts. Closely resembling *Oospora*, and distinguished more especially by the more copious development of mycelium. The conidiophores are often furnished with minute tooth-like projections varying from 2–5 in number, each of which produces a chain of conidia, so that there is a tendency on the part of the chains to become fasciculate.

**Monilia aurea.** Genel. (fig. 2, p. 274.)

Tufts pulvinate. compact, yellow, hyphae ascending, simple or scantily and vaguely branched, septate, 7–8 $\mu$ thick, at and near the apex giving origin to minute spicules from which the short chains of conidia spring; conidia lemon-shaped rather abruptly attenuated at each end, yellow, 18–21 × 10–12 $\mu$.

*Monilia aurea*, Sacc., Syll., iv. 149.

On bark, mosses, &c. Rare.

Tufts pulvinate (cushion-shaped), up to $\frac{1}{4}$ in. across, pure yellow or with an ochraceous tinge.

**Monilia fructigena.** Pers.

Tufts compact, pulvinate, often growing in circles and becoming confluent, white, then dingy ochraceous red, hyphae branched; chains of conidia long, often variously branched; conidia elliptic-oblong, rather variable, colourless then tinged dull red, 19–26 × 10–12 $\mu$.

*Monilia fructigena*, Pers., Syn., p. 693; Sacc., Syll., iv. n. 157.

On various fruits. Common.

Forming dense tomentose tufts.

**Monilia caespitosa.** Purton.

Hyphae tufted, branched in a racemose manner; chains of globose conidia terminal and lateral.

*Monilia caespitosa*, Purton.

*Monilia racemosa*, Sacc., Syll., iv. n. 163.

On putrid substances.

A doubtful species that has not been seen of late years.

**Monilia pruinosa.** C. & M.

Forming a broadly effused thin white pruinose stratum, hyphae flexuous, elongated, septate, 10–12 $\mu$ thick, irregularly branched; conidia in short chains, subglobose or elliptical, smooth, hyaline, 14–15 × 12 $\mu$.

*Monilia pruinosa*, Cke. and Mass., Grev., xvi. p. 78.

On fading leaves of *Caladium*.

## CYLINDRIUM. Bon. (fig. 3, p. 274.)

Hyphae very short, hardly distinct from the conidia. Conidia concatenate, cylindrical, elongated, ends obtuse, colourless or brightly coloured. Patches thin, plane, slightly pulverulent.

*Cylindrium*, Bonordan, Hdbk. Myk., p. 34; emended by Sacc., Mich., ii. p. 14; Sacc., Syll., 36.

Distinguished by the scanty mycelium and the elongated cylindrical, concatenate conidia with blunt ends, this difference in shape of conidia distinguishes between the present genus and *Fusidium*, where the conidia are fusiform (spindle-shaped).

**Cylindrium Cordae.** Sacc. (fig. 3, p. 274.)

Tufts white, very thin, slightly pulverulent; conidia cylindrical, tips abruptly truncate, colourless, 28–33 × 3–4 $\mu$.

*Cylindrium Cordae*, Sacc., Syll., iv. n. 169.

On dead oak leaves. Not uncommon.

Forming exceedingly thin white pileus on the leaf.

**Cylindrium flavo-virens.** Bon.

Tufts thin, plane, yellowish-green; conidia cylindric-fusiform, sometimes curved, both ends blunt, 14–15 × 3–3·5 μ.

*Cylindrium flavo-virens*, Bon., Hdbk., p. 34; Sacc., Syll., iv. n. 171.

On fallen leaves of oak, beech, &c.

**Cylindrium heteronemum.** Sacc.

Tufts thin, small, white; conidiophores not septate, simple or rarely forked above; conidia rather variable in form, cylindrical with blunt ends or fusoid, 15–40 × 3–4 μ, colourless.

*Cylindrium heteronemum*, Sacc., Syll., iv. 177.

On wood and dung. Rare.

Intermediate in form of conidia between *Fusidium* and *Cylindrium*.

## POLYSCYTALUM. Riess. (fig. 21, p. 313.)

Hyphae scanty, slightly branched, hyaline or smoky; conidia slender, cylindrical, truncate at both ends, concatenate.

*Polyscytalum*, Riess, Bot. Ztg., 1853, p. 138; Sacc., Syll., iv. p. 38.

**Polyscytalum fungorum.** Sacc. (fig. 21, p. 313.)

Tufts consisting of hyphae that are fasciculate at the base, brownish, colourless above, and running off into long, slender chains of conidia, that measure 10–18 × 3, hyaline, cylindrical, truncate at both ends.

*Polyscytalum fungorum*, Sacc., Syll., 1622.

On *Nyctalis parasiticae*.

The conidial stage of *Hypomyces asterosporus*.

## GEOTRICHUM. Link. (fig. 17, p. 313.)

Mycelium creeping, fertile branches or conidiophores ascending, septate; conidia shortly cylindrical with both ends truncate, colourless, chains of conidia short.

*Geotrichum*, Link, Obs., i. p. 53; Sacc., Syll., iv. p. 39.

Distinguished from *Cylindrium* by the presence of creeping, interwoven mycelium, and the shortly cylindrical conidia with truncate ends.

**Geotrichum candidum.** Link. (fig. 17, p. 313.)

Tufts pulvinate, white, rather powdery; sterile hyphae creeping, somewhat continuous; fertile ascending, short; conidia cylindrical, truncate at both ends, 5–10 × 4, hyaline.

*Geotrichum candidum*, Link, Obs., i. p. 15; Sacc., Syll., n. 183.

On the naked ground, also on damp, rotten paper, bones, &c.

**Geotrichum roseum.** Grove.

Hyphae creeping, white, interwoven; conidia pale rose-coloured, concatenate, shortly cylindrical, ends truncate, 16–30 × 9–10 $\mu$ or sometimes longer.

*Geotrichum roseum*, Grove, Journ. Bot., tab. 266, f. 8; Sacc., Syll., iv. n. 185.

Forming dense small, round or oblong rosy spots at the base of a species of *Juncus*.

## OIDIUM. Link (emended). (fig. 8, p. 313.)

Growing on living plants. Mycelium creeping, conidiophores erect, sub-simple; chains of conidia soon breaking up; conidia rather large, elliptical, colourless or coloured.

*Oidium*, Link, emended by Saccardo, Mich., ii. p. 15; Sacc., Syll., 40.

Developing on living plants, chiefly on the leaves. Many species have been proved to be the conidial condition of ascigerous fungi belonging to the *Perisporiaceae*.

### I. *On Dicotyledons.*

**Oidium erysiphoides.** Fr.

Broadly effused, indeterminate, white; tufts conspicuous, rosy-white; hyphae almost erect, very slender; conidia ovate, oblong, pellucid, internally granular, 30–45 × 13–20 $\mu$.

*Oidium erysiphoides*, Fries, Syst. Mycol., iii. p. 432; Sacc., Syll., iv. n. 189.

On living leaves of various plants. The conidial phase of a species of *Erysiphe*.

**Oidium leucoconium.** Desm. (fig. 8, p. 313.)

Tufts broadly effused, white; hyphae creeping with short, erect, fertile branchlets; conidia elliptical, 20–30 × 13–16 $\mu$.

*Oidium leucoconium*, Desmaz., Ann. Sci. Nat., 1829, xiii. p. 102, t. 6, f. 1–2; Sacc., Syll., iv. n. 190.

On stems, leaves, and calyces of cultivated and wild roses. The conidial condition of *Sphaerotheca pannosa*.

**Oidium Tuckeri.** Berk.

Tufts small, densely gregarious, often confluent and forming broad white patches of a loose, open texture, whitish, becoming dingy; sterile hyphae with lobed haustoria, ending in short, suberect, colourless conidiophores; conidia elliptical or oblong, ends obtuse, in short chains of 2–3, 25–30 × 15–17, granular within, hyaline.

*Oidium Tuckeri*, Berk., in Gard. Chron., 1847, p. 779; Sacc., Syll., iv. n. 191.

On living leaves and fruit of vine.

**Oidium farinosum.** Cooke.

White, mealy, effused, covering the young leaves and twigs as if dusted with flour; threads simple, breaking up into elliptical, truncate joints or conidia, which are smooth, 28–30 × 12 $\mu$.

*Oidium farinosum*, Cooke, Grev., xvi. p. 10.

On living leaves and twigs of apple.

**Oidium erumpens.** Cke. & Mass.

Tufts greyish-white, erumpent, rather compact, becoming dark-coloured with age, formed on the under surface of the leaves; conidia subglobose, at first rather quadrate, due to mutual pressure, concatenate, hyaline, 5 × 7 $\mu$. On short stout conidiophores.

*Oidium erumpens*, Cke. & Mass., Grev., xvi. p. 49.

On living leaves of *Rivea hypocrateriformis*.

**Oidium chrysanthemi.** Rab.

Effused, white; sterile hyphae creeping, aseptate, hyaline; conidia in long chains, elliptic-oblong, rounded at both ends, granular inside, hyaline, 40–50 × 20–25 $\mu$.

*Oidium Chrysanthemi*, Rabenh., Hedw., i. p. 19, t. 3, f. 1; Sacc., Syll., no. 199.

On leaves of cultivated species of *Chrysanthemum*.

**Oidium aceris.** Rabach.

Densely caespitose, whitish with a red tinge; conidia ovoid or broadly ovate, often truncate, 25–45 × 8–12 $\mu$.

*Oidium aceris,* Rabach., Flora, 1854, p. 207 ; Sacc., Syll., n. 207.

On living leaves of *Acer pseudoplatanus.*

The conidial stage of *Uncinula bicornis.*

**Oidium mespilinum.** Thüm.

Tufts lax, broadly effused like a delicate cobweb on the upper surface of the leaf, pure white ; hyphae short, simple, without septa, hyaline ; conidia obovately-elliptical, both ends obtuse, simple, in chains of 2–3, hyaline or very pale grey, 10 × 6 $\mu$.

*Oidium mespilinum,* Thüm., Fungh. Litor, n. 249 ; Sacc., Syll., n. 208,

On living leaves of medlar (*Mespilus germanica*).

**Oidium pactolinum.** Cooke.

Thinly effused, golden-tawny ; hyphae very short, scarcely conspicuous ; conidia subglobose, white in chains truncate at the points of contact, at length when free globose, filled with subgranular golden endochrome, 10 $\mu$ diameter.

*Odium pactolinum,* Cooke, Sacc., Syll., iv. n. 209.

On living jasmine leaves in a hothouse.

**Oidium balsamii.** Mont.

Forming a very delicate, white cobweb-like film, often broadly effused and minutely powdery from the conidia ; sterile hyphae creeping, vaguely branched, sparingly septate, slender ; chains of conidia elongated, conidia elliptical and truncate at both ends (barrel-shaped), hyaline, 15–22 × 8–10 $\mu$.

*Oidium balsamii,* Mont., in B. & Br., Ann. Nat. Hist., n. 763 (name only).

On living leaves of various species of mullein (*Verbascum*).

The above description is from Montague's specimen in Berk. Herb., Kew.

II. *On Monocotyledons.*

**Oidium monilioides.** Link.

Tufts broadly effused, ochraceous-white ; conidia forming moniliform chains, elliptical, white or dirty white, hyaline, 25–30 × 8–10 $\mu$.

*Oidium monilioides*, Link, sp. pl. p. 122; Sacc., Syll., iv. n. 219.

On the living leaves and culms of various grasses. The conidial stage of *Erysiphe graminis*.

## Subsect. 2. **Macronemeae.** Sacc.

### Tribe 3. *Cephalosporieae.* Sacc.

### OEDOCEPHALUM. Preuss. (figs. 4, 5, p. 274.)

Sterile hyphae scanty; creeping; fertile hyphae erect, simple, gregarious, apex swollen and rough with minute point-like projections, to which the conidia are attached; very slightly or not at all areolate; conidia sessile, continuous, globose or oblong, hyaline or bright coloured.

*Oedocephalum*, Preuss, Fung. Hoyersw., n. 100; Sacc., Syll., iv. p. 47.

Distinguished from *Rhopalomyces* in the swollen apex of the fertile hyphae not being broken up into polygonal portions.

**Oedocephalum roseum.** Cooke.

Forming effused rose-coloured tufts; fertile hyphae short, simple, septate, heads subglobose; conidia broadly elliptical with a basal apiculus, colourless, smooth, 11–14 × 8–10 $\mu$.

*Oedocephalum roseum*, Cooke, Grev., i. p. 184, t. 22, f. 8; Sacc., Syll., 226.

On paper and old cloth, &c.

Individual tufts almost invisible to the naked eye, but gregarious, and forming extended patches.

**Oedocephalum laeticolor.** B. & Br. (fig. 4, p. 274.)

Very minute, brick-red with a rosy tinge; fertile hyphae equal, pallid, apex inflated, not 1 mm. high; heads subglobose, conidia subglobose or broadly elliptical, apiculate at the base, minutely warted, 15–20 × 9–12 $\mu$.

*Oedocephalum laeticolor*, B. & Br., Ann. Nat. Hist., no. 1056, t. 14, f. 12; Sacc., Syll., 228.

On dung of sheep.

**Oedocephalum Preussii.** Sacc. (fig. 5, p. 274.)
Loosely gregarious; fertile hyphae erect, base bulbous, becoming a little thinner upwards, apex broadly pyriform or nearly globose; heads globose, white; conidia colourless, broadly elliptical or nearly globose, apiculate at the base, 10 × 7–8 μ.
*Oedocephalum Preussii*, Sacc., Syll., iv. no. 233.
On decaying leaves, stems, &c.

**Oedocephalum sulfureum.** C. & M.
Tufts hemispherical, often confluent, sulphur-coloured; threads septate, branching in a dichotomous manner, swollen into a globose, papillate vesicle at the apex; conidia globose, hyaline, smooth, 3–5 μ diem.
*Oedocephalum sulfureum*, Cooke and Massee, Grev., 17, p. 3.
On damp decaying rope.

## RHOPALOMYCES. Corda. (figs. 19, 20, p. 274.)

Sterile hyphae scanty, creeping; fertile hyphae erect, simple or rarely furcate, apex inflated into a globose or broadly obovate vesicle which is distinctly areolate; conidia elliptical, continuous, not concatenate, hyaline or slightly coloured, supported on papillae occupying the centre of the areolae.
*Rhopalomyces*, Corda, Prachtflora, p. 3; Sacc., Syll., iv. p. 50.
Distinguished by the walls of the vesiculose heads of the erect, fertile hyphae being divided into distinct polygonal portions, each of which has a papilla at its centre that bears a conidium.

**Rhopalomyces candidus.** B. & Br.
White; sterile hyphae obsolete; fertile hyphae erect, simple; vesicular head globose are broadly obovate, distinctly areolate; conidia minute, elliptical, 8 × 4–5 μ.
*Rhopalomyces candidus*, B. & Br., Ann. Nat. Hist., n. 505, t. v. f. 3; Sacc. Syll., iv. n. 240.
On decaying vegetable matter.

**Rhopalomyces elegans.** Corda.

Fertile hyphae erect, aseptate, colourless, vesicles spherical, distinctly hexagonally areolate, centre of the areolae papillate; conidia elliptic-oblong, hyaline then tinged with brown, 35–40 × 18 $\mu$.

*Rhopalomyces elegans*, Corda, Prachtflora, p. 3, t. ii.; Sacc., Syll., iv. n. 239.

On decaying herbaceous stems, &c.

**Rhopalomyces pallidus.** B. & Br. (figs. 19, 20, p. 274.)

Pale fawn-colour, effused, fertile hyphae forked, flexuous; conidia minute, supported on the papillae occupying the centre of the areolae, 10 × 6 $\mu$.

*Rhopalomyces cervinus*, B. & Br., Ann. Nat. Hist., n. 504, t. v. f. 2; Sacc., Syll., iv. n. 241.

On decayed Russian matting. Broadly effused, forming fawn-coloured, subfurfuraceous patches.

## BOTRYOSPORIUM. Corda. (figs. 3, 4, p. 358.)

Mycelium creeping; fertile hyphae, ascending, septate, simple or branched, and furnished with numerous short lateral branches; tips of the short lateral branchlets each bearing a globose head of spores that are produced on minute spine-like spicules present at the tip of the branchlet; conidia colourless, the heads soon dispersing. Each spicule bears a cluster of spores, the whole forming the head.

*Botryosporium*, Corda, Anl., p. 53; Sacc., Syll., iv. p. 54.

**Botryosporium diffusum.** Corda. (figs. 3, 4, p. 358.)

Fertile hyphae long, ascending, often more or less forked, septate, colourless, bearing numerous scattered short branchlets of equal length, each with 3–4 spicules at the tip, each of these spicules bears a cluster of conidia, the whole forming a globose head. Conidia broadly ellipsoid or globose, colourless.

*Botryosporium diffusum*, Corda, in Sturm, Deutschl. Fl.; Sacc., Syll., iv. n. 265.

On rotten wood, branches, leaves, &c.

**Botryosporium pulchrum.** Corda.

Tufts lax, broadly effused, white; fertile branches long, simple or forked, with numerous scattered short branchlets of about equal length arranged in a racemose manner; each branchlet bears at its apex five short spicules or conidiophores, each of which in turn bears a cluster of conidia, the whole framing a globose head. Conidia colourless, broadly elliptical.

*Botryosporium pulchrum*, Corda, Prachtflora, t. xix.; Sacc., Syll., iv. n. 266.

On stems of herbaceous plants

## CEPHALOSPORIUM. Corda. (fig. 23, p. 274.)

Primary hyphae long, creeping and producing numerous erect, scattered short branchlets at intervals; these branchlets are of nearly equal length, and each bears at its tip a globose head of conidia.

*Cephalosporium*, Corda, Anl., p. 61; Sacc., Syll., p. 56; Grove, Journ. Bot., t. 257, f. 3.

Distinguished from *Botryosporium* by the creeping primary hyphae, and also by the absence of distinct conidiophores at the tips of the branchlets. Differs from *Acremonium* in the capitate spores.

**Cephalosporium acremonium.** Corda. (fig. 23, p. 274.)

Tufts dense, rather cottony, at first white, then pale rose; primary branches creeping, secondary erect, not septate, 40–50 × 3 $\mu$; terminal heads of conidia globose, 8–10 $\mu$ diameter; conidia colourless, elliptic-oblong; for a long time remaining in clusters, 4–5 × 2 $\mu$.

*Cephalosporium acremonium*, Corda, Icones Fungorum, iii. p. 11, f. 29; Sacc., Syll., iv. n. 270.

On stems of *Rubus*, *Heracleum*, on rotting wood and a *Myxomycete*. Heads round, pure white, about 10–12 $\mu$ diam., but varying in size from age. The long creeping stems are sometimes suberect; the branches often once, sometimes twice forked, 30–40 $\mu$ high or more. Corda describes the spores as assuming a rosy tint, which no other author has

observed. My specimens belong rather to Penzig's form, but scarcely differ from Corda's figure, except in the more oblong spores. (Grove.)

## PAPULOSPORA. Preuss. (figs. 1, 2, p. 358.)

Sterile hyphae creeping, effused, septate; fertile branches or conidiophores ascending, septate, bearing at the tip a head of conidia that does not readily separate into its component conidia. Conidia globose or elliptical, colourless or coloured.

*Papulospora*, Preuss, Fl. Hoyers., n. 40; Sacc., Syll., iv. p. 58.

The head of conidia, as described above, is considered by some authors to be a single many-celled conidium.

**Papulospora sepedonioides.** Preuss. (figs. 1, 2, p. 358.)

Sterile hyphae effused, branched, septate, interwoven, brownish-rust colour; conidiophores colourless, septate, bearing at the tip a cluster of agglutinated conidia forming a red head; conidia oblong, 10–15 $\mu$ long.

*Papulospora sepedonioides*, Preuss, Fl. Hoyersw., n. 40; Sacc., Syll., n. 282.

On decaying cabbage stalks, rotten apples, &c.

## GLIOCLADIUM. Corda.

Stem erect, septate, penicillate above, branches and branchlets septate, crowned by a common gelatinous head. Conidia acrogenous, irregularly heaped together, simple, with a gelatinous coat.

*Gliocladium*, Corda, Icon. Fung., iv. p. 31; Grove, Journ. Bot., vol. xxiii. p. 10.

Differs from *Penicillium* in the spores being produced singly, not in chains, but remaining united in the mucous substance simultaneously excreted. (Grove.)

**Gliocladium penicillioides.** Corda.

Tufts minute, punctiform, white; stems erect, flexuous, thickened above, white; branches opposite, branchlets

whorled, quaternate, crowded; head of conidia globose, white; conidia 5·5 $\mu$ long, conglutinate, oblong, surrounded by a thick gelatinous stratum.

*Gliocladium penicillioides*, Corda, Icon. Fung., iv. p. 31, pl. vii. fig. 92; Grove, Journ. Bot., vol. xxiii. p. 10.

On the hymenium of an old *Stereum* (probably *hirsutum*).

The gelatinous heads of neighbouring stems unite, even 15–20 being thus bound together into one large common head. The resemblance of the *Gliocladium* to *Penicillium* is striking, but I could not ascertain that the spores were ever in chains in my specimens, and the abundant gelatinous secretion of the former is a marked feature, which Mr. Plowright informs me that he did not notice in the conidia of the *Hypomyces* figured in "Grevillea." I could not perceive in my spores the gelatinous coat which Corda figures; they measured 5 × 2 $\mu$, and were extremely abundant. The stems were thrice bi- tri-chotamous, the branchlets being parallel and appressed. (Grove.)

Considered to be the conidial stage of *Hypomyces aureonitens*.

**Gliocladium lignicolum.** Grove.

Hyphae gregarious or fasciculate, erect, equal, 3–4 septate, hyaline, apex penicillate di- tri-chotamous; head of conidia white, globose or obovate; conidia involved in mucus, oblong ovoid, 2–2·5 × 1·5 $\mu$.

*Gliocladium lignicolum*, Grove, Journ. Bot., vol. xxiii. p. 11.

On wood.

Perhaps a variety of *Gliocladium penicillioides*, from which it differs in the conidia being only half the length, and the habitat different. (Grove.)

TRICHODERMA. Pers. (emend.) (fig. 26, p. 313.)

Mycelium or sterile hyphae in plane, compact tufts, fertile branches ascending, typically 2–3 times forked, tips not inflated, but bearing a head of minute colourless or coloured conidia.

*Trichoderma*, Persoon, Disp. Fung., p. 12; Sacc., Syll., iv. p. 59.

**Trichoderma lignorum.** Harz. (fig. 26, p. 313.)

Tufts pulvinate, more or less circular, rather compact, then effused, at first white, then from the centre becoming entirely verdigris-green, here and there yellowish; hyphae very slender, not septate; fertile ascending, forking into 2–3 branches; conidia globose, minute, green, 3 $\mu$ diam., collected into a small head.

*Trichoderma lignorum* (Tode), Harz, Einig. Hyph., p. 29, t. iv., f. 6; Sacc., Syll., n. 284.

*Trichoderma viride*, Pers., Syn., p. 230.

On bark, wood, rotten leaves, &c.

The conidial stage of *Hypocrea rufa*.

## Tribe 4. *Aspergilleae.* Sacc.

## ASPERGILLUS. Micheli. (figs. 20, 21, p. 274.)

Mycelium creeping, effused, septate; fertile hyphae or conidiophores erect, inflated and vesiculose at the tip, the vesiculose portion giving origin to numerous radiating chains of gonidia.

*Aspergillus*, Mich., Nov. Pl. Gen., 212; Sacc., Syll., iv. p. 64.

The sterigmata borne by the inflated head are often reduced to minute points. Many species are known to be the conidial stage of higher fungi. The mycelium of some species forms sclerotia.

### * *Glaucous or greenish.*

**Aspergillus glaucus.** Link. (figs. 20, 21, p. 274.)

Hyphae creeping, floccose, branched, indistinctly septate, uncoloured; fertile erect, simple, almost without septa, hyaline or with a glaucous tinge, the apex inflated into a vesicle covered with minute cylindrical sterigmata or conidiophores each bearing a chain of conidia; conidia globose, slightly asperulate, hyaline, then glaucous, 8–10 $\mu$ diam.

*Aspergillus glaucus*, Link, sp. pl., Fung., i. p. 67; Sacc., Syll., n. 304.

On fruit, branches, leaves, and all kinds of decaying organic matter.

The conidial condition of *Eurotium herbariorum*.

**Aspergillus griseus.** Link.

Mycelium effused, grey, branched and interwoven, sparingly septate; fertile hyphae erect, septate, head club-shaped or nearly globose, small, grey; basidia cylindrical, minute; conidia in chains, globose, 2–3 $\mu$ diameter.

*Aspergillus glaucus*, Link, sp. pl., Fung., i. p. 69; Sacc., Syll., iv. p. 306.

On fruit and various decaying substances.

*Var.* **fenestrale**, Link; mycelium radiating in a dendritic manner; Sacc., Syll., iv. 306.

*Byssocladium fenestrale*, Link.

On glass.

**Aspergillus virens.** Link.

Mycelium creeping, branched; fertile ascending, slender, 300–500 × 10 $\mu$, very sparingly septate, apex inflated, green; conidia in chains, globose, greenish, 3 $\mu$ diameter.

*Aspergillus virens*, Link, Obs., i. p. 14; Sacc., Syll., iv. n. 309.

On decaying wasps' nests and other putrifying organic substances.

** *Whitish.*

**Aspergillus candidus.** Link.

Mycelium creeping, white; fertile branches erect, gregarious, white, without septa as a rule, 150–200 × 4–5 $\mu$, apex inflated; chains of conidia colourless; conidia globose, 2–3 $\mu$ diam.

*Aspergillus candidus*, Link, sp. pl., Fungi, i. p. 65; Sacc., Syll., iv. n. 315.

On fungi, dried plants, &c.

The white colour and small conidia distinguish the present species from *A. glaucus*.

**Aspergillus mollis.** Berk.

Forming minute, scattered, whitish spots; mycelium branched, septate, interwoven, fertile hyphae erect, branched,

heads clavate, conidia in chains, colourless, globose, 5 $\mu$ diameter.

*Aspergillus mollis*, Berk., Engl. Fl., vol. v. p. 340; Sacc., Syll., iv. n. 340.

On dead leaves.

*** *Reddish.*

**Aspergillus roseus.** Link.

Mycelium scanty, creeping; fertile branches erect, simple, without septa, head globose, conidia catenulate, pale rose-coloured, globose, 3 $\mu$ diameter.

*Aspergillus roseus*, Link, as determined by Berkeley in Eng. Fl., v. p. 340; Sacc., Syll., iv. n. 320.

On damp paper, linen, &c.

Scarcely visible during the vegetative stage, but showing as pale rose-coloured patches when in fruit.

**** *Yellowish or tawny.*

**Aspergillus flavus.** Link.

Mycelium white, spreading in a cobweb-like manner; fertile branches erect, in loose tufts, tips globose, becoming yellowish; conidia in chains, globose, yellowish, very minutely warted, 5–7 $\mu$ diameter.

*Aspergillus flavus*, Link, Obs., p. 14; Sacc., Syll., iv. n. 328.

On dried plants in herbaria, and on various organic substances.

**Aspergillus spiralis.** Grove.

Sterile hyphae, septate, spirally contorted, branched, interwoven, citrin-yellow; fertile hyphae yellow, erect, not septate, once or twice forked above, tips subclavate; sterigmata obovate or oblong, constricted in the middle, 20–30 $\times$ 10 $\mu$; conidia obovate then globose, smooth, yellow, 10–12 $\mu$ diameter.

*Aspergillus spiralis*, Grove, Journ. Bot. 1885, p. 164, t. 257, f. 5; Sacc., Syll., iv. n. 332.

On the cork of a bottle containing a solution of carmine in ammonia.

The mycelium spirally contorted, also the lower portion of the fertile hyphae, and the latter sometimes flexuous up to the apex.

***** *Brownish.*

**Aspergillus nigricans.** Cooke.

Fertile hyphae erect, colourless, simple, not septate, apex inflated into a globose vesicle; sterigmata linear; conidia in chains, globose, smoke-coloured, 5 $\mu$ diameter.

*Aspergillus nigricans*, Cooke, Journ. Quekett Micr. Club, 1885, p. 3, pl. 9, f. 3; Sacc., Syll., iv. n. 337.

In meatus auditorius of human ear.

The heads of conidia are black in the mass.

## STERIGMATOCYSTIS. Cram. (figs. 27, 28, p. 313.)

Mycelium creeping, fertile branches erect, not branched, tip inflated and covered with radiating basidia-like outgrowths, each producing at the summit several slender spines or sterigmata; these latter in turn bear each a chain of conidia.

*Sterigmatocystis*, Cram., Viert. Nat. Gesell., Zurich, 1859; Sacc., Syll., iv. p. 71.

With the general habit of *Aspergillus*, but known by the well-developed basidia and whorled sterigmata bearing the catenulate conidia.

**Sterigmatocystis dubia.** Sacc. (figs. 27, 28, p. 313.)

Tufts minute, white: mycelium creeping, fertile threads erect, without septa, head globose; basidia slender, radiating, each with 3–4 slender sterigmata at the apex, conidia in chains, globose, colourless, 4–5 $\mu$ diameter.

*Sterigmatocystis dubia*, Sacc., Syll., iv. n. 346.

*Aspergillus dubius*, B. & Br., Ann. Nat. Hist., n. 520.

On decaying cheese, dung, &c.

## AMBLYOSPORIUM. Fres. (fig. 30, p. 313.)

Mycelium copious, creeping, septate, interwoven; fertile hyphae ascending, tips not inflated but furnished with

numerous minute points that bear the chains of brightly coloured, fusiform conidia that are abruptly truncate at both ends.

*Amblyosporium*, Fres., Beitr., p. 99, t. xii. f. 17–21; Sacc., Syll., iv. p. 77.

**Amblyosporium botrytis.** Fres. (fig. 30, p. 313.)

Tufts broadly effused, forming a woolly felt of a bright orange-red colour; fertile hyphae ascending, orange-red, septate, 20–25 $\mu$ thick, branched, the concatenate conidia forming a bright orange head, conidia elliptic, both ends contracted and abruptly truncate, 15–25 × 10–12 $\mu$.

*Amblyosporium botrytis*, Fres., Beitr., p. 99, t. xi. f. 17–21; Sacc., Syll., iv. n. 372.

On decaying fungi of various species.

The mould often completely covers the host with a dense felt of a brilliant orange-red colour. In some instances numerous bright orange sclerotia are formed in the substance of the fungus attacked.

## PENICILLIUM. Link. (fig. 22, p. 274.)

Mycelium creeping, septate; fertile branches erect, with branchlets arranged in irregular verticils towards the apex; conidia globose, catenulate, colourless or brightly coloured.

*Penicillium*, Link, sp. pl., Fungi, i. p. 69; Sacc., Syll., iv. p. 78.

Distinguished by the branchlets being arranged in irregular whorls, or in a penicillate manner, and the chains of globose conidia.

* *Glaucous or greyish.*

**Penicillium glaucum.** Link. (fig. 22, p. 274.)

Mycelium effused, creeping, white; sterile hyphae creeping, septate, interwoven; fertile hyphae erect, apex penicillately branched, branches single or in pairs, erect, once or twice forked at the apex; conidia concatenate, globose or broadly elliptical, smooth, hyaline with a tinge of green, 4 $\mu$ diam., the chains of conidia produced at the tips of the ultimate branchlets.

*Penicillium glaucum*, Link, Obs. Myc., i. p. 15; Sacc., Syll., n. 373.

On fruit, leaves, and on almost every kind of decaying or damp organic matter.

*Var.* **coremium**, Sacc., Syll., n. 373.

Fertile hyphae fasciculate, forming a white compound tem.

*Floccaria glauca*, Grev., Scot. Cr. Fl., t. 301.

**Penicillium quadrifidum.** Salisb.

Hyphae of mycelium nodulose, fertile threads septate, divided above into four equal branches, divided in a subfasciculate manner below, tips of the branches with 3–4 branchlets in a verticil; conidia in long chains, globose, glaucous.

*Penicillium quadrifidum*, Salisb., in Hallier's Zeitsch. Paras., iv. Bd., 1 Heft, Catt. Mic. Carp. um., p. 123, t. vi., f. 11; Sacc., Syll. iv., n. 378.

On human blood taken from a patient suffering from erysipelas.

**Penicillium pruriosum.** Salisb.

Fertile hyphae septate, branched (?), with a whorl of 6–8 branchlets at the apex; conidia elliptic-globose.

*Penicillium pruriosum*, Salisb., in Catt. Mic. Carp. um., p. 124, t. vi., f. 12; Sacc., Syll., iv. n. 379.

Appearing on mucous membrane.

** *Whitish.*

**Penicillium candidum.** Link.

White, appearing as minute tufts that soon run together; sterile hyphae creeping, interwoven, septate; fertile branches ascending or erect, septate, branched above, branches erect, bearing small branchlets that carry the chains of minute, globose, colourless conidia, measuring 2–3 $\mu$ diameter.

*Penicillium candidum*, Link, Obs. Mycol., i. p. 15; Sacc., Syll., iv. n. 381.

On decaying leaves, bulbs, fungi, &c.

*Var.* **coremoides** (= *Coremium candidum*, Nees).

Fertile hyphae fasciculate.

**Penicillium hypomycetis.** Sacc.

Effused, white, fertile threads erect, septate, 2–3 times forked at the apex, branches short, erect, the terminal ones bearing short chains of elliptical conidia, 3–4 × 2 $\mu$.

*Penicillium hyphomycetis*, Sacc., Syll., n. 382.

Described and figured as the conidial stage of *Hypomyces aureo-nitens*, Tul., in Grevillea, vol. xi. p. 49, t. 156, figs. c, d.

On *Stereum hirsutum*, accompanying the ascigerous condition of *Hypomyces aureo-intens.*

Allied to *P. candidum*, differing in the greater regularity of branching, and elliptical conidia.

**Penicillium subtile.** Berk.

Very minute, snow-white; mycelium very delicate, creeping; fertile hyphae erect, simple or ternately divided; conidia in short chains, broadly elliptical, apiculate at both ends, 20 × 8–10 $\mu$.

*Penicillium subtile*, Berk., Ann. Nat. Hist., n. 241, t. xiv. f. 25; Sacc., Syll., iv. n. 385.

In the interior of a dead willow.

The chains of conidia are few in number; the elliptic form of the conidia is unusual in the genus.

*Var.* **ramosius,** Grove, Journ. Bot.

Sterile hyphae creeping; fertile, erect, often ternate at the apex, branched below the apex; conidia in short chains of 4–8, hyaline, broadly elliptical, apiculate at both ends, 16–20 × 10 $\mu$.

On rotten wood. Entirely pure white and very thin and delicate.

**Penicillium megalosporum.** B. & Br.

Pure white, short, hyphae fasciculate, conidia globose or oblong, smooth, 13–15 $\mu$ diameter.

*Penicillium megalosporum*, B. & Br., Ann. Nat. Hist. 1875, p. 34, n. 1457; Sacc., Syll., iv. n. 386.

In an old chicken-coop.

There is no specimen of the present species in Berkeley's herbarium, consequently I cannot supplement the original meagre description.

**Penicillium sparsum.** Grev.

Tufts whitish, elongated, sterile hyphae effused; fertile branches simple, sparingly septate, suberect, forked near the apex, each branch with a terminal verticil of branchlets, conidia colourless, minute, globose.

*Penicillium sparsum*, Greville, Scot. Crypt. Fl., t. 58, f. 2; Sacc., Syll., iv. n. 390.

On putrid stem of *Lappa*.

**Penicillium abnorme.** B. & Br.

White, hyphae scanty, delicate, continuous, apex swollen and obconical; conidia minute, nearly globose, catenulate, springing from the apex of the vesicle.

*Penicillium abnorme*, B. & Br., Ann. Nat. Hist., n. 1914, t. 3, fig. 4; Sacc., Syll., n. 393.

On leaves of *Trientalis*.

As there are no specimens of the present species in Berkeley's herbarium, it is impossible to add to the above brief diagnosis, or to know whether the fungus belongs to *Penicillium* or *Aspergillus*.

**** Yellowish, ochraceous, or tawny.*

**Penicillium bicolor.** Fr.

Sterile, hyphae effused, yellowish; fertile hyphae more or less fasciculate, apex penicillately branched; conidia subglobose, about 4 $\mu$ diam. borne in chains at the tips of the branchlets.

*Penicillium bicolor*, Fries, Syst. Myc., iii. p. 408; Sacc., Syll., n. 394.

*Coremium glaucum*, Link. (When the fertile hyphae are distinctly fasciculate.)

On various decaying organic substances.

**Penicillium macrosporum.** B. & Br.

Orange, conidia globose, large.

Berk. & Broome, Ann. Nat. Hist., n. 1978; Sacc., Syll., n. 396.

On rotting lettuce.

An imperfectly known species, described from a drawing.

**Penicillium coffeicolor.** B. & Br.

Broadly effused, umber: fertile hyphae short, thick, conidia in short chains, subglobose or irregular, 12–13 $\mu$ diam., translucent, tinged with brown.

*Penicillium coffeicolor*, B. & Br., Ann. Nat. Hist., n. 1614; Sacc., Syll., n. 403.

Forming a felt on Pasteur's solution. Possibly an abnormal aquatic condition of some species.

**** *Reddish or rose-colour.*

**Penicillium roseum.** Link.

Sterile hyphae very delicate, creeping, white, forming a very thin cobweb-like film on the matrix; fertile hyphae erect, sparingly penicillately branched at the apex; conidia in persistent, short chains, rose-colour, globose, 3 $\mu$ diam.

*Penicillium roseum*, Link, Obs., ii. p. 37; Sacc., Syll., n. 405.

On dry potato stems.

A coremioid form of the present species has been described.

## BRIAREA. Corda. (fig. 22, p. 313.)

Mycelium creeping; fertile hyphae erect, unbranched; chains of conidia springing directly from the tip of the fertile branch, which is not inflated, nor furnished with conidia-bearing branchlets.

*Briarea*, Corda, in Sturm, D. C. Fl. France, ii. p. 11; Sacc., Syll., iv. p. 85.

Distinguished from *Aspergillus* by the absence of an inflated head, and from *Penicillium* by the absence of branchlets that bear the conidia.

**Briarea elegans.** Corda. (fig. 22, p. 313.)

Mycelium creeping, fertile branches erect, simple, constricted at the septa; chains of conidia loosely spreading and springing directly from the apex of the primary erect branch; conidia subglobose.

*Briarea elegans*, Sturm., Deutschl. Cr. Fl., p. 11, f. 6; Sacc., Syll., iv. n. 412.

Forming grey, scattered or gregarious patches on decaying grass, leather, wood, &c.

Tribe 5. *Botrytideae.* Sacc.

HAPLARIA. Link. (fig. 16, p. 313.)

Mycelium creeping; fertile branches erect, septate, once or several times bifurcating; conidia globose or elliptical, one-celled, almost colourless, sessile and springing laterally from the branches.

*Haplaria*, Link., Obs., i. p. 9; Sacc., Syll., iv. p. 85.

I am not acquainted with the species constituting the present genus, and am not certain as to the origin of the conidia which in figures are represented as scattered in an irregular manner over the branches.

**Haplaria grisea.** Link. (fig. 16, p. 313.)

Forming minute greyish tufts; hyphae very slender, rather rigid, simple or forked, becoming thin at the tip, sparingly septate; conidia subglobose, very minute, at first clustered near to or below the tip, then becoming dispersed over every part, subhyaline.

*Haplaria grisea*, Link, Obs., i. p. 9, f. 12; Sacc., Syll., iv. n. 414.

On damp grass leaves.

HYPHODERMA. Fries. (fig. 33, p. 313.)

Mycelium very thin, septate, creeping and forming an effused stratum that is covered with erect, very slender, closely packed branches, each bearing a one-celled conidium at the apex.

*Hyphoderma*, Fries, Sum. Veg. Scand., p. 447; Sacc., Syll., iv. p. 89.

Forming crust-like patches resembling a *Corticium*.

**Hyphoderma roseum.** Fr. (fig. 33, p. 313.)

Tufts compressed, at first rounded then effused, minutely villose, margin minutely radiato-byssoid; fertile branches very slender, erect, parallel, crowded, with a globose, rose-coloured conidium at the apex, 7–8 $\mu$ diameter.

*Hyphoderma roseum*, Fr., Summ. Veg. Scand., p. 447; Sacc. Syll., iv. n. 434.

Forming orange or rosy patches on decayed wood, &c.

## ACREMONIUM. Link. (emended). (fig. 32, p. 313.)

Hyphae simple or sparingly branched, creeping, with scattered, suberect conidiophores that bear a single conidium at the tip; conidia colourless or brightly coloured.

*Acremonium*, Link., Obs., i. p. 13; emended by Saccardo, Syll., iv. p. 89.

Loosely interwoven, prostrate hyphae giving off slender branches, each with a single conidium at the tip, are the features of the present genus.

### Acremonium alternatum. Link. (fig. 32, p. 313.)

Mycellium white, delicate, loosely interwoven; fertile braches suberect, from alternate sides of the prostrate hyphae, acute, 40–50 $\mu$ long, conidia elliptical, straight or curved hyaline, 6–10 × 2–4 $\mu$.

*Acremonium alternatum*, Link., Obs. Myc., i. p. 13; Sacc., Syll., iv. n. 435.

On fallen leaves.

The conidia are at first involved in mucus and are then globose, but at maturity the mucus disappears and the true form is seen.

### Acremonium verticillatum. Link.

Mycelium white, very delicate, densely compacted; fertile branches verticillate; conidia elliptical, minute.

*Acremonium verticillatum*, Link, Obs., i. p. 20; Sacc., Syll., iv. n. 436.

On rotten trunks, &c.

## RHINOTRICHUM. Corda. (fig. 6, p. 274.)

Saprophytes. Mycelium creeping, fertile branches erect, simple or sparingly branched; tips of the branches with minute spindules that bear the one-celled, colourless or brightly coloured conidia.

*Rhinotrichum*, Corda, Ic. Fung., i. p. 17; Sacc., Syll., iv. p. 91.

* *Whitish or greyish.*

**Rhinotrichum repens.** Preuss.

Tufts grey or yellowish; mycelium, branched, septate, creeping, interwoven; fertile branches erect, septate, above with spine-like warts that bear the conidia in loose clusters; conidia elliptical, apiculate at the base, smooth, pale grey, protoplasm granular, 18–23 × 10–12 $\mu$.

*Rhinotrichum repens*, Preuss, Sturm, p. 6, t. 22; Sacc., Syll., n. 443.

On rotten wood.

**Rhinotrichum niveum.** Cke. & Mass. (fig. 6, p. 274.)

Tufted, caespitose, snow-white; fertile hyphae erect, simple, septate, not quite so thick as the diameter of the spores; upper joint, and sometimes the one below, bearing conical spicules that bear the conidia; conidia continuous, hyaline, ovate or broadly elliptical, smooth, with a persistent minute apiculus at the base, 20–25 × 10–12 $\mu$.

*Rhinotrichum niveum*, Cooke & Massee, Grevillea, vol. xvi. p. 10.

On dead wood.

**Rhinotrichum opuntia.** B. & Br.

White. Hyphae rather thick, simple below, towards the top forked 2–3 times, here and there rather swollen, tips of branchlets thickened, and furnished with minute wart-like projections that bear the globose, colourless conidia, measuring 8–9 $\mu$ diameter.

*Rhinotrichum opuntia*, B. & Br., Ann. Nat. Hist., n. 761, t. xvi. f. 13; Sacc., Syll., iv. n 445.

On wood.

**Rhinotrichum decolorans.** Cooke.

Snow-white then brownish; hypha erect, tip 2–3 times furcate in a corymbose manner, tips slightly swollen, minutely denticulate; conidia globose, minutely rugulose, colourless, apiculate, 10 $\mu$ diameter.

*Rhinotrichum decolorans*, Cooke, Grevillea, v. p. 58; Sacc., Syll., iv. n. 446.

On chips.

**Rhinotrichum lanosum.** Cooke.

White or pale ochraceous; forming dense, extended patches; mycelium delicate, branched, septate interwoven; fertile branches decumbent, elongated, slender, septate, and with short, spreading branchlets, each with 3–4 minute spicules at the tip that bear the obovate, colourless conidia.

*Rhinotrichum lanosum*, Cke., Hdbk., n. 1769; Sacc., Syll., iv. n. 451.

*Rhinotrichum lanosum*, Cooke, Pop. Science Rev., 1871, t. 68, f. 1–3.

Forming woolly patches on damp wall-paper.

** *More or less rosy.*

**Rhinotrichum Bloxami.** B. & Br.

Forming white or cream-coloured effused patches; mycelium white, decumbent, septate; fertile hyphae erect, sometimes sparingly divided, tips clavate bearing scattered spicules surmounted by subelliptic or slightly obovate conidia, which are sometimes obtuse, sometimes apiculate, $6 \times 4\ \mu$.

*Rhinotrichum Bloxami*, B. & Br., Ann. Nat. Hist., n. 541, t. vii. f. 19; Sacc., Syll., iv. n. 454.

On dead wood.

**Rhinotrichum decipiens.** Cooke.

Broadly effused, at first pale rose-coloured, becoming whitish with age, margin radiating; mycelium densely interwoven, creeping, branched, septate; fertile branches erect, closely septate, the one or two highest joints with short, pointed, wart-like projections that bear the elliptical, colourless conidia, 22–25 × 14–15 $\mu$.

*Rhinotrichum decipiens*, Cke., Grev., xiv. p. 6; Sacc., Syll., iv. n. 455.

Incrusting bark and moss, resembling a *Corticium*, and in some instances can be separated in a sheet.

**** Golden, citron, ochraceous, or tawny.*

**Rhinotrichum ramosissimum.** B. & C.

Pale fawn-colour or clay-colour; hyphae very much and irregularly branched, septate, the terminal joints elongated and furnished with slight, projecting points that bear the obovate conidia, which measure 7–8 × 4–5 μ.

*Rhinotrichum ramosissimum*, Berk. & Curt., N. Amer. Fung., n. 662; Sacc., Syll., n. 469.

On rotten wood.

The British form differs from the type in having the hyphae densely fasciculate, resembling the capillitium of a *Trichia* after the rupture of the peridium.

**Rhinotrichum Thwaitesii.** B. & Br.

Tufts orbicular, often becoming confluent, yellow with a pale margin; mycelium dense, interwoven, creeping, the tips becoming erect and branching in a forked manner, apices slightly thickened, denticulate, spores globose, very pale yellow, minutely warted, furnished with a very short pedicel, 7–10 μ diameter.

*Rhinotrichum Thwaitesii*, B. & Br., Ann. Nat. Hist., Ser. 2, vol. vii. p. 10, t. vi. f. 12 (n. 542); Sacc., Syll., iv. n. 470.

On naked ground.

*Var.* **fulvum**, Grove. Tawny or almost fuscous; spores not so coarsely warted.

On rotten wood.

**Rhinotrichum aureum.** C. & M.

Broadly effused, overrunning the entire matrix, bright deep orange; sterile threads creeping, branched, thin, septate; fertile threads erect, simple or forked, septate, 180–250 × 12 μ; ultimate joint papillate with small, obtuse warts; conidia broadly elliptical, 18–20 × 10–12 μ, springing from the warts, and forming subglobose heads.

*Rhinotrichum aureum*, Cke. & Mass. Grev., xviii. p. 27.

On decaying *Paxillus*, *Boletus*, and *Lactarius*.

SPOROTRICHUM. Link. (emended). (fig. 31, p. 313.)

Hyphae vaguely and repeatedly branched, with or without septa, all similar and procumbent. Conidia springing from the tips of branchlets or spinous processes, subsolitary, elliptical or subglobose, one-celled.

*Sporotrichum*, Link., sp. pl. Fungi, i. p. 1, emended by Saccardo in Mich., ii. p. 16; Sacc., Syll., iv. p. 96.

Distinguished from *Botrytis* by all the hyphae being procumbent, and the subsolitary spores; from *Trichosporium* by never being black.

* *Whitish.*

† *Saprophytes on Plants.*

**Sporotrichum laxum.** Nees.

Forming minute white spots that often eventually become confluent; hyphae irregularly branched, forming lax, depressed tufts; conidia minute, white, elliptic or obovate.

*Sporotrichum laxum*, Nees, Syst., p. 49, f. 45; Sacc., Syll., iv. n. 483.

*Sporotrichum minutum*, Grev., Scot. Crypt. Fl., t. 108, f. 1.

On rotten wood and on various substances.

†† *Growing on animals.*

(= *Microsporon.* Gruby.)

**Sporotrichum mentagrophytes.** Rob.

Hyphae densely interwoven; conidia subglobose, very numerous, 6–12 $\mu$ diam.

*Sporotrichum mentagrophytes*, Robin., Hist. Veget. Paras.; Sacc., Syll., n. 499.

On human hair, especially near the bulb.

** *Yellow or saffron.*

**Sporotrichum flavissimum.** Link.

Hyphae sparingly septate, vaguely branched, hyaline, interwoven and forming a loose, thick, broadly effused stratum, and giving off numerous short conidia-bearing

branches; conidia obovate or subglobose, 4–6 × 3–3·5 $\mu$, deep yellow.

*Sporotrichum flavissimum*, Link, Obs., ii. p. 34; Sacc., Syll., n. 510.

? *Sporotrichum sulphureum*, Grev., Scot. Cr. Fl., t. 108, f. 2.

On decaying leaves, stems, wood, tubers, &c., also on dung.

**Sporotrichum sulphureum.** Grev.

Tufts small, orbicular, clear yellow, sometimes becoming confluent; hyphae very slender, scantily septate, branched, loosely interwoven; conidia minute, globose, yellow.

*Sporotrichum sulphureum*, Grev., Scot. Crypt. Fl., t. 108, f. 2; Sacc., Syll., iv. n. 511.

On bark, dung, corks and other substances, in cellars, &c.

**Sporotrichum merdarium.** Ehrb.

Tufts minute, deep yellow, somewhat powdery; branches of hyphae often trifid, slightly rough; conidia globose, muriculate, yellow, 9–10 $\mu$ diameter.

*Sporotrichum merdarium*, Ehrenb., Sylv. Berol., p. 10; Sacc., Syll., iv. n. 524.

On dung.

Distinguished from the other yellow species by its globular conidia, which leave a wavy or knobby outline in optical section, arising from the bluntly convex elevations by which the surface is ornamented. Conidia 5–6 $\mu$ diameter. On dog's dung. (Grove.)

**Sporotrichum aurantiacum.** Grev.

Forming minute orange-red tufts; hyphae very slender, very much interwoven; conidia globose, very minute.

*Sporotrichum aurantiacum*, Grev. in Wern. Trans., iv. t. 5, f. 4; Sacc., Syll., iv. n. 523.

On dung, &c.

**Sporotrichum geochroum.** Desm. (fig. 31, p. 313.)

Tufts small, velvety, ochraceous with rust tinge; fertile hyphae erect, minutely rough, very sparingly septate, branchlets scanty; conidia globose, clear brown, 3–4 $\mu$ diameter.

*Sporotrichum geochroum*, Desm., in Fries, Syst. Myc., iii. p. 146; Sacc., Syll., iv. n. 532.

On rotten wood, &c.

*** *Greenish.*

**Sporotrichum chlorinum.** Link.

Forming effused, rather thick olive-green or yellowish patches; hyphae dense, branched, interwoven; conidia obovate, with a green tinge, 4–6 × 2–3 $\mu$.

*Sporotrichum chlorinum*, Link, Obs. Myc., ii. p. 35; Sacc., Syll., iv. n. 569.

On fallen leaves, especially oak.

## MONOSPORIUM. Bon. (fig. 4, p. 313.)

Sterile hyphae creeping; fertile hyphae repeated branched in a tree-like manner, erect; conidia hyaline or brightly coloured, terminal and solitary on the tips of the terminal branchlets.

*Monosporium*, Bonorden, Hdbk., p. 95; Sacc., Syll., vol. iv. p. 113.

**Monosporium olivaceum.** C. & M. (fig. 4, p. 313.)

Broadly, and for the most part densely effused, olive; hyphae interwoven, septate, pale olivaceous, fertile branches erect, sparingly branched towards the apex, branchlets sometimes alternate, sometimes in pairs; conidia hyaline, oval, 6–8 × 4 $\mu$.

*Monosporium olivaceum*, Cke. & Massee, Grevillea, vol. xvi. p. 78.

On *Corticium* and bark.

**Monosporium coprophilum.** C. & M.

Tufts snow-white, subglobose, sometimes confluent; hyphae interwoven, septate; fertile hyphae short, repeatedly dichotomous, branches ascending, slightly narrower upwards; conidia ovate, continuous, hyaline, granular inside. 12–15 × 10 $\mu$.

*Monosporium coprophilum*, Cke. & Mass., Grev., xvi. p. 10.

On dung.

**Monosporium saccharium.** B. & Br.

Tufts gelatinous, coffee-colour, fertile hyphae short, erect, somewhat clavate; spores obovate, base truncate, smooth, tinged coffee-colour, 10–13 × 7 $\mu$.

*Monosporium saccharinum*, Berk. & Broome, Ann. Nat. Hist., n. 1379; Sacc., Syll., n. 503.

On decaying substances under glass.

## BOTRYTIS. Mich. (emended). (fig. 7, p. 274.)

Sterile hyphae creeping, fertile erect, vaguely branched. Branchlets slender, tips rather acute (*Eubotrytis*); branchlets thickened, rather obtuse (*Polyactis*); tips inflated and furnished with pointed wart-like projections (*Phymatotrichum*); tips obtuse and divided into numerous spine-like projections (*Cristularia*). Conidia one-celled, globose, ellipsoid, or oblong, colourless or brightly coloured, variously aggregated near the tips of the branchlets, but not forming dense heads.

*Botrytis*, Micheli, emended by Link, Sp. Pl., i. p. 53; Sacc., Syll., iv. p. 116. *Polyactis*, Link. (in part).

### A. Eubotrytis.

Small, soft, colour variable; branches slender, somewhat equal; conidia loosely aggregated at the tips.

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FIGURES ILLUSTRATING THE *MUCEDINEAE*.

1. *Milowia nivea*, portion of plant and a free conidium;—Fig. 2, *Prismaria furcata* (enlarged, after Grove);—Fig. 3, *Mucrosporium sphaerocephalum*;—Fig. 4, *Monosporium olivaceum*;—[Fig. 5, *Marsonia ipomeae*, natural size, emerging from a branch;—Fig. 6, portion of same;—Fig. 7, *Hypodermium orchidearum*, emerging from a leaf;]—Fig. 8, *Oidium leucoconium*;—Fig. 9, *Hormiscium splendens*;—Fig. 10, *Torula monilioides*;—Fig. 11, *Gyroceras plantaginis*; Fig. 12, *Echinobotryum atrum*;—Fig. 13, *Stachybotrys asperula*;—Fig. 15, *Chromosporium lateritium*;—Fig. 15a, *Clonostachys araucaria*;—Fig. 16, *Haplaria grisea*;—Fig. 17, *Geotrichum candidum*;—Fig. 18, *Fusidium viride*;—Fig. 19, *Rhopalomyces pallidus*;—Fig. 20, head of same, showing areolated surface;—Fig. 21, *Polyscytalum fungorum*;—Fig. 22, *Briaria elegans*;—Fig. 23, *Septocylindrium Bonordeni*;—Fig. 24, *Diplocladium melleum*;—Fig. 25, *Sepedonium chrysospermum*;—Fig. 26, *Trichoderma lignorum*;—Fig. 27, *Sterigmatocystis dubia*;—Fig. 28, section of head of same;—Fig. 29, *Microstroma album*;—Fig. 30, *Amblyosporium botrytis*;—Fig. 31, *Sporotrichum geochroum*;—Fig. 32, *Acremonium alternatum*;—Fig. 33, *Hyphoderma roseum*. All the figures are highly magnified.

Figs. 5–7 do not belong to the Hyphomycetes.


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* *Whitish.*

**Botrytis trabea.** Sacc.

Forming minute pale spots; fertile hyphae erect, septate, sparingly branched in a forked manner, branches divided at the apex into 3–5 slender branchlets, each bearing a single, globose, colourless conidium, 5–6 $\mu$ diameter.

*Botrytis trabea*, Sacc., Syll., iv. n. 597.

*Stachylidium trabeum*, B. & Br., Ann. Nat. Hist., n. 1920, t. 3, f. 6.

On an old beam.

**Botrytis corolligena.** C. & M. (fig. 7, p. 274.)

Pure white. Sterile hyphae scanty; fertile, erect, septate, 7–8 $\mu$ thick, elongated, very shortly branched near the tip; conidia elliptical, crowded in small subglobose heads, continuous, hyaline, smooth, 25 × 15–18 $\mu$.

*Botrytis corolligena*, Cke & Mass., Grevillea, xvi. p. 10.

On fading corollas of *Calceolaria*.

**Botrytis gonabotryoides.** C. & M.

Whitish. Hyphae gregarious but not fasciculate, erect, simple or furcate, septate, pale olive below, conidia elliptical, continuous, hyaline, 15 × 7–8 $\mu$, in subglobose, apical clusters, and also in three or four similar clusters at various heights around the septa of the hyphae, but the joints are not swollen, conidia-bearing branchlets short and crested at the tip.

*Botrytis gonabotryoides*, Cke. & Mass., Grev., xvi. p. 79.

On dead leaves of *Hypericum calycinum*.

** *Reddish or lilac.*

**Botrytis coccotricha.** Sacc.

Tufts rather large, pallid, then dingy rose-coloured; hyphae branched in a dichotomous, rarely trichotomous manner, 6–7 $\mu$ thick, colourless below, rosy towards the tip; conidia generally solitary at the attenuated tips of the branchlets, elliptical, 25–30 $\mu$ long, at first granular, rufous-ferruginous.

*Botrytis coccotricha*, Sacc., Fung. Ital., t. 694; Sacc., Syll., iv. n. 614.

On decayed branches.

**** Yellow; tawny, or golden.*

**Botrytis citrina.** Berk.

Forming thin patches 1 in. or more across, at first white, then yellow; hyphae erect, septate, main branches attenuate or often in opposite pairs, branchlets short, each bearing a single pear-shaped yellow conidium at the tip, measuring 9–10 × 5 $\mu$.

*Botrytis citrina*, Berk., Ann. Nat. Hist., vol. i. n. 127, t. viii. f. 12.

On dead fallen branches of cherry.

The hyphae when mature are bright yellow.

**Botrytis brevior.** Sacc.

Tufts minute, subglobose, rufous, hyphae sparingly branched, septate, joints short; conidia elliptical, granulated, 5 × 7–8 $\mu$.

*Botrytis brevior*, Sacc., Syll., n. 635.

*Coccotrichum brevius*, B. & Br., Ann. Nat. Hist., n. 1918, t. 3, f. 8.

On bark.

Tingeing water with a rufous shade. Subferruginous when dry.

***** Clay-colour or greenish.*

**Botrytis argillacea.** Cooke.

Forming broadly effused, thin, greyish-brown patches; fertile hyphae, erect, septate, main branches few, divided in a forked manner at the apex; tips of branchlets slightly thickened, bearing small numbers of elliptical, almost colourless conidia, measuring 10–12 × 7 $\mu$.

*Botrytis argillacea*, Cke., Grev., t. 48, f. 6; Sacc., Syll., iv. n. 646.

On wood.

Forming clay-coloured patches 6 in. and more long.

**Botrytis virella.** Fr.

Forming an effused, powdery, very delicate greenish layer; sterile hyphae creeping, about 3 $\mu$ thick, colourless, branded, septate; fertile hyphae erect, septate, coloured, 100–120 × 3 $\mu$, bearing near the apex 2–4 short, slightly inflated branch-

lets, that bear the imperfect, greenish heads of conidia; conidia globose, pale dingy green, 2 $\mu$ diameter.

*Botrytis virella*, Fries, Summa. Veg. Sc., p. 491; Sacc., Syll., n. 653.

On very wet and rotten wood.

***** *Brownish or dark-coloured.*

**Botrytis Tilletii.** Desm.

Forming dense and often broadly effused, fawn-coloured or brownish expansions; sterile hyphae 8–10 $\mu$ thick, septate, branched, interwoven; fertile, same thickness, short, erect, irregularly or imperfectly verticillately branched near the apex, tips of the branchlets spinulose and bearing numerous elliptical or subglobose conidia, 4 × 3 or 4 $\mu$ diameter.

*Botrytis Tilletii*, Desm., Ann. Sci. Nat. (1838), vol. x. p. 308; Sacc., Syll., n. 660.

Running over moss, leaves, wood, &c.

**Botrytis croci.** Cke. & Mass.

Small dark smoky tufts, sometimes confluent and effused; threads thick, rather closely septate, slightly branched at the attenuated tips, pale olive below, colourless above; conidia elliptical, continuous, hyaline, 15–18 × 8–10 $\mu$, collected at the tips of the branches in small heads of from 3–8 conidia.

*Botrytis croci*, Cke. & Mass., Grev., xvi. p. 10.

On dead leaves of *Crocus*.

B. **Polyactis.** Link.

Large, rather rigid, forming brownish-grey tufts; branches thickish, obtuse, usually with scattered tooth-like projections arranged in a racemose or corymbose manner, and bearing the conidia.

**Botrytis vulgaris.** Fr.

Tufts greyish-olive, scattered; often becoming confluent, fertile hyphae septate, ascending or erect, olive, branched near the tip; primary branches short, spreading, bearing a few short branchlets usually arranged in pairs; conidia

clustered at tips of branchlets, elliptical, smooth, pale brown, 10–12 × 7–9 μ.

*Botrytis vulgaris*, Fries, Syst. Mycol., iii. p. 398; Sacc., Syll., iv. n. 664.

On decaying fruit, flowers, leaves, wood, &c.

The following varieties, some of which have not yet been met with in Britain, are known.

*Var.* **plebeja**, Fres., Beitr., p. 13, t. 11, f. 1–7.

Tufts greyish-olive, hyphae rather rigid, ascending or erect, septate, sparingly branched or subsimple, fertile branches divided in a binate or ternate manner at the apex, nodulose; conidia elliptical, hyaline, 10–14 × 7–8 μ, smooth, borne on very minute, verruculose branchlets that spring from the nodulose portions of the branches.

On dead or fading leaves, branches, &c.

*Var.* **condensata**, Sacc., Mich., ii. p. 358.

Tufts suberumpent, grey; conidia 10–12 × 9–10 μ.

Parasitic on *Tubercularia*.

*Var.* **furcata**, Fres., Beitr., p. 13, t. ii. f. 8–11.

Tufts olive, hyphae 1·5 mm. high, once or twice forked, bearing tufts of conidia here and there; conidia globose, 10–15 μ diameter.

On damp paper.

*Var.* **interrupta**, Fres., l.c., figs. 12–14.

Tufts brownish; hyphae subsimple, elongated, subnodulose, conidia globoso-ellipsoid, 11–15 μ long, arranged in elongated clusters at the nodes and resembling an interrupted spike.

On onion scape.

**Botrytis cana.** Kunze & Schm.

Forming subrotund hoary tufts that are often crowded or confluent; hyphae septate, branched above in a botryoid manner; conidia elliptical, pale brown.

*Botrytis cana*, Kunze & Schm., Myk., Heft i. p. 83; Sacc., Syll., iv. n. 129 (not of Corda).

*Polyactis cana*, Bon., Hdbk., p. 115, f. 156.

On dead leaves of various plants.

**Botrytis vera.** Fr.

Forming minutely woolly tufts of a greyish colour; fertile

hyphae vaguely branched above, septate; conidia almost colourless, elliptical, 10–12 × 5–7 $\mu$, arranged in a spicate manner at the tips of the branchlets.

*Botrytis vera*, Fries, Syst. Myc., iii. p. 417; Sacc., Syll., iv. n. 666.

*Mucor botrytis*, Bolton, Fung., t. 132, f. 3.

On fruit, decaying herbaceous stems, fungi, &c.

**Botrytis cinerea.** Pers.

Sterile hyphae creeping, fertile erect, gregarious, simple or sparingly branched, and with several short, simple or divided branchlets near the apex, the ultimate branchlets spinulose; septate, slightly constricted at the septa, smoky-brown, 200–300 × 12–16 $\mu$; conidia broadly elliptical or subglobose, apiculate, almost colourless, 10–12 $\mu$ diameter.

*Botrytis cinerea*, Pers., Syn., p. 690; Sacc., Syll., n. 667.

On rotting leaves, stems, putrid fungi, &c.

*Var.* **sclerotiophila**, Sacc., Mich., ii. p. 358. Hyphae densely fasciculate, sooty-grey, septate, not at all or sparingly branched, nodulose above; conidia springing from the nodules, elliptical, 8–9 × 6, almost hyaline.

On dead stems of *Umbellifers;* springing from an elongated, externally black sclerotium, once called *Sclerotium durum*.

**Botrytis capitata.** B. & Br.

Altogether white. Fertile hyphae arising from a basal inflated cell, erect, bifid or trifid above; conidia obovate, 25 $\mu$ long.

*Botrytis capitata*, B. & Br., Ann. Nat. Hist. (1881), p. 131, n. 1919; Sacc., Syll., iv. n. 680.

On *Cheiranthus*.

**Botrytis fascicularis.** Sacc.

Tufts minute, brown, shining; hyphae erect, clustered, rather wavy, fasciculate or connate at the base, brown, semi-pellucid above; branches hyaline; clusters of conidia subglobose; conidia oblong, large.

*Botrytis fascicularis*, Sacc., Syll., n. 686.

*Polyactis fascicularis*, Corda.

On decaying plants.

**Botrytis aclada.** Fr.

Forming minute brownish tufts; hyphae unbranched, septate, erect; conidia elliptic-oblong, almost colourless, 6–8 × 5–6 $\mu$, aggregated in elongated clusters at the tips of the hyphae.

*Botrytis aclada*, Fres., Beitr., p. 16, t. ii. f. 23–24; Sacc., Syll., iv. n. 672.

On decaying onion scapes.

C. *Cristularia.*

Tips of the branchlets scarcely inflated, cristato-crenate or digitate.

**Botrytis depraedens.** Sacc.

Forming grey determinate or confluent spots on leaves; hyphae colourless, ascending, septate, wavy, unbranched, terminated by elliptical basidia-like cells, the terminal one bilobed; head of conidia globose, subcompact; conidia globose, hyaline, 12 $\mu$ diameter.

*Botrytis depraedens*, Cooke, some remarkable moulds, Quelet, Micr. Journ., v.; Sacc., Syll., iv. n. 692.

On sycamore leaves (*Acer pseudo-platanus*), which it destroys.

D. *Phymatotrichum.*

Tips of branches inflated and everywhere covered with pointed wart-like projections bearing the conidia.

**Botrytis tricephala.** Sacc.

Tufts minute, elliptical, white, 3 mm. long; sterile hyphae hyaline, loosely interwoven; fertile simple, erect, septate, 10 $\mu$ thick, simple above or divided into two branches each again divided into 3 short branchlets with globose inflated tips, from which originate the globose conidia, measuring 5 $\mu$ diameter.

*Botrytis tricephala*, Sacc., Syll., iv. n. 698.

*Acmosporium tricephalum*, Phillips, in Gard. Chron., Mar. 8, 1884, fig. 61.

On fallen leaves of *Cryptomeria Japonica*.

**Botrytis galanthina.** Sacc.

Hyphae with short branches towards the tip, umber-brown, branchlets incrassated at the tip; conidia obovate, borne on elongated spicules, 15–18 $\mu$ long.

*Botrytis galanthina*, Sacc., Syll., iv. n. 705.

*Polyactis galanthina*, B. & Br., Ann. Nat. Hist., n. 1385, t. viii. f. 8.

On bulbs of snowdrop (*Galanthus nivalis*).

## OVULARIA. Sacc. (fig. 8, p. 274.)

Parasites. Hyphae subsimple, erect, more or less distinctly furnished with minute tooth-like projections near the apex that bear the conidia. Conidia one-celled, colourless, solitary, or rarely in short chains.

*Ovularia*, Sacc., Mich., ii. p. 17; Sacc., Syll., iv. p. 139.

Closely allied to *Ramularia*, but distinguished by the continuous conidia.

* *On Dicotyledons.*

**Ovularia lychnicola.** Mass.

Spots often rather large and numerous, subcircular, ochraceous; fertile hyphae short, simple, erect, tufted; conidia cylindrical, attenuated slightly at both ends, colourless, 12–15 × 4 $\mu$.

*Ramularia lychnicola*, Cke., Grev., xiv. p. 40; Sacc., Syll., iv., n. 993.

On living leaves of *Lychnis diurna*.

**Ovularia lapsanae.** Mass.

Spots at first inconspicuous then becoming dry and pale; fertile hyphae tufted, simple or with a few short branchlets, 30–50 × 3 $\mu$, not septate; conidia cylindrical, rather attenuated at both ends, 10–15 × 3·5–4 $\mu$, in short chains.

*Ramularia lampsanae*, Sacc., Mich., ii. p. 549; Sacc., Syll., iv. n. 1008.

On under surface of living leaves of nipplewort (*Lapsana communis*).

**Ovularia destructiva.** Mass.

Parasitic. Erumpent; forming broadly effused patches;

fertile hyphae erect, simple, not septate, aggregated; conidia elliptical, cream-coloured, 15 $\mu$ long, in short chains of two or three, terminal upon the hyphae.

*Ramularia destructiva*, Phill. & Plow., Grev., vi. p. 23, t. 94, f. 1; Sacc., Syll., iv. n. 962.

On *Myrica gale*. When it occurs upon the smaller branches it is in the manner of an encircling zone 1–3 cm. wide, which quickly causes loss of vitality of the parts beyond, very much in the same manner that *Rhytisma maxima* does. It also occurs on the under surfaces of the leaves, upon reddish-brown spots. (P. & P.).

**Ovularia senecionis.** Mass.

Tufts white, conspicuous, irregular; hyphae erect, septate, wavy, slender; conidia cylindrical, ends rounded, continuous, 7–18 × 5 $\mu$, colourless.

*Ramularia senecionis*, Sacc., Syll., iv. n. 1023.

*Cylindrosporium senecionis*, B. & Br., Ann. Nat. Hist., n. 1613.

On leaves of *Senecio vulgaris*.

**Ovularia lactea.** Mass.

Spots subcircular, whitish, bounded by a brownish margin; hyphae rather wavy, 30–60 × 2 $\mu$; conidia variable, elliptic-oblong, fusoid, or cylindrical, both ends obtuse, 8–11 × 2–3 $\mu$, colourless, in short chains.

*Ramularia lactea*, Sacc., Mich., ii. p. 549; Sacc., Syll., iv. n. 979.

On upper surface of living leaves of *Viola hirta*, *V. odorata*, &c.

**Ovularia armoraciae.** Mass.

Spots irregular in form and size, often numerous, subochraceous then pale; hyphae subfasciculate, springing from a prostrate mycelium, without septa, simple or rarely with an indication of branching; conidia elongated, cylindrical, both ends obtuse, colourless, 15–25 × 2·5–3 $\mu$ (or according to Fuckel, becoming subventricose, and measuring 22 × 5 $\mu$).

*Ramularia armoraciae*, Fckl., Symb. Myc., p. 361, t. i. f. 24; Sacc., Syll., iv. n. 978.

On leaves of horse-radish.

**Ovularia interstitialis.** Mass.

Spots hypophyllous, yellowish; conidiophores erect, aseptate, simple subflexuous or irregularly nodulose, 60–80 × 5–6 $\mu$, supporting a single conidium attached obliquely to the abrupt apex; conidia elliptic-oblong, colourless, 15–18 × 5–7 $\mu$.

*Peronospora interstitialis*, B. & Br., Ann. Nat. Hist., ser. iv. vol. xv. p. 34 (n. 1455); Sacc., Syll., vii. n. 867.

On the under surface of primrose leaves. "Spots hypophyllous, yellow, confined to the interstices of the veins, rarely extending slightly beyond them." (Berk.)

A singular species, a typical *Ovularia*. The above description is drawn up from the type specimens in Berkeley's herbarium at Kew.

**Ovularia rufibasis.** Mass.

Hypophyllous, spots on under surface, pale on upper surface bright brown, conidiophores erect, simple, aseptate, 60–80 × 4–5 $\mu$, apex abrupt with a very minute oblique apiculus supporting a single conidium; conidia variable in shape, obovate, ovate, or elliptic-oblong, colourless, 25–30 × 5–7 $\mu$.

*Peronospora rufibasis*, B. & Br., Ann. Nat. Hist., ser. iv. vol. xv. p. 34 (n. 1456); Sacc., Syll., vii. n. 873.

On under surface of leaves of *Myrica gale*. Rare.

Spots small, pallid, with corresponding bright brown spots on the upper surface of the leaf. The above diagnosis is drawn up from Berkeley's type specimens. Evidently a characteristic species of *Ovularia*.

**Ovularia cochleariae.** Mass.

Forming one or two large subcircular pale spots on leaves; conidia elongated, cylindrical, both ends round, colourless, 25–30 × 2·5–3 $\mu$.

*Ramularia cochleariae*, Cke., Grev., xi. p. 155; Sacc., Syll., iv. n. 977.

On living leaves of *Cochlearia officinalis*.

**Ovularia alnicola.** Mass.

Spots circular, greyish-white then smoky, epiphyllous; hyphae very short; conidia elliptical, colourless, in short chains, 10–14 × 4 $\mu$.

*Ramularia alnicola*, Cke., Grev., xiv. p. 40; Sacc., Syll., iv. n. 967.

On living leaves of *Alnus glutinosa*.

**Ovularia scelerata.** Mass.

Spots elongated, brown, often becoming effused over the greater portion of the leaf; hyphae short, scattered, generally on the under surface of the leaf; conidia cylindric-ellipsoid, rounded at both ends, colourless, 20 × 3·5 μ.

*Ramularia scelerata*, Cke., Grev., xiv. p. 40; Sacc., Syll., iv. n. 971.

On living radical leaves of *Ranunculus sceleratus*.

**Ovularia rosea.** Mass.

Spots subochraceous or with a tinge of rose-colour; hyphae erect, fasciculate, simple or sparingly forked, tips subdenticulate, colourless, 30–40 × 2·5–3 μ; conidia fusoid, 15–25 × 2–3 μ, colourless.

*Ramularia rosea*, Sacc., Syll., iv. n. 966.

On the under surface of living leaves of *Salix viminalis*, *S. triandra*, *S. vitellina*, &c.

Sometimes the conidia are spuriously 1-septate, due to the division of the protoplasm into two parts, but a true septum is not present.

**Ovularia asperfolii.** Sacc.

Tufts spot-like, depressed, white; hyphae tortuous, sparingly septate, 50–70 × 4 μ; conidia elliptical, base subapiculate, 10–12 × 7–8 μ, hyaline, inserted on lateral or terminal scars of the hyphae.

*Ovularia asperfolii*, Sacc., Fung. Ven., ser. v. p. 186; Sacc., Syll., iv. n. 735.

On leaves of Comfrey (*Symphytum officinalis*).

Those portions of the surface of the leaf opposed to the spots are yellow.

**Ovularia veronicae.** Sacc. (fig. 8, p. 274.)

Tufts white, often occupying nearly the whole of the under surface of the leaf; hyphae long, branched; conidia cylindric-ellipsoid, one-celled, colourless, size very variable, 12–30 × 5–6 μ.

*Ovularia veronicae*, Sacc., Syll., iv. n. 742.

*Ramularia veronicae*, Fuckel, Symb. Myc., p. 361; Berk. & Broome, Ann. Nat. Hist., n. 1917, t. 3, f. 7.

On under surface of leaves of various species of Speedwell; *Veronica hederifolia, V. agrestis*, &c.

**Ovularia Lamii.** Sacc.

Tufts minute, white, seated on somewhat discoloured spots; hyphae fasciculate, very short, simple, thinner than the elliptical, continuous conidia which measure 18 × 6 μ.

*Ovularia Lamii*, Sacc., Syll., n. 744.

*Ramularia Lamii*, Fuckel, Symb. Myc., p. 361, t. 1, f. 25.

On leaves of *Lamium*.

**Ovularia berberidis.** Cke.

Hypophyllous, greyish-white, effused; hyphae short, simple; conidia elliptical, hyaline, 15–18 × 8–9 μ.

*Ovularia berberis*, Cke., Grev., v. 16; Sacc., Syll., iv. n. 746.

On fading leaves of *Berberidis asiatica*.

**Ovularia syringiae.** Berk.

Hyphae decumbent, 300 μ long, conidia at first subglobose, apex papillate, then elliptical, large, 50–75 μ long.

*Ovularia syringae*, Berk. in Grev., 1882, p. 15 and 115; also in Gard. Chron., 1881, fig. 135.

On leaves of *Syringa*.

**Ovularia obliqua.** Oudem.

Spots subcircular, subochraceous when dry, bordered by a red margin; hyphae on both sides of the leaves, but usually on the under surface, fasciculate, simple or with 1–2 small branchlets, colourless, aseptate or rarely 1–septate, 70–125 × 3–4 μ; conidia elliptic-oblong, one-celled, often oblique, 18–28 × 9–12 μ.

*Ovularia obliqua*, Oudemans, Hedw., 1883, p. 85; Sacc., Syll., iv. n. 150.

*Peronospora obliqua*, Cke.

On fading leaves of *Rumex crispus, R. obtusifolius*, &c.

Said to be the conidial stage of *Sphaerella rumicis*, Fckl.

** *On Monocotyledons.*

**Ovularia elliptica.** Berk.

Hyphae short, here and there nodulose, septate, springing from creeping mycelium; conidia elliptical, colourless, large.

*Ocularia elliptica*, Berk., Gard. Chron., 1881, with fig., Grev., 1881, p. 51; Sacc., Syll., iv. n. 752.

On several cultivated varieties of *Lilium*.

## SEPEDONIUM. Link. (fig. 25, p. 313.)

Hyphae vaguely branched, creeping; conidia produced at the tips of branches, solitary or 2–3 together, one-celled, minutely warted, hyaline or brightly coloured.

*Sepedonium*, Link, Obs. Myc., i. p. 16; Sacc., Syll., iv. p. 146.

Most species are parasitic on fungi, and are the conidial stage of species of *Hypomyces*.

### Sepedonium chrysospermum. Fr. (fig. 25, p. 313.)

Hyphae effused, interwoven, rather thick, almost hyaline, variously forked and branched, bearing short, spreading, lateral conidiophores; conidia solitary, globose, minutely warted, very numerous, bright yellow, 13–17 $\mu$ diameter.

*Sepedonium chrysospermum*, Fr., Syst. Myc., iii. p. 438; Sacc., Syll., n. 754.

Very common on decaying fungi, Boletus, Agarics, &c. Probably a true parasite, attacking the fungus early and arresting its development. At first white, then bright yellow and powdery from the very numerous spores.

The conidial condition of *Hypomyces chrysospermus*.

### Sepedonium Tulasneanum. Sacc.

Effused, ochraceous or with an olive tinge, hyphae sparingly septate, dividing into 2–3 subequal, short branches near the apex, each producing at its summit an ochraceous, elliptic-fusiform, warted conidium, 16–24 × 8–10 $\mu$.

*Sepedonium Tulasneanum*, Sacc., Syll., vol. iv. n. 766.

Parasitic on various species of *Boletus*.

The conidial condition of *Hypomyces Tulasneanus*.

## ASTEROPHORA. Ditm. (fig. 5, p. 358.)

Hyphae vaguely branched, creeping; conidia stellately tuberculose.

*Asterophora*, Ditm., in Sturm's Deutschl. Fl., iii. p. 53; Sacc., Syll., iv. p. 148.

Shown by Brefeld to be the chlamydosporous state of the parasitic agaric *Nyctalis*.

**Asterophora agaricicola.** Corda. (fig. 5, p. 358.)

Hyphae filiform, septate, hyaline, interwoven, sparingly branched; conidia globose or broadly elliptical, stellately tuberculose, rarely 2 conidia superposed, hyaline then somewhat dingy ochraceous, 18–24 $\mu$.

*Asterophora agaricicola*, Corda, Ic. Fung., vi. p. 8, f. 24; Sacc., Syll., n. 770.

On the pileus of *Nyctalis asterophora*, of which Brefeld has proved it to be the chlamydosporous condition.

## Tribe 6. *Verticillieae*. Sacc.

## VERTICILLIUM. Nees. (fig. 9, p. 274.)

Vegetative hyphae creeping, septate, fertile erect, with more or less elongated branches that are frequently branched, and arranged in a verticillate manner; conidia solitary at the tips of the branchlets, colourless or coloured, simple or septate.

*Verticillium*, Nees, Syst. der Pilze, p. 57; Sacc., Syll., iv. p. 150.

In most species both primary and secondary branches are arranged in a verticillate manner, and the secondary branches are thickened at the base, tapering towards the tip bearing the conidium.

### A. *Eu-Verticillium*.

Branches almost straight; heads of conidia not involved in mucus.

#### * *Whitish*.

**Verticillium candelabrum.** Bon.

Tufts white, at first minute, then often growing into each other, velvety, fertile hyphae erect, septate, primary branches few, scattered, shorter towards top of main stem, ultimate

branchlets thick at the base, becoming thin at the tip, short, usually in whorls of three; conidia elliptical, 4–6 × 3 μ.

*Verticillium candelabrum*, Bonorden, Hdbk., p. 97, f. 121; Sacc., Syll., iv. n. 777.

On rotten wood, leaves, &c.

**Verticillium compactiusculum.** Sacc.

Forming rather compact, effused white tufts, sterile creeping hyphae scanty, fertile erect, septate, primary and secondary branches in whorls of 3–4; conidia cylindric-oblong, 8–10 × 2–3 μ.

*Verticillium compactiusculum*, Sacc., Fung. Ital., t. 724; Syll., iv. n. 781.

On various decaying vegetable substances.

**Verticillium ampelinum.** Cke. & Mass.

White; caespitose. Hyphae erect, sparingly branched, ultimate branches mostly ternate, attenuated at the apex, septate, conidia elliptic, hyaline, continuous, 10 × 4 μ.

*Verticillium ampelinum*, Cke. & Mass., Grevillea, vol. xvi. p. 79.

On knots on vine stems.

**Verticillium distans.** B. & Br. (fig. 9, p. 274.)

Forming scattered, indistinct white patches, primary branches 3–4, alternate, secondary branches attenuated at the tip, in whorls, a whorl also terminates the main stem, conidia colourless, elliptic-oblong, becoming distinctly one-septate, 8–10 × 4 μ.

*Verticillium distans*, B. & Br., Ann. Nat. Hist., n. 534, t. 7, f. 16; Sacc., Syll., iv. n. 784.

On herbaceous stems.

An examination of the type specimen in Berkeley's herbarium at Kew shows that the conidia are distinctly uniseptate at maturity, hence technically the species is not a *Verticillium;* but as the agreement with this genus is perfect in every other respect, it is retained here.

**Verticillium terrestre.** Sacc.

Vegetative mycelium creeping, interwoven, white, fertile erect, septate, often wavy, sometimes branched once or twice

in a forked manner, secondary branches short, in verticils usually consisting of four branchlets; conidia minute, globose, colourless.

*Verticillium terrestre*, Sacc., Syll., iv. n. 785.

*Stachylidium terrestre*, Grev., Scot. Crypt. Fl., t. 257.

On the bare ground and on fallen wood.

**Verticillium nanum.** B. & Br.

Very minute, white, barren hyphae creeping, interwoven, fertile erect, minute, wavy, branches short, in pairs or single; conidia elliptical, white, 5 × 3 μ.

*Verticillium nanum*, B. & Br., Ann. Nat. Hist., n. 532, t. 7, f. 18; Sacc., Syll., iv. n. 789.

On pears.

A very minute and degenerate species, the whorls being reduced to two opposite branches, sometimes only one.

**Verticillium agaricinum.** Corda.

Forming white, woolly tufts; fertile hyphae erect, septate, verticillately branched, the lowermost and most vigorous branches with branchlets in verticils; branchlets acute at the tip and bearing a single elliptic-obovate conidium (rarely more) at the apex; conidia 14 × 5–6 μ.

*Verticillium agaricinum*, Corda, Icon. Fung., xi. p. 15, f. 68; Sacc., Syll., no. 790 (in part); (not Plowright, Grevillea, pl. 150, f. A.)

On Agarics.

**Verticillium lactescentium.** Sacc.

Effused, white; hyphae erect, 8–10 μ thick, attenuated towards the apex, septate, simple or with 1–2 branches towards the top, branchlets in whorls of 3–5, acuminate, each bearing a single conidium at the apex; conidia elliptical, apiculate at the base, 25–30 × 10–12 μ.

*Verticillium lactescentium*, Sacc., Syll., n. 791; Grevillea, pl. 153, fig. A.

On species of *Lactarius;* accompanying *Hypomyces terrestris*, of which it is the conidial form.

**Verticillium microspermum.** Sacc.

Effused, white; fertile branches erect, 5–6 μ thick, apex tapering, septate; branches in verticils of 3–4, bearing

secondary verticils of 2–4 acuminate branchlets; conidia terminal, solitary, elliptical, 5 × 3 μ.

*Verticillium microspermum*, Sacc., Syll., iv. n. 793; Grevillea, pl. 154, fig. A.

On *Fomes annosus*; accompanying *Hypomyces Broomeanus*, of which it is the conidial form.

**Verticillium aspergillus.** B. & Br.

White; sterile hyphae scanty, creeping; fertile branches erect, septate, simple, rarely branched near the base, up to 150 μ long, repeatedly dividing near the apex, in a dichotomous manner, the branches terminating in a verticil of 3–4 acuminate branchlets; conidia apical, solitary, elliptical, 3 × 2 μ.

*Verticillium aspergillus*, Berk. & Broome; Ann. Nat. Hist., n. 1384, pl. 8, f. 7; Sacc., Syll., n. 795.

On decaying *Poria vaporaria*.

The habit is that of *Clonostachys araucaria*, Cda. It is worth inquiry whether this may not be a state of *Hypocrea farinosa*. (B. & Br.)

**Verticillium quaternellum.** Grove.

Snow-white. Mycelium very slender, intricately branched, fertile hyphae short, hyaline, erect, almost cylindrical, remotely septate; branches cylindrical, straight, simple, in verticils of 3–4, and bearing 3–5 (most frequently four) conidia at the apex; conidia cylindric-oblong, hyaline, 7–8 μ long.

*Verticillium quaternellum*, Grove, Journ. Bot., vol. xiii. p. 10; t. 246, f. 7; Sacc., Syll., n. 726.

On *Agaricus* (*Mycena*).

*** Rosy, red, tawny, or yellow.*

**Verticillium epimyces.** B. & Br.

Forming effused, rather dense patches, at first white, then tinged with rose, primary and secondary branches usually in pairs, opposite, tertiary branches short, becoming sharp-pointed, often also in pairs; conidia colourless, at first almost globose, then elliptical, 9–12 × 5 μ when mature.

*Verticillium epimyces*, B. & Br., Ann. Nat. Hist., n. 533, t. vii. f. 15; Sacc., Syll., iv. n. 798.

On various species of decaying fungi.

**Verticillium buxi.** Aners. & Fleisch.

Forming effused, minutely pulverulent, very pale rose-coloured tufts; sterile hyphae creeping, interlaced; fertile erect, main branches short, in opposite pairs or whorls of three, secondary branchlets similarly arranged; conidia elliptic-oblong, with a faint rosy tinge when mature, 6–10 × 3–4 $\mu$.

*Verticillium buxi*, Aners. & Fleisch. in Hedwigia, 1867, p. 9; Sacc., Syll., iv. n. 800.

Not *Penicillium roseum*, Cooke, as stated by Saccardo.

On the under surface of fading and dead box leaves.

**Verticillium lateritium.** Berk.

Forming broadly effused velvety orange-red or vermilion-coloured patches; sterile hyphae dense, creeping septate, fertile erect, primary and secondary branches in verticils, the whorls becoming smaller upwards, giving the whole a pyramidal outline; conidia, like the hyphae, pale red by transmitted light, elliptic-oblong, 4–6 × 3 $\mu$.

*Verticillium lateritium*, Berk., in Cke., Hdbk., p. 635; Sacc., Syll., iv. n. 808.

On various decaying vegetable substances.

[*Verticillium Vizei*, B. & Br., in Vize, Microfungi, n. 247.

According to Saccardo, who has examined a specimen in Vize's exs., this is the imperfectly developed mycelium of *Oospora perpusilla*, Sacc. In the Kew copy there is only mycelium, and that only in small quantity.]

## ACROSTALAGMUS. Corda. (figs. 6, 7, p. 358.)

Vegetative hyphae creeping, septate; fertile hyphae erect, septate, primary branches in whorls that become smaller upwards, secondary branches also whorled; conidia aggregated in clusters at the tips of the branchlets and involved in mucus.

*Acrostalagmus*, Corda, Icon. Fung., ii. p. 15; Sacc., Syll., iv. p. 163.

Resembling *Verticillium* in habit, distinguished by the cluster of spores involved in mucus at the tip of each branchlet. By some the spores are considered as being enclosed in a cell, as in *Mucor*, but it has been shown by Berlese that the apparent membrane consists of mucus that disappears at maturity.

**Acrostalagmus cinnabarinus.** Corda. (figs. 6, 7, p. 358.)

Tufts pulverulent, effused, orange-red or vermilion; vegetative hyphae branched, septate; fertile hyphae erect, rigid, septate, primary and secondary branches arranged in whorls, clusters of conidia globose, conidia elliptical, very faintly tinged rose, 3–5 × 1–2 $\mu$.

*Acrostalagmus cinnabarinus*, Corda, Ic. Fung., ii., p. 15, fig. 66; Sacc., Syll., iv. n. 139.

On various decaying vegetable substances.

CLONOSTACHYS. Corda. (fig. 15A, p. 313.)

Sterile hyphae creeping, continuous; fertile, erect, simple, continuous below, septate towards the apex and giving off whorls of branches, usually in fours, from the septa; branchlets also bearing whorls of branchlets, usually in fours; branchlets subulate, the upper part densely covered with white, continuous conidia, spirally arranged, and resembling a compact spike.

*Clonostachys*, Corda, Prachtflora, p. 31, t. xv.; Sacc., Syll., vol. iv. p. 165.

**Clonostachys araucaria.** Corda. (fig. 15A, p. 313.)

Forming-minute white, downy tufts 1–2 line broad and $\frac{1}{2}$ a line high; fertile branches erect, simple and without septa for some distance from the base, septate above, and bearing verticils of branches at the septa, branches also verticillately arranged, branches and branchlets in fours; the branches covered for some distance with closely crowded, oblong conidia, the whole resembling a spike; spikes crowded, and forming a compact, elliptical head; conidia 5–6 × 2 $\mu$.

*Clonostachys araucaria*, Corda, Prachtfl., p. 31, t. xv.; Sacc., Syll., n. 849.

On bark, wood, &c.

A very beautiful fungus, resembling an *Araucaria* in miniature when seen under a low magnifying power.

SPICARIA. Harz. (fig. 10, p. 274.)

Sterile hyphae creeping, branched, septate; fertile hyphae erect, septate, repeatedly verticillately branched towards the apex, ultimate branchlets each bearing a diverging chain of elliptic or oblong, pale or colourless, continuous conidia.

*Spicaria*, Harz, Hyph., p. 50; Sacc., Syll., iv. p. 166.

With the general habit of *Verticillium*, but distinct in the lax, spreading chains of conidia.

**Spicaria elegans.** Harz. (fig. 10, p. 274.)

Tufts thin, effused, minutely velvety, whitish; fertile hyphae erect, septate, 2–3 times verticillately branched above, ultimate branchlets tapering, chains of conidia elongated, lax; conidia elongato-elliptical, colourless. 5 × 3 $\mu$.

*Spicaria elegans*, Harz, Hyphom. p. 51; Sacc., Syll., iv. p. 853.

On bark, fungi, &c.

*Var.* **muscorum**, Grove, Journ. Bot., t. 256, f. 8.

Fertile hyphae 150–250 × 4–5 $\mu$; conidia slightly larger than in type, subacute at both ends, 9 × 3 $\mu$.

On moss, wood, &c.

Forming a thin, white, pulverulent stratum.

Tribe 7. *Gonatobotryteae.* Sacc.

GONATOBOTRYS. Corda. (fig. 12, p. 274.)

Sterile hyphae creeping, fertile erect, septate, inflated at the septae, inflated portions covered with spicule-like projections that bear the continuous conidia.

*Gonatrobatrys*, Corda, Prachtflora, t. v.; Sacc., Syll., iv. p. 169.

Must not be confounded with *Arthrobotrys*, which has 1-septate conidia.

**Gonatobotrys simplex.** Corda.

White; tufts lax, minute, downy; fertile hyphae simple, long, erect, furnished with many nodes or swollen portions, septate, fertile nodes globose; conidia hyaline, subglobose, base apiculate.

*Gonatobotrys simplex*, Corda, Prachtfl., t. v.; Sacc., Syll., n. 863.

On decaying fruit of *Tamus;* on hawthorn branches; on old perithecia of *Valsa*, &c.

**Gonatobotrys flava.** Bon. (fig. 12. p. 274.)

Tufts, minute, white then yellowish; fertile hyphae erect, simple, here and there inflated, the inflated portions covered with spicules spirally arranged; conidia elliptic-oblong, base subapiculate, 18–25 × 10–12 $\mu$, at first colourless then slightly tinged yellow.

*Gonatobotrys flava*, Bonorden's Hdbk., p. 105, f. 22, 23; Sacc., Syll., iv. n. 864.

On decayed wood, fungi, &c.

## NEMATOGONIUM. Desm. (fig. 13, p. 274.)

Sterile hyphae creeping, fertile erect, conspicuously jointed, sterile joints thickened at both ends (bone-shaped), fertile joints globose, smooth; conidia elliptical, continuous.

*Nematogonium*, Desmazieres, Ann. Sc. Nat., 1834, ii. p. 69; Sacc., Syll., iv. p. 170.

Recognised by the thigh-bone-shaped sterile joints of the erect hyphae interspersed with spherical joints bearing the conidia in loose clusters.

**Nematogonium aurantiacum.** Desm. (fig. 13, p. 274.)

Tufts orange-brown minutely velvety, often considerably effused; sterile hyphae very slender, septate, creeping; fertile hyphae erect, jointed, sterile joints inflated at both ends, with conidia-bearing globose cells interposed here and there; conidia obovate, base acute, 15 × 8–10 $\mu$, with an orange tinge, sessile, arranged on the globose cells in loose clusters.

*Nematogonium aurantiacum*, Desm., Ann. Sci. Nat., 1834, ii. t. 11, f. 1; Sacc., Syll., iv. n. 867.

On rotten wood and bark.

**Nematogonium aureum.** Sacc.

Fertile hyphae erect, short, club-shaped, consisting of about four joints; conidia elliptical, golden-yellow, sparsely scattered.

*Nematogonium aureum*, Sacc., Syll., iv. n. 868.

*Aspergillus aureus*, Berk., Eng. Fl., vol. v. p. 340.

On bark.

No specimen exists in Berkeley's herbarium, and the description is probably too brief to insure future identification, although mycologists are not wanting who imagine they possess the power of knowing exactly what species were intended in such cases. Possibly self-assurance goes for much on such occasions.

## Sect. II. DIDYMOSPORAE. Sacc.

### DIPLOCLADIUM. Bon. (fig. 24, p. 313.)

Sterile hyphae creeping; fertile erect and verticillately branched; conidia elliptic-oblong or obovate, 1-septate, hyaline or clear and bright in colour, solitary or 2-3 at the tips of the branchlets.

*Diplocladium*, Bonorden, Hdbk., p. 98; Sacc., Syll., iv. p. 176.

**Diplocladium minus.** Bon.

Tufts, small, white, silky; fertile hyphae ascending, oppositely branched; branchlets usually in threes at the ends of the branches, tips slightly thickened; conidia obovate, 1-septate, slightly constricted, hyaline, 13–15 × 7–8 $\mu$.

*Diplocladium minus*, Bon., Hdbk., p. 98, t. 5, f. 119; Sacc., Syll., n. 871.

*Diplocladium Renneyi*, Sacc., Syll., n. 875.

*Dactylium Renneyi*, B. & Br., Ann. Nat. Hist., n. 1383.

On trunks; forming white, downy patches 1–3 lines across.

**Diplocladium penicillioides.** Sacc.

White; effused; hyphae fasciculate, septate, 4–5 $\mu$ thick, erect or ascending, vaguely branched, bearing at the apex an

imperfect whorl of 3–4 short, erect branchlets; conidia apical, solitary, elliptic-clavate, becoming 1-septate, 12–14 × 5 μ.

*Diplocladium penicillioides*, Sacc., Syll., n. 872; Grev., pl. 150, fig. b.

On decaying species of *Polyporus*, *Agaricus*, and *Panus*; along *Hypomyces aurantius*, of which it is considered to be the conidial form.

**Diplocladium melleum.** Sacc. (fig. 24, p. 313.)

Forming minute, honey-coloured tufts; hyphae branched at the apex, branchlets arranged in whorls, acute at the tip; conidia elliptical, base slightly attenuated, almost colourless, 12–14 × 5–6 μ.

*Diplocladium melleum*, Sacc., Syll., n. 874.

*Dactylium melleum*, B. & Br., Ann. Nat. Hist., n. 1382, t. 8, f. 6.

On old specimens of *Polyporus* and *Stereum*.

**Diplocladium tenellum.** Mass.

Tufts white or with a reddish tinge; hyphae aggregated, fertile, short, slender, erect, septate, branchlets short, subverticillate; conidia slightly obovate, colourless, 1-septate, in clusters of 3–4 at the tips of the branches, 12–13 × 6 μ.

*Mucrosporium tenellum*, Sacc., Syll., n. 924.

*Dactylium tenellum*, Fries, Syst. Myc., iii. p. 413.

An examination of authentic specimens shows the spores to be constantly 1-septate, hence the species cannot be a *Mucrosporium*, as placed by *Saccardo*.

**Diplocladium macrosporum.** Mass.

Sterile hyphae loosely interwoven, white then pale rose-colour; fertile subverticillately branched at the apex; conidia elliptic-oblong, apiculate at the base, colourless, 1-septate, 20–25 × 8–10 μ, produced in clusters of 2–3 at the tips of the branchlets.

*Dactylium macrosporum*, Fries, Syst. Myc., iii. p. 414; Sacc., Syll., iv. n. 918.

On bark, moss, &c.

The spores are constantly 1-septate, hence the present species cannot belong to the genus *Dactylium*, where it was placed by Saccardo.

DIPLOSPORIUM. Bonord. (fig. 15, p. 274.)

Sterile hyphae creeping; fertile hyphae ascending or erect, septate, vaguely branched; conidia terminal on the branchlets, usually solitary, 1-septate, elliptical or oblong.

*Diplosporium*, Bonorden, Hdbk., p. 93; Sacc., Syll., iv. p. 178.

Closely allied to *Diplocladium*, differing only in the branchlets being scattered, and not in whorls.

**Diplosporium album.** Bon. (fig. 15, p. 274.)

Forming effused, lax, silky, snow-white tufts; fertile hyphae ascending, septate repeatedly irregularly forked; conidia, oblong, 1-septate, constricted, 20–28 × 8 $\mu$; hyaline, contents granular.

*Diplosporium album*, Bonorden, Hdbk., p. 99, f. 108; Sacc., Syll., n. 877.

On decaying stems of bean (*Vicia faba*); also on branches.

*Var.* **fungicolum,** Sacc., Syll., n. 877; Grevillea, pl. 157, fig. d.

Conidia elliptic-oblong base apiculate, remaining for a long time continuous, then 1-septate, not constricted, 18–23 × 6–7 $\mu$.

On *Aethalium septicum*, along with *Hypomyces violascens*, of which it is supposed to be the conidial form.

**Diplosporium cervinum.** Sacc.

Effused; pale fawn-colour; hyphae branched, septate; conidia obovate, 1-septate, base apiculate.

*Diplosporium cervinum*, Sacc., Syll., n. 879.

*Dactylium cervinum*, B. & Br., Ann. Nat. Hist., n. 1716.

On branches of laburnum.

There is no specimen in Berkeley's herbarium, and owing to the absence of information respecting the mode of branching, it is uncertain whether the present belongs to *Diplosporium* or to *Diplocladium*.

TRICHOTHECIUM. Link. (fig. 14, p. 274.)

Sterile hyphae creeping; fertile, simple, erect; conidial terminal, solitary, two-celled, colourless or brightly coloured.

*Tricothecium*, Link, sp. pl. Fungi, i. p. 28; Sacc., Syll., iv. p. 178.

**Trichothecium roseum.** Link. (fig. 14, p. 274.)

Tufts minutely velvety, rather large, often becoming confluent, at first white then pale rose-coloured; fertile hyphae erect, short, without septa; conidia pyriform, slightly constricted at the septum, attached obliquely to the narrow apex of the conidiophore, 12–18 × 8–12 $\mu$, pale rose or almost colourless.

*Trichothecium roseum*, Link, Obs. Mycol., i. p. 16, f. 27; Sacc., Syll., iv. n. 881.

*Dactylium roseum*, Berk.

On bark, leaves, fruit, paper, cheese, dung, &c.

**Trichothecium candidum.** Wallr.

Tufts roundish, often confluent, minutely velvety, white; fertile hyphae erect, septate, 150 × 3 $\mu$; conidia solitary, elliptic-oblong, apiculate at the base, two-celled, slightly constricted at the septum, colourless, 20–25 × 10–15 $\mu$.

*Trichothecium candidum*, Wallr., Fl. Crypt., n. 1879; Sacc., Syll., n. 883.

On bark and decaying vegetable substances.

Care must be taken not to mistake bleached states of *T. roseum* for the present species.

**Trichothecium obovatum.** Sacc.

White, forming exceedingly minute tufts; fertile hyphae very slender, without septa; conidia colourless, obovate, two-celled, not constricted at the septum, solitary or in pairs at the tips of the conidiophores, 14–17 × 10 $\mu$.

*Trichothecium obovatum*, Sacc., Syll., n. 884.

*Dactylium obovatum*, Berk., Ann. Nat. Hist., n. 242, t. 14, f. 26.

On willow branches, springing from the exolete perithecia of a *Sphaeria*.

**Trichothecium piriferum.** Sacc.

Tufts, minute, white, often becoming confluent and forming effused, minutely velvety patches; fertile hyphae aggregate, sparingly branched above; conidia obovate, two-celled, terminal cell largest, not constricted at the septum, colourless, 20–25 × 10–12 $\mu$.

*Trichothecium piriferum*, Sacc., Syll., iv. n. 885.
*Dactylium piriferum*, Fries, S. M., iii. p. 413.
On dead stems and on the naked ground.

**Trichothecium domesticum.** Fries.
This species has been recorded as British; but examination of the specimens show it to be *T. roseum*.

## CEPHALOTHECIUM. Corda. (fig. 11, p. 358.)

Sterile hyphae creeping; fertile hyphae erect, simple, septate; conidia oblong or clavate, 1-septate, hyaline, forming somewhat of a head at the tip of the hypha.
*Cephalothecium*, Corda, Anl., p. 57; Sacc., Syll., iv. p. 180.
Differs from *Trichothecium* in the conidia being produced in clusters or heads.

**Cephalothecium candidum.** Bon. (fig. 11, p. 358.)
Tufts white, effused, or minute and bursting through the epidermis; fertile hyphae erect; subfasciculate, not septate, 40–60 × 5–6 $\mu$; conidia obovate, 1-septate, constricted, 12–14 × 8 $\mu$, 3–6 springing from the apex of the hypha.
*Cephalothecium candidum*, Bonorden, Handbuch, p. 81, f. 89; Sacc., Syll., n. 891.
On rotten branches.

## ARTHROBOTRYS. Corda. (fig. 16, p. 274.)

Hyphae erect, simple, septate, nodulose; nodes furnished with minute pointed warts spirally arranged, each bearing a single conidium; conidia elliptical or obovate, 1-septate, hyaline or bright and clear in colour.
*Arthrobotrys*, Corda, Prachtfl. t. xxi.; Sacc., Syll., iv. p. 181.

**Arthrobotrys rosea.** Mass. (fig. 16, p. 274.)
Tufts small, downy, pale rose-colour; fertile hyphae erect, simple, sparingly septate, 7–8 $\mu$ thick, having 3–5 vesicular inflations at equal distances, swollen nodes, each bearing a

head of conidia springing from minute spicules on the nodes; conidia broadly pyriform, 1-septate, constricted at the septum, upper cell almost globose, lower small, apiculate, smooth, almost colourless.

*Arthrobotrys rosea*, Massee, Journ. Roy. Microscop. Journ., vol. v., p. 758, pl. 13, figs. 6, 7; Sacc., Syll., n. 896.

On wet rotten branches.

## MYCOGONE. Link. (fig. 11, p. 274.)

Hyphae branched, interwoven; fertile branches short, lateral. Conidia unequally two-celled, terminal cell largest, often warted.

*Mycogone*, Link, sp. pl. Fungi, i. p. 29.

There is some difference of opinion as to whether the conidia are in reality two-celled, the so-called lower cell is in most species not cut off from the conidiophore by a septum, of which it may be the inflated apex.

### Mycogone rosea. Link.

Forming effused, velvety, rose-coloured patches; hyphae slender, colourless, densely interwoven; conidia obovate, reddish, two-celled, upper cell largest, warted, lower cell paler, smooth, 35–40 × 20–25 $\mu$.

*Mycogone rosea*, Link, Obs., i. p. 16; Sacc., Syll., iv. n. 899.

On various decaying Agarics.

### Mycogone cervina. Ditm. (fig. 11, p. 274.)

Forming greyish woolly tufts; hyphae slender, white, densely interwoven; conidia two-celled, obtuse, fawn-coloured, upper cell largest, warted, lower cell paler, smooth, 28–36 × 18–20 $\mu$.

*Mycogone cervina*, Ditm. in Sturm's D. F., t. 53; Sacc., Syll., iv. n. 900.

On species of *Peziza*, as *P. macropoda*, &c.

### Mycogone anceps. Sacc.

Tufts minute, ochraceous-olive, velvety, effused; hyphae forked or vaguely branched, with scattered septa, yellowish; conidia sometimes almost globose, 20 $\mu$ diam., sometimes

elliptical, 30–35 × 20, often slightly constricted at the basal septum, contents granular, somewhat orange-colour.

*Mycogone anceps*, Sacc., Mich., ii. p. 372; Sacc., Syll., n. 902.

On dung, human and other.

Chlamydosporous condition of *Pilobolus oedipus*.

## DIDYMARIA. Corda. (fig. 17, p. 274.)

Parasitic. Hyphae subsimple, erect, gregarious, bearing a single two-celled, colourless conidium at the tip.

*Didymaria*, Corda, Ic. Fung., vi. p. 8; Sacc., Syll., iv. p. 184.

**Didymaria Ungeri.** Corda. (fig. 17, p. 274.)

Forming subcircular ochraceous spots that become pale with age; tufts white, minute, hypophyllous; fertile hyphae erect, fasciculate, slender, unbranched, without septa, 50–60 × 3–4 $\mu$, bearing at the tip a single obovate-elliptic, colourless, 1-septate conidium scarcely or not all constricted at the septum, 20–25 × 7–10 $\mu$.

*Didymaria Ungeri*, Corda, Anleit., t. B., f. 9. I.; Sacc., Syll., iv. n. 904.

On the under surface of living leaves of *Ranunculus repens*.

## BOSTRICHONEMA. Cesati. (fig. 18, p. 274.)

Parasitic. Hyphae erect, unbranched, spirally waved, without septa, colourless. Conidia elliptic or oblong, two-celled, hyaline.

*Bostrichonema*, Cesati, Erb. Critt. Ital., n. 149; Sacc., Syll., iv. p. 185.

Distinguished from *Didymaria* by the wavy or spirally curved fertile hyphae.

**Bostrichonema alpestre.** Ces. (fig. 18, p. 274.)

Spots subcircular, ochraceous-brown; fertile hyphae forming white tufts on the under surface of the leaf, spirally waved, 130–140 × 4–6 $\mu$, sparingly septate, not

constricted, slightly thinner towards the tip; conidia produced at the apex (and laterally ?), elliptical, for a long time 1-celled, then 2-celled and slightly constricted at the septum, 20–22 × 14–15, colourless, curved, at length asperulate.

*Bostrichonema alpestre*, Cesati, Erb. Critt. Ital., n. 149; Sacc., Syll. iv. n. 909.

On living leaves of *Polygonum bistorta*, *P. vivipara*, &c.

**Bostrichonema modestum.** Sacc.

White, springing from brownish spots; hyphae almost straight or slightly wavy, about 100–7 $\mu$; conidia elliptic-oblong, 1-septate, constricted, 24–27 × 8–10 $\mu$.

*Bostrichonema modestum*, Sacc., Syll., n. 910.

*Dactylium modestum*, Berk. and White, Scottish Nat., vol. iv. p. 162, t. 2, fig. 2.

On the under surface of fading leaves of *Alchemilla alpina*.

## Sect. III. PHRAGMOSPORAE. Sacc.

### Subsect. 1. Macronemeae. Sacc.

### Tribe 8. *Dactylieae*. Sacc.

### DACTYLIUM. Nees. (fig. 26, p. 274.)

Saprophytes. Sterile hyphae creeping, fertile ascending, repeatedly branched in a verticillate manner, or (in the subgen. *Helminthophora*) once verticillately branched. Conidia oblong, 2 or many septate, colourless, subsolitary at the tips of the branchlets.

*Dactylium*, Fries, Syst. Myc., iii. p. 413; Sacc., Syll., iv. p. 189.

**Dactylium dendroides.** Fries. (fig. 26, p. 274.)

Forming whitish, effused, byssoid tufts; fertile hyphae erect, septate, main branches usually subopposite, branchlets in whorls of three as a rule, tips thin; conidia oblong, apiculate at the base, 3-septate, scarcely constricted at the septa, colourless, 26–32 × 10–13 $\mu$.

*Dactylium dendroides*, Fr., S. M., iii. p. 413; Sacc., Syll., n. 916.

On various decaying Agarics and on the adjoining moss, &c.

## MUCROSPORIUM. Preuss. (fig. 3, p. 313.)

Sterile hyphae, septate, creeping fertile erect, verticillately branched, branchlets with a cluster of spicules at the tip that bear a head of colourless, septate conidia.

*Mucrosporium*, Preuss, F. Hoyersw., n. 97; Sacc., Syll., iv. p. 190.

Distinguished from *Dactylium* by the tips of the branchlets bearing a head of spores instead of a single one as in the last-named genus.

**Mucrosporium sphaerocephalum.** Sacc. (fig. 3, p. 313.)

Forming effused, thin, persistently white patches; sterile hyphae creeping, fertile erect, septate, towards the top more or less regularly branched in threes; branchlets thickened at the base and tapering upwards, bearing at the tip a cluster of colourless, oblong, 3–septate spores, furnished with a short pedicel at the base, 20–26 × 6–8 $\mu$.

*Macrosporium sphaerocephalum*, Sacc., Syll., n. 923.

*Dactylium sphaerocephalum*, Berk., Ann. Nat. Hist., vol. vi n. 233, t. 14, f. 27.

On dead wood, branches, &c.

## DACTYLELLA. Grove. (fig. 25, p. 274.)

Mucedinous, saprophytic. Fertile hyphae suberect, simple; conidia elongated, pluriseptate, terminal, solitary.

*Dactylella*, Grove, Journ. Bot. 1884, p. 199; Sacc., Syll., iv. p. 193.

Allied to *Dactylium*, but differing in the solitary spores. Distinguished from *Piricularia* more especially by the saprophytic habit of the species.

**Dactylella minuta.** Grove.

Scattered, white; fertile hyphae cylindrical, slender, hyaline, unbranched, 120–150 $\mu$ high, apex passing into the

solitary, terminal, perfectly hyaline, clavulate, 6–8-septate conidium, measuring 60–70 × 14–15 $\mu$.

*Dactylella minuta*, Grove, Journ. Bot. 1884, p. 199, t. 246, f. 6; Sacc., Syll., iv. n. 937.

On dead wood.

This species closely resembles *Dactylium candidum*, Nees (Bonord. Hdbk., p. 82, f. 139), but differs in the form of the spores, if Bonorden's figure be correct, and in their constant position as a continuation of the stem. It is certainly not congeneric with *Dactylaria purpurella*, Sacc. (Fung. Ital., f. 8). (Grove.)

*Var.* **fusiformis.** Distinguished from type by the gregarious or caespitose hyphae, and the elongato-fusoid conidia, 60–75 × 7–9.

**Dactylella rhombospora.** Grove.

Very much scattered and exceedingly delicate, closely resembling *Dactylella minuta*, but differing in the form of the conidia, which are broadly fusoid, almost rhomboid, and obtuse at both ends.

*Dactylella rhombospora*, Grove, Journ. Bot., t. 257, f. 4; Sacc., Syll., iv. n. 938.

On rotten wood.

**Dactylella ellipsospora.** Grove.

Pure white, in effused tufts; fertile hyphae slender, erect, not or very sparingly septate, white, 100–200 × 4 $\mu$; conidia elliptical, rather acute at both ends, colourless, guttulate, then a slender septum is formed near to each end, central cell with one large vacuole, 40–50 × 16–18 $\mu$.

*Dactylella ellipsospora*, Grove, Sacc., Syll., iv. n. 939.

*Merispora ellipsospora*, Preuss, F. Hoyersw., n. 69.

On rotten wood, &c.

**Dactylella implexa.** Sacc. (fig. 25, p. 274.)

Forming an exceedingly thin greyish-white film; fertile hyphae simple or very sparingly branched above, erect, septate; conidia subcylindrical, base apiculate, 3-septate, 25–30 × 5–6 $\mu$.

*Dactylella implexa*, Sacc., Syll., iv. n. 941.

*Dactylium implexum*, B. & Br., Ann. Nat. Hist., n. 1381, t. vii. f. 5.

Inside a hollow willow.

## DACTYLARIA. Sacc. (fig. 24, p. 274.)

Saprophytic. Sterile hyphae present or almost obsolete; fertile erect, simple; conidia fusoid or more or less clavate, clustered in an irregular manner at the apex of the stem, 2- many-septate, hyaline or brightly coloured.

*Dactylaria*, Sacc., Mich., ii. p. 20; Sacc., Syll., iv. p. 194.

*Dactylium*, Bonord. (in part.)

*Dactylella* differs in having only a single conidium at the apex of the fertile hyphae.

**Dactylaria orchidis.** Cke. & Mass. (fig. 24, p. 274.)

Scattered or solitary; fertile hyphae erect, simple, springing from a delicate, branched mycelium, septate, 250–280 × 10–12, filled with orange colouring-matter, apex 2–3-times dichotomous, branchlets short, almost erect; conidia fusoid, 4-guttulate, then 3-septate, hyaline, 40–50 × 7–9 $\mu$, solitary at the tips of the branchlets, and altogether forming a lax head.

*Dactylaria orchidis*, Cke. & Mass., Grev., xix. p. 42; Sacc., Syll., Suppl., vol. x. n. 7248.

On putrid leaves of *Oncidium macranthum*.

### Tribe 9. *Ramularieae*. Sacc.

## RAMULARIA. Unger (emended). (figs. 27, 28, p. 274.)

Parasitic. Hyphae simple or with short, scattered branchlets, tips denticulate and bearing conidia which are 1- many-septate, colourless or rarely brightly coloured, and in some species catenulate.

*Ramularia*, Unger, Exanth., p. 169; Sacc., Syll., iv. p. 196.

The parasitic habit, simple or sparingly branched hyphae denticulate and bearing the septate conidia at the tips, characterise the genus, which differs from *Ovularia* only in the septate conidia.

**Ramularia hellebori.** Fuckel. (fig. 28, p. 274.)

Forming suborbicular spots on both sides of the leaves, spots white with a rather broad black margin; hyphae

fasciculate, nodulose, not septate, colourless, 20 × 3 μ; conidia fusoid; 24–30 × 4–5, at first continuous, then 1-septate, colourless.

*Ramularia hellebori*, Fckl., Symb. Myc., p. 361; Sacc., Syll., iv. n. 970.

On leaves of *Helleborus foetidus* and *H. viridis*.

**Ramularia ulmariae.** Cooke.

Spots, irregularly angular, whitish, often with a rufous margin; hyphae fasciculate, simple or rarely with very short branchlets, sparingly septate, 30–50 × 4 μ; conidia cylindrical, ends obtuse, for a long time continuous then 1-septate, 15-25 × 4–5 μ, colourless.

*Ramularia ulmariae*, Cke., Grev., iv. p. 109; Sacc., Syll., iv. n. 989.

On living leaves of meadow-sweet (*Spiraea ulmaria*).

**Ramularia geranii.** Fuckel.

At first appearing as whitish, minute scattered tufts seated on brownish spots, then becoming confluent; fertile hyphae short, 30 × 2 μ, nodulose, not septate; conidia cylindrical, ends obtuse or apiculate, 18–20 × 2·5–3 μ, colourless, 1-septate.

*Ramularia geranii*, Fuckel, Symb. Myc., p. 361, t. 1, f. 23; Sacc., Syll., n, 994.

On the under surface of the leaves of various species of *Geranium*, as *G. pusillum*, *G. pratense*, *G. dissectum*, *G. silvaticum*.

**Ramularia Keithii.** Mass.

Tufts lax, whitish, thin yellowish-green, becoming confluent and rather broadly effused; fertile hyphae tufted, short, subsimple; conidia subcylindrical, obtuse, colourless, 1-septate, 30 × 5 μ.

*Ramularia malvae*, var. *Malvae moschatae*, Sacc., Syll., iv. n. 995.

On living leaves of *Malva moschata*.

**Ramularia lapsanae.** Sacc.

Spots at first indistinct, then becoming dry and pale; hyphae in small tufts, simple or with short branches, 30–50 × 3 μ, continuous; conidia tereti-fusoid, 10-15 ×

3·5–4 $\mu$, hyaline, continuous, rather acute at both ends, catenulate.

*Ramularia lapsanae*, Sacc., Mich., ii. p. 549; Sacc., Syll., n. 1008.

On the under surface of living leaves of *Lapsana communis*.

**Ramularia pruinosa.** Speg.

Spots at first small, soon coalescing and covering the greater portion of the leaf, ochraceous; tufts densely gregarious, whitish, pruinose; hyphae suberect, continuous, 40–60 × 3–4 $\mu$, apex 1–3 denticulate; conidia cylindrical, and rounded, 20–30 × 3–4 $\mu$, becoming 1-septate, colourless.

*Ramularia pruinosa*, Speg., Mich., ii. p. 170; Sacc., Syll., iv. n. 1022.

On leaves of *Senecio jacobaea*.

**Ramularia variabilis.** Fuckel.

Tufts lax, thin, whitish, seated on greenish-brown spots; hyphae fasciculate, flexuous, continuous, apex very minutely denticulate; conidia very variable, ovate, obovate, elliptical, typically cylindrical and 1-septate, colourless, 15–22 × 3–4 $\mu$.

*Ramularia variabilis*, Fuckel, Symb. Myc., p. 361; Sacc., Syll., iv. n. 1030.

On leaves of foxglove (*Digitalis purpurea*), *Verbascum thapsus*, *V. blattaria*.

**Ramularia calcea.** Ces.

Spots minute, whitish, bounded by a brown margin; hyphae fasciculate, cylindrical, 15–20 × 2 $\mu$, sparingly denticulate, hyaline, continuous; conidia cylindrical, slightly obtuse or apiculate at both ends, 25 × 3–3·5 $\mu$, continuous or 1-septate, hyaline.

*Ramularia calcea*, Cesati, in Klotzsch, Herb. Mycol., 1681; Sacc., Syll., n. 1032.

On leaves of ground-ivy (*Glechoma hederacea*).

**Ramularia cryptostegiae.** Pim.

Snow-white, cottony, very delicate; hyphae simple or sparingly branched; conidia cylindric-oblong, apex rather obtuse, 30–40 × 6–7 $\mu$, delicately 1–3 septate, apical on the hyphae.

*Ramularia cryptostegiae*, Pim, Grevillea, 1880, p. 130; Sacc., Syll., n. 1048.

On fallen seeds of *Cryptostegia*, in a hothouse.

**Ramularia pratensis.** Sacc. (fig. 27, p. 274.)

Spots generally epiphyllous, subcircular or elongated, pale ochraceous with a brown marginal zone; hyphae rather lax, terete, 30–40 × 4 $\mu$, denticulate at the obtuse apex, colourless, continuous or 1-septate; conidia cylindrical or subfusoid, catenulate, becoming 1-septate, hyaline, 16–25 × 3–3·5 $\mu$.

*Ramularia pratensis*, Sacc., Mich., ii. p. 550; Sacc., Syll., iv. n. 1049.

On leaves of *Rumex acetosa*.

**Ramularia urticae.** Ces.

Spots white then greyish, small, 1–3 mm., indefinite, on both surfaces of the leaf; hyphae hypophyllous, loosely fasciculate, subeffused, hyaline, continuous, 30–40 $\mu$ long, denticulate above, rarely with very short branchlets; conidia cylindric-fusoid, sometimes apiculate at both ends, becoming 1-septate, 15–20 × 3–5 $\mu$, forming rather long chains.

*Ramularia urticae*, Cesati, in Fresen. Beitr., p. 89; Sacc., Syll., n. 1053.

On leaves of *Urtica dioica*, and other nettles.

## Subsect. 11. **Micronemeae.** Sacc.

### Tribe 10. *Fusomeae.* Sacc.

### PARASPORA. Grove.

Saprophytic. Conidia septate, springing in minute clusters from a delicate, creeping mycelium.

*Paraspora*, Grove, Journ. Bot., vol. xiii. (1884), p. 196; Sacc., Syll., iv. p. 222.

It resembles *Bactridium*, but hyphae are almost entirely wanting. (Grove.)

**Paraspora triseptata.** Grove.

White; spores oblong, obliquely apiculate, hyaline, 3-septate, 15–20 × 5–6 $\mu$.

*Paraspora triseptata*, Grove, Journ. Bot., vol. xiii. (1884), p. 196, pl. 246, f. 9; Sacc., Syll., n. 1084.

On dead wood. Invisible to the naked eye; consisting of small, closely compacted clusters of the erect spores.

## Tribe 11. *Milowieae*. Sacc.

### MILOWIA. Mass. (fig. 1, p. 313.)

Sterile hyphae forming an intricately interwoven tuft that produces here and there towards the surface large vesicular bodies, which in turn bear 2–4 erect, cylindrical outgrowths, the contents of which become broken up by transverse septa into conidia; the conidia at length escape through the ruptured apex of the mother hypha.

*Milowia*, Massee, Journ. Roy. Micr. Soc., vol. v. p. 758, pl. 13; Sacc., Syll., iv. p. 222.

The counterpart of *Sporochisma* in the *Dematieae*. The conidia present the appearance of spores in an ascus.

**Milowia nivea.** Mass. (fig. 1, p. 313.)

Tufts globose, 1 line across, snow-white; the erect hyphae containing the conidia, 60–70 × 7–8 $\mu$, and containing 6–8 cylindrical, abruptly truncate conidia, 9–10 × 6–7 $\mu$.

*Milowia nivea*, Mass., Journ. Roy. Micr. Soc., vol. v. p. 758, pl. 13; Sacc., Syll., n. 1086.

On dead leaves of *Blysmus compressus*.

## Tribe 12. *Septocylindrieae*. Sacc.

### SEPTOCYLINDRIUM. Bon. (fig. 23, p. 313.)

Hyphae very short, scarcely distinct from the conidia. Conidia cylindrical, colourless or brightly coloured, concatenate, 2- many-septate.

*Septocylindrium*, Bonorden, Handb., p. 35; Sacc., Syll., iv. p. 223.

The species are reduced to chains of septate conidia.

**Septocylindrium Bonordenii.** Sacc. (fig. 23, p. 313.)
White, velvety, effused, thin; conidia cylindrical, obtuse at both ends, 30–40 × 4, at first continuous, then 2–4 septate, hyaline; chains rarely branched.

*Septocylindrium Bonordenii*, Sacc., Syll., n. 1087.

*Cylindrium septatum*, Bon., Hdbk., 35, f. 16.

On rotten leaves, especially those of the snowdrop (*Galanthus nivalis*).

**Septocylindrium elongatisporum.** Sacc.
Tufts effused, white, rather powdery; hyphae erect, with a few minute branchlets; conidia cylindrical, tips rather acute, 1–3 septate, colourless, 15–25 × 5 $\mu$.

*Septocylindrium elongatisporum*, Sacc., Syll., iv. n. 1094.

*Septonema elongatispora*, Preuss, F. Hoyersw., n. 25.

On dead stems of mint (*Mentha*) and nettle (*Urtica*).

**Septocylindrium pallidum.** Grove.
Conidia pale olive, 3–septate, acute at the ends, 25–40 × 5–6, in short, straight, simple or rarely branched chains; hyphae as long as the chains but thinner, sparingly septate, olive, darker than the conidia.

*Septocylindrium pallidum*, Grove, Journ. Bot., tab. 266, f. 12; Sacc., Syll., iv. n. 1095.

Forming pallid tufts on the ostiola of *Diatrype stigma*.

The olive colour of hyphae and spores along with the well-developed hyphae suggest that the present species should be located with the *Dematieae*.

**Septocylindrium chaetospira.** Grove.
Subfasciculate or gregarious, white, chains of conidia erect, spirally coiled like a corkscrew, 200–250 $\mu$ high; conidia becoming 3-septate, cylindrical, ends subacute, sometimes curved, hyaline, 20–25 × 2·5–3 $\mu$.

*Septocylindrium chaetospira*, Grove, Journ. Bot., tab. 266, f. 1; Sacc., Syll., iv. n. 1096.

On rotten wood.

The chains of conidia spirally coiled like a corkscrew readily distinguish this species.

**Septocylindrium concentricum.** B. & Br.
In small orbicular spots that often become confluent, every part at first white, the centre changing to pale ochraceous;

hyphae erect, short, septate, springing from a pale stroma; conidia in chains, cylindrical, tips subacute, 1-septate, 16–25 × 3–7 μ.

*Septocylindrium concentricum*, Sacc., Syll., iv. n. 1097.

*Septonema concentricum*, B. & Br., in Rab. Fung. Eur., Exs., n. 777.

On chips of larch and pine.

**Septocylindrium viride.** Sacc.

Tufts very thin and cloud-like, more or less effused, greenish; stroma-like base very thin, yellowish; chains straight, rigid, with short branchlets; conidia subfusiform, tips obtuse, 3-septate, pellucid with a green tinge, 18–24 × 6–7 μ.

*Septocylindrium viride*, Sacc., Syll., iv. n. 1107.

*Septonema viride*, Corda, Ic. Fung., ii. p. 9, f. 44.

On rotten wood.

**Septocylindrium Magnusianum.** Sacc.

Tufts suberumpent, dirty white, on reddish, slightly corrugated portions of both surfaces of the leaves, very minutely velvety; chains of conidia springing from a slightly inflated basal hypha; conidia cylindrical, ends obtuse, 20–25 × 4 μ, colourless, 1-septate, not constricted at the septum.

*Septocylindrium Magnusianum*, Sacc., Mich., i. p. 130; Sacc., Syll., iv. n. 1088.

On fading leaves *Trientalis Europaea*.

## Sect. IV. STAUROSPOREAE. Sacc.

### PRISMARIA. Preuss. (fig. 2, p. 313.)

Fertile hyphae erect, simple, not septate, conidia radiating from the tip and forming an incomplete head. Conidia elongated, colourless, with or without septa.

*Prismaria*, Preuss, F. Hoyersw., n. 86; Sacc., Syll., iv. p. 229.

Distinguished by the unbranched, aseptate conidiophores producing a few elongated, radiating conidia at the tip that form a loose, non-compacted head.

**Prismaria furcata.** Grove. (fig. 2, p. 313.)

Scattered or gregarious, white; mycelium thin, creeping; fertile hyphae short or almost absent. equal, hyaline, non-septate, bearing at the tip two or rarely three radiating elongato-conical conidia, rounded at the base and attenuated upwards, inconspicuously multiseptate, colourless, 60–100 × 6–7 $\mu$.

*Prismaria furcata*, Grove, Journ. Bot., 1884, p. 198; Sacc., Syll., iv. n. 1110.

On decaying wood.

## Sect. V. HELICOSPORAE. Sacc.

### HELICOMYCES. Link. (fig. 19, p. 274.)

Hyphae very short, without septa. Conidia cylindrical, spuriously septate, subhyaline or brightly coloured, spirally coiled.

*Helicomyces*, Link., Obs., i. p. 19; Sacc., Syll., iv. p. 233.

The colourless or clear-coloured, long hypha-like spirally coiled conidia mark the genus. In some species there are several distinct coils in a conidium; in others, the conidia are curved to form part of a circle only.

**Helicomyces roseus.** Link.

Forming minute pale rose-coloured patches; hyphae very short, colourless. nodulose at the tip; conidia springing from the nodules, rose-coloured, cylindrical, becoming many-septate, slightly tapering at both ends, curved in a loose spiral, 150–180 × 6 $\mu$.

*Helicomyces roseus*, Link., Obs. Myc., i. p. 19, t. i. f. 35; Sacc., Syll., iv., n. 1115.

On wood, branches, &c.

When old the tufts become whitish.

**Helicomyces tubulosus.** Riess. (fig. 19, p. 274.)

Forming whitish minutely powdery, minute tufts; hyphae very short; conidia brown, many-septate, joints cuboid, spirally coiled into a long tube, joints of conidia about 10 $\mu$, the tube composed of 5–7 spirals.

*Helicomyces tubulosus*, Riess, Bot. Ztg., 1853, p. 140, t. iii. f. 11–13; Sacc., Syll., iv. n. 1120.
On rotten wood.

### Fam. II. DEMATIEAE. Fries.

Hyphae forming a cottony or byssoid expansion, brown or black, rather rigid, threads lax, crowded but not aggregated in definite fascicles or heads. Hyphae and conidia typically blackish-brown, but in some cases the hyphae are hyaline and the conidia dark; in others the hyphae are dark and the conidia almost colourless.

In the present family the hyphae and conidia are never both colourless in the same fungus, there is also an absence of bright, clear colours, the predominating shade being blackish or olive-brown, the colour being in many cases so intense that the hyphae and conidia are quite opaque.

#### Sect. I. **Amerosporae.** Sacc.

Conidia globose, elliptical, or oblong, blackish or somewhat hyaline, continuous, the hyphae always brown.

##### Subsect. 1. **Micronemeae.** Sacc.

Hyphae almost obsolete or very short, scarcely distinct from the conidia.

###### Tribe 1. *Coniosporieae.* Sacc.

Conidia not catenulate.

###### Tribe 2. *Toruleae.* Sacc.

Conidia catenulate.

###### Tribe 3. *Echinobotryeae.* Sacc.

Conidia crowded in small heads or racemes.

Subsect. 2. **Macronemeae.** Sacc.

Hyphae evident and distinct from the conidia.

Tribe 4. *Periconieae.* Sacc.

Conidia brown, capitate, not catenulate.

Tribe 5. *Arthrineae.* Sacc.

Conidia brown, not catenulate, produced in whorls along the hyphae.

Tribe 6. *Trichosporieae.* Sacc.

Conidia brown, not catenulate, produced vaguely in a scattered matter.

Tribe 7. *Monotosporeae.* Sacc.

Conidia brown, not catenulate, borne singly at the tips of erect hyphae or conidiophores.

Tribe 8. *Haplographieae.* Sacc.

Conidia brown, catenulate.

§ Conidia colourless or almost so, borne by short specialised conidiophores situated at the base of the long, sterile, erect, brown hyphae.

Tribe 9. *Myxotricheae.* Sacc.

Conidia aggregated to form a head; (at first enclosed in a vesicle?).

§§ Conidia colourless or nearly so; hyphae brown, not differentiated into fertile and sterile, *i.e.* all alike in structure.

Tribe 10. *Chlorideae.* Sacc.

Conidia solitary, *i.e.* neither catenulate nor capitate.

Tribe 11. *Stachylidieae.* Sacc.

Conidia aggregated into a head.

Tribe 12. *Chalareae.* Sacc.

Conidia catenulate.

Sect. II. **Didymosporae.** Sacc.

Conidia elliptical or oblong, typically 1-septate.

Subsect. 1. **Micronemeae.** Sacc.

Hyphae very short, or scarcely distinguishable from the conidia.

Tribe 13. *Bisporeae.* Sacc.

Subsect. 2. **Macronemeae.** Sacc.

Hyphae evident, distinct from the conidia.

Tribe 14. *Cladosporieae.* Sacc.

Conidia smooth, without appendages, not capitate.

Sect. III. **Phragmosporae.** Sacc.

Conidia elliptical, oblong, cylindrical, or worm-like, 2- many-septate, brown, rarely somewhat colourless.

Subsect. 1. **Micronemeae.** Sacc.

Fertile hyphae or conidiophores almost obsolete or very short, or scarcely distinguishable from the conidia.

Tribe 15. *Clasteriosporieae.* Sacc.

Conidia not catenulate.

Tribe 16. *Septonemeae.* Sacc.

Conidia catenulate.

Subsect. 2. **Macronemeae.** Sacc.

Hyphae evident, distinct from the conidia.

Tribe 17. *Helminthosporieae.* Sacc.

Conidia few, borne at the apex or lateral and scattered.

Tribe 18. *Acrothecieae.* Sacc.

Conidia either in sessile, lateral whorls, or forming a terminal head.

Tribe 19. *Sporochismeae.* Sacc.

Conidia catenulate, produced within the hyphae, then escaping.

Tribe 20. *Dendryphieae.* Sacc.

Conidia catenulate, springing from the apex of conidiophores.

Sect. IV. **Dictyosporae.** Sacc.

Conidia globose, or oblong, transversely and longitudinally septate, brown.

Subsect. 1. **Micronemeae.** Sacc.

Hyphae almost obsolete or very short, scarcely distinct from the conidia.

Subsect. 2. **Macronemeae.** Sacc.

Hyphae evident, distinct from the conidia.

Sect. V. **Staurosporae.** Sacc.

Conidia stellate.

Sect. VI. **Helicosporae.** Sacc.

Conidia cylindrical, coiled in a spiral plane, typically many-septate, hyaline or coloured.

Fam. II. **DEMATIEAE.** Fries.

Sect. I. AMEROSPORAE. Sacc.

Subsect. 1. **Micronemeae.** Sacc.

Tribe 1. *Coniosporieae.* Sacc.

CONIOSPORIUM. Link. (figs. 18, 19, p. 358.)

Conidia globose, elliptical, or discoid, springing from very short, colourless hyphae, generally forming when mature a pulverulent mass.

*Coniosporium*, Link, Obs. Myc., i. p. 8; Sacc., Syll., iv. p. 238.

**Coniosporium arundinis.** Sacc. (figs. 18, 19, p. 358.)

Conidia forming blackish, usually elongated or effused patches, originating from a yellowish pseudoparanchymatous mass of hyphae; conidia lenticular, outline circular or subangular, 8–12 $\mu$ diameter by 4–6 $\mu$ in thickness, when young reddish brown, becoming darker and with an olive tinge.

*Coniosporium arundinis*, Sacc., Mich., ii. p. 124; Sacc., Syll., iv. n. 1150.

On culms and sheaths of *Arundo donax* and *Phragmites communis*.

**Coniosporium physciae.** Sacc.

Conidia minute, elliptical, semipellucid, forming a black, pulverulent, superficial stratum.

*Coniosporium physciae*, Sacc., Syll., iv. n. 1170.

On the apothecia of *Physcia parietina*.

**Coniosporium carbonaceum.** Cke. & Mass.

Epiphyllous, effused, resembling patches of *Fumago*, black, opaque; conidia oval or lemon-shaped, like spores of some species of *Chaetomium*, continuous, brown, opaque, 10 × 12 $\mu$.

*Coniosporium carbonaceum*, Cke. & Mass., Grevillea, vol. xvi. p. 79.

*Gymnosporium carbonaceum*, Carus, MS.

On leaves of meadowsweet (*Spiraea ulmaria*).

**Coniosporium olivaceum.** Link.

Patches small, rounded or oblong, blackish-olive; conidia heaped together, subovate or somewhat irregular, 4–6 $\mu$ long, olive.

*Coniosporium olivaceum*, Link, Obs., i. p. 8; Sacc., Syll., iv. n. 1131.

On wood.

Tribe 2. *Toruleae*. Sacc.

TORULA. Pers. (fig. 10, p. 313.)

Sterile hyphae decumbent, fertile branches short, or very short and scarcely distinct from the chains of conidia. Chains either separate or aggregated in fascicles (*Tetracolium*, Link), soon breaking up into their component conidia, which are all alike, black or brown, continuous, globose, oblong, or subfusoid.

*Torula*, Pers., Syn., p. 693; amended by Saccardo in *Michelia*, ii. p. 21; Sacc., Syll., iv. p. 247.


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I. *Eu-Torula.*

Conidia smooth.

* *On Dicotyledons.*

**Torula ulmicola.** Rabenh.

Black, tufts unequally and often broadly effused, rather shining; conidia oblong, rounded at both ends, dirty brown, semi-pellucid, in long, branched chains.

*Torula ulmicola*, Rab., Hdbk. Pilze, p. 35; Sacc., Syll., iv. n. 1201.

On dead, slender twigs of *Ulmus campestris.*

**Torula pulvillus.** B. & Br.

Tufts minute, pulvinate, black, springing up in cracks in the bark; chains rather compact, erect, sparingly branched, moniliform; conidia oblong, ends rounded, 1-nucleate.

*Torula pulvillus*, B. & Br., Ann. Nat. Hist., n. 463; Sacc., Syll., iv. n. 1206.

On oak bark. Tufts about 1 mm. diameter.

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FIGURES ILLUSTRATING THE *DEMATIEAE.*

Fig. 1, *Papulospora sepedonoides*;—Fig. 2, head of same;—Fig. 3, *Botryosporium diffusum*;—Fig. 4, Two heads of same;—Fig. 5, *Asterophora agaricicola*;—Fig. 6, *Acrostalagmus cinnabarinus*;—Fig. 7, head of same;—Fig. 8, *Camptoum curvatum*;—Fig. 9, *Zygodesmus terrestris*;—Fig. 10, *Monatospora pumila*;—Fig. 11, *Cephalothecium candidum*;—Fig. 12, *Haplographium olivaceum*;—Fig. 13, *Acrospeira mirabilis*;—Fig. 14, *Periconia atra*;—Fig. 15, *Dematium hispidulum*;—Fig. 16, *Acremoniella pallida*;—Fig. 17, *Hadrotrichum arundinaceum*;—Fig. 18, *Coniosporium arundinis*;—Fig. 19, spores of same;—20, *Catenularia atra*, Sacc. (not British);—Fig. 21, *Arthrinum caricicolum*;—Fig. 22, *Virgaria umbrina*;—Fig. 23, *Cephalotrichum curtum*;—Fig. 24, *Menispora ciliata*;—Fig. 25, *Trichosporium fuscum*;—Fig. 26, *Oedemium atrum*;—Fig. 27, *Goniosporium puccinioides*;—Fig. 28, Thread of same, showing arrangement of conidia;—Fig. 29, *Menispora lucida*;—Fig. 30, *Chaetopsis grisea*;—Fig. 31, *Verticladium apicale*;—Fig. 32, *Myxotrichum ochraceum*;—Fig. 33, Thread of same, showing barbs;—Fig. 34, *Scolecotrichum sticticum*;—Fig. 35, *Chalara longipes*;—Fig. 36, *Stachylidium cyclosporum* (after Grove);—Fig. 37, *Bispora monilioides*;—Fig. 38, *Dicoccum unisseptatum*;—Fig. 39, *Gonytrichum caesium*;—Fig. 40, *Passalora bacilligera*;—Fig. 41, *Bolacotricha grisea*, showing general aspect of a tuft, and a single thread;—Fig. 42, Spores of same in clusters, and free. (All the figures are highly magnified.)

**Torula monilioides.** Corda. (fig. 10, p. 313.)
Tufts effused, black; conidia elliptical, subtruncate at both ends, 6–7 × 3–4 μ, smoky-brown, arranged in moniliform erect chains.
*Torula monilioides*, Corda in Sturm's Deutsch. Cr. Fl., t. 38; Sacc., Syll., iv. n. 1217.
On rotten wood and branches.

**Torula cylindrica.** Berk.
Forming black, effused patches; basidia short, cylindric-clavate, erect; chains of conidia short, decumbent; conidia cylindrical, ends slightly rounded, dark smoky-brown, 7–9 × 5 μ.
*Torula cylindrica*, Berk., Engl. Flor., v. p. 359; Sacc., Syll., iv. n. 1220.
On fallen branches.

**Torula abbreviata.** Corda.
Tufts small, black, soon confluent, chains short, of 3–4 minute, globose, greyish-brown, semipellucid conidia.
*Torula abbreviata*, Corda, Ic. Fung., i. p. 8, f. 130; Sacc., Syll. iv., n. 1233.
On herbaceous stems, wood, &c.
*Var.* **sphaeriformis**, B. & Br., Ann. Nat. Hist., n. 464. Not effused, but collected in little heaps; mycelium more abundant than in type, fertile hyphae forked, bearing the chains of conidia at the tips.
On decorticated branches of *Pinus sylvestris*.

**Torula basicola.** B. & Br.
Forming black, effused patches; sterile hyphae creeping, branched, here and there ascending; fertile hyphae very short; chains of conidia short, in compacted fascicles; conidia subquadrate, dark brown, 6-7 μ diameter, not narrowed at the ends, hence the chains present no constrictions.
*Torula basicola*, B. & Br., Ann. Nat. Hist., n. 465, t. xi. f. 4; Sacc., Syll., 1237.
On stems of *Pisum* and *Nemophila*.

**Torula gyrosa.** Cke. & Mass.
Forming small punctiform spots, black; conidia subquadrate, three or four united in variously curved threads,

which are often adglutinated side by side, pale olive, 12 × 6–8 μ, scarcely constricted at the joints.

*Torula gyrosa*, Cke. & Mass., Grev., xvi. p. 10.

On rotting pine wood.

**Torula pulveracea.** Corda.

Tufts blackish-olive, very thick and powdery, oblong, parallel, sometimes confluent, dense, stroma spurious, blackish; chains of conidia branched; conidia elliptic-oblong, smooth, 1–2 guttulate, olivaceous, 7–11 × 4–6 μ.

*Torula pulveracea*, Corda, Ic. Fung., xi. p. 8, f. 38; Sacc., Syll., iv. n. 1221.

On fallen branches, wood, &c.

**Torula antennata.** Pers.

Tufts effused, felty, blackish-violet or black with ochraceous tinge; fertile hyphae, filiform short, conidia oblong, unequal, 10–15 × 3–4 μ, sometimes slightly constricted at the centre, but never septate, with 1–3 hyaline oil globules, sooty; in rather persistent, longish chains that are sometimes branched.

*Torula antennata*, Pers., Myc. Eur., i. p. 21; Sacc., Syll., iv. n. 1189.

On rotten wood of *Fagus*, *Fraxinus*, *Vitas* and *Corylus*.

**Torula ovalispora.** Berk.

Tufts flattened, powdery, circular or elongated, black or with an olive tinge; conidia in long chains, very irregular in form, broadly elliptical, fusiform, or oblong; size variable, 8–15 × 4–6 μ, clear pale brown.

*Torula ovalispora*, Berk., Engl. Flora, vol. v. p. 359.

*Oospora ovalispora* (Berk.), Sacc. et Vogl., Syll., iv. n. 30.

On rotten wood and branches.

Patches sometimes $\frac{1}{2}$ in. across, black, powdery; a typical *Torula*. The above description is drawn up from Berkeley's type specimen.

**Torula expansa.** Pers.

Tufts large; chains of conidia aggregated or solitary, simple, straight, rather rigid, subpellucid, jointed, joints or conidia more or less quadrate, 7–10, central ones slightly largest, 6–8 μ diameter, not separating, brown.

*Torula expansa*, Pers., Myc. Eur., i. p. 22; Sacc., Syll., iv. n. 1231.

*Hormiscium expansum*, Kunz., Myc., Heft i. p. 13, t. 1, f. 7.

On herbaceous stems, rotten wood, &c.

The conidia are more or less quadrate, and may possibly be only joints of an elongated conidium, slightly attenuated at each end, and if so, will not properly belong to the present genus, but to *Hormiscium*.

**Torula herbarum.** Link.

Tufts effused, minutely velvety, olivaceous then black with olive tinge; sterile hyphae creeping, smoky, septate; fertile short, erect, soon passing into the elongated, simple or branched chains of conidia. Conidia olive, subglobose, 6–7 $\mu$ diameter.

*Torula herbarum*, Link, sp. pl. Fungi, i. p. 128; Sacc., Syll., iv. n. 1230.

On decayed stems of various herbaceous plants.

**Torula nucleata.** Cke.

Forming small, irregular, thinly effused, blackish patches, mycelium creeping, thread with an attenuated hyaline base, above resolved into 6–8 subglobose concatenate conidia, which remain for a long time united; conidia dark brown, with a large oil globule, 10–12 $\mu$ diameter.

*Torula nucleata*, Cke., Grev., xvi. p. 79.

On herb stems.

** *On Monocotyledons.*

**Torula graminis.** Desm.

Tufts very minute, subrotund or slightly elongated; at first brown, then blackish; chains of conidia simple, erect; conidia globose, equal, blackish, 5–6 $\mu$ diameter.

*Torula graminis*, Desmaz., Ann. Sci. Nat., 1834, ii. p. 72, t. ii. f. 6; Sacc., Syll., iv. n. 1246.

On leaves of grasses and sedges.

**Torula rhizophila.** Corda.

Tufts oblong, minute, then confluent and forming lines, black; hyphae simple or bifid, short, tinged brown; conidia,

globose, equal, clear brown, translucent, 8–10 $\mu$ diameter, very soon free from each other.

*Torula rhizophila*, Corda, Icon., p. 8, t. 11, f. 127; Sacc., Syll., iv. n. 1249.

On rhizomes of *Carex arenaria*, *Phragmites*, *Triticum repens*, and other grasses and sedges.

**** On paper.*

**Torula chartarum.** Corda.

Tufts effused, indeterminate, black; mycelium white, branched, septate, white; fertile hyphae hyaline, short, nodulose; chains of conidia long, branched, wavy or erect; conidia elliptical, smooth, brown, 8–9 × 5–6 $\mu$.

*Torula chartarum*, Corda, Ic. Fung., iv. p. 24, f. 78; Sacc., Syll., n. 1260.

On damp decaying paper.

II. *Trachytora.* Sacc.

Conidia rough.

**Torula asperula.** Sacc.

Tufts effused, sooty, velvety; sporophores cylindrical, simple or forked, 30–33 × 4 $\mu$, ascending; conidia globose, 6–7 $\mu$ diam., in chains, sooty-brown, minutely rough.

*Torula asperula*, Sacc., Mich., ii. p. 560; Sacc., Syll., iv. n. 1269.

On damp rotting paper.

HORMISCIUM. Kunze. (fig. 9, p. 313.)

Hyphae short or almost obsolete, or scarcely distinct from the conidia. Conidia catenulate, chains not readily breaking up, cuboid or globose-cuboid, brown.

*Hormiscium*, Kunze, Myk., Heft i. p. 12; Sacc., Syll., iv. p. 263.

Very closely allied to the genus *Torula*, in fact the only difference consists in the chains of conidia not breaking up in the present genus.

**Hormiscium splendens.** Sacc. (fig. 9, p. 313.)

Forming black, rather dense, velvety patches; chains of conidia becoming thinner towards the tip, simple or rarely branched, straight or slightly wavy, up to 400 $\mu$ in length; conidia subglobose, subcompressed in the direction of the long axis of the chain, blackish-brown, remaining in chains for a long time, at the base 10 $\mu$ diameter, rather smaller towards tip of chain.

*Hormiscium splendens*, Sacc., Syll., iv. n. 1279.

*Torula splendens*, Cooke, Grev., t. 48, f. 1.

On bark.

**Hormiscium hysterioides.** Sacc.

Tufts linear, short, often parallel, black; chains of conidia erect, crowded, equal, filiform, yellowish, remaining in parallel bundles for some time; conidia cylindric-cuboid, semipellucid.

*Hormiscium hysterioides*, Sacc., Syll., iv. n. 1282.

*Torula hysterioides*, Corda, Icon. Fung., i. p. 9, f. 139.

On rotten wood.

The pale chains of conidia remaining collected in bundles for a long time mark the present species.

**Hormiscium stilbosporum.** Sacc.

Tufts erumpent, pulverulent, elongated, confluent, very black; chains of conidia simple or unequally branched, wavy, conidia subquadrate, brown, 7–8 $\mu$ diameter.

*Hormiscium stilbosporum*, Sacc., Syll., n. 1283.

*Torula stilbospora*, Corda, in Sturm's Deutschl. Fl., t. 46.

On branches of poplar and willow.

**Hormiscium pithyophilum.** Sacc.

Effused, thick, superficial forming very irregular black patches; chains of conidia irregularly branched, branches becoming thinner at the tips, rather wavy; conidia cuboid or globoso-cuboid, smoky-brown, 18–20 $\mu$ diameter.

*Hormiscium pithyophilum*, Sacc., Syll., n. 1286.

*Rhacodium pithyophilum*, Wallr., Fl. Cr., ii. p. 120.

On branches and leaves of *Taxus baccata* and species of *Abies* and *Pinus*.

## GYROCERAS. Corda. (fig. 11, p. 313.)

Sterile hyphae creeping, vaguely branched. Conidia dark coloured, cuboid, for a long time coherent in long cylindrical chains that are more or less curved or circinate towards the tip.

*Gyroceras*, Corda, Ic. Fung., i. p. 9; Sacc., Syll., iv. p. 206.

Distinguished from *Torula* by the cuboid conidia forming chains that are more or less curved.

**Gyroceras plantaginis.** Sacc. (fig. 11, p. 313.)

Forming rather large, irregular, velvety, black patches on the under surface of leaves; sterile mycelium creeping, branched; chains of conidia erect, brown, springing in fascicles, simple or rarely furcate, incurved; conidia subquadrate, 9–13 $\mu$ or 10 $\times$ 5 $\mu$, smooth, brown, 1-guttulate.

*Gyroceras plantaginis*, Sacc., Mich., i. p. 226; Sacc., Syll., iv. n. 1295.

*Torula plantaginis*, Corda, Ic., iii. p. 5, t. i. f. 14.

On leaves of *Plantago media*.

### Tribe 3. *Echinobotryeae*. Sacc.

## ECHINOBOTRYUM. Corda. (fig. 12, p. 313.)

Hyphae slender, simple or with short branchlets; conidia elliptical or lemon-shaped, smooth or minutely warted, brown, continuous, produced in clusters at the tips of the hyphae.

*Echinobotryum*, Corda, Anleit., p. 10; Sacc., Syll., iv. p. 268.

**Echinobotryum atrum.** Corda. (fig. 12, p. 313.)

Appearing as minute blackish tufts that usually become confluent; conidia pear-shaped, fixed by the broad end, apex beaked, pale, remainder brown, minutely warted, 10–12 $\times$ 6–8 $\mu$, grouped in stellate clusters; hyphae pale brown, septate.

*Echinobotryum atrum*, Corda, Ic. Fung., iii. f. 6; Sacc., Syll., iv. n. 1297.

**Echinobotryum leve.** Sacc.

Loosely gregarious, effused, black; hyphae short, simple or with very short branchlets, sparingly septate, hyaline; conidia in loose racemose heads towards tip of hyphae, ovate or somewhat fusoid, 12 × 6–7 $\mu$, attenuated and more or less apiculate at the apex, base subtruncate, smooth, sooty, paler above, with a very short hyaline pedicil.

*Echinobotryum leve*, Sacc., Mich., i. p. 82; Sacc., Syll., iv. n. 1298.

On rotten wood, paper, dung, &c.

Specimens agreed exactly with the description, in regard to the spores, but the hyaline hyphae belonged, I fear, to a fungus upon which the *Echinobotryum* was parasitic. I do not think that *E. leve* is distinct from *E. atrum*, Ca., being in fact merely "*status junior*." (Grove.)

## TRICHOSPORIUM. Fr. (fig. 25, p. 358.)

Hyphae creeping, brown or pale, vaguely branched; conidia globose or elliptical, smooth, or minutely asperulose, brown, rarely almost colourless, terminal or lateral on short branchlets.

*Trichosporium*, Fr., Summa Veg. Scand., p. 492; Sacc., Syll., iv. p. 288.

A somewhat doubtful genus, at least so far as British species are concerned, and resembling a weft of broadly effused felt-like mycelium, but here and there producing conidia.

**Trichosporium umbrinum.** Sacc.

Hyphae septate, brown, forming a broadly effused, interlaced stratum; conidia rare, terminal on the branches, globose, smooth, brown, 12–14 $\mu$ diameter.

*Trichosporium umbrinum*, Sacc., Syll., iv. n. 1413.

*Colletosporium umbrinum*, Link., sp. pl. Fungi, i. p. 25.

Forming a dense felt overrunning plant-pots in a stove. Also inside bark on rotten trunks.

**Trichosporium fuscum.** Sacc. (fig. 25, p. 358.)

Hyphae brownish, interwoven into a dense felt, repeatedly irregularly branched, septate; branchlets somewhat acute, conidia elliptical, brown, 8–11 × 6–7 $\mu$, forming lax racemes at the tips of the branchlets.

*Trichosporium fuscum*, Sacc., Mich., ii. p. 640; Sacc., Syll., iv. n. 1400.

On rotten bark of pine and other trees; often associated with *Rosellinia aquila*.

**Trichosporium inosculans.** Sacc.

Forming a dark brown, thin, minutely velvety crust; sterile hyphae much branched, septate, interwoven; fertile, erect, forked; conidia elliptical, smooth, brown, 6 × 4 $\mu$.

*Trichosporium inosculans*, Sacc., Syll., iv. n. 1427.

*Sporotrichum inosculans*, Berk., Eng. Flor., v. p. 346.

On dead fungi, *Thelephora*, &c.

**Trichosporium murinum.** Sacc.

Aggregated in minute tufts or effused, flocculose, greenish-grey then blackish-brown; hyphae dichotomously or vaguely branched, septate, olive-brown; conidia inserted near the tips of the branchlets more or less spicate, ovate, 10–12 × 8 $\mu$, apex rather acute, 1-guttate, olive-brown.

*Trichosporium murinum*, Sacc., Fung. Ital., t. 740; Sacc., Syll., iv. n. 1409.

On rotten branches and on old *Fistulina*.

## Subsect. 2. **Macronemeae.** Sacc.

### Tribe 4. *Periconieae.* Sacc.

### STACHYBOTRYS. Corda. (fig. 13, p. 313.)

Fertile hyphae erect, sometimes springing from a prostrate mycelium, entirely brown; conidia forming a head at the apex, subglobose or elliptical, brown, sometimes (spuriously?) 1-septate, produced at the tips of short, specialised conidiophores.

*Stachybotrys*, Corda, Anleit., p. 57; Sacc., Syll., iv. p. 269.

Characterised by the crown of specialised conidiophores at the apex of the erect fertile hyphae.

**Stachybotrys alternans.** Bon.

Sterile hyphae creeping, branched, sparingly septate, often minutely rough or papillose, blackish-brown, 3–5 $\mu$ thick; fertile erect, smoky or almost hyaline, slender, 3–5 $\mu$ thick, often simple, apex not inflated, bearing numerous obclavate conidiophores, smoky or hyaline, 10 × 4–5 $\mu$; conidia terminal, elliptical, 7–9 × 5–6 $\mu$, black, opaque.

*Stachybotrys alternans*, Bonord.; Hdbk., p. 117, fig. 185; Sacc., Syll., n. 1301.

On damp paper.

**Stachybotrys atra.** Corda.

Tufts delicate, black; hyphae dichotomously branched, sparsely septate, yellowish-olive; fertile branches ascending, paler upwards; apical conidiophores crowded, erect, somewhat fusiform, almost colourless; conidia elliptical, brown, 2-guttulate and (spuriously?) 1-septate, smooth, 8–9 $\mu$ long.

*Stachybotrys atra*, Corda, Icon. Fung., i. p. 21, f. 278; Sacc., Syll., vol. iv. n. 1303.

On damp paper, damp walls, rotting wood, &c.

**Stachybotrys lobulata.** Berk.

Black, sterile hyphae creeping, fertile branches ascending or erect, simple or branched, pale upwards, crowned at the apex by 4–6 thickish, almost erect, hyaline conidiophores; conidia elliptical, 8–9 × 5–6 $\mu$, brown, smooth at first, but distinctly warted when mature.

*Stachybotrys lobulata*, Berk., Outl., p. 343; Sacc., Syll., n. 1304.

*Sporocybe lobulata*, Berk., Ann. Nat. Hist., n. 228, t. 13, f. 17.

On damp linen, paper, &c.

From the articulated creeping mycelium, spring slender, very minutely scabrous threads, branched proliferously; ramuli often alternate, attenuated, their apices swelling into a pyriform, 4–5-lobed receptacle, from which spring elliptic spores, some of which are echinulate, others smooth, with two nuclei. The lobes are not mamillate, as in *S. atra*, and the spores have no true septum. (Berk.)

**Stachybotrys dichroa.** Grove.

Hyphae scattered, erect, simple, hyaline, 3–8-septate,

flexuous, 150–200 × 6 $\mu$ diameter, thinner upwards, base somewhat bulbous, apex crowned with 5–6 hyaline, simple conidiophores arranged in a compact verticil, 12–15 and 3–4 $\mu$; conidia blackish-olive, oblong (spuriously?) 1-septate, apex obtuse, base oblique and attenuated, involved in mucus and crowded together to form a spherical, black, shining head.

*Stachybotrys dichroa*, Grove, in Sacc., Syll., iv. n. 1306.

On rotten stem of *Carduus palustris*.

**Stachybotrys asperula.** Mass. (fig. 13, p. 313).

Effused; black. Hyphae abundant, creeping, dichotomously branched, ascending, minutely rough, the tips crowned with pale, clavate conidiophores; conidia globose, blackish-brown, opaque, minutely rough, 7–10 $\mu$ diameter.

*Stachybotrys asperula*, Mass., Grevillea, vol. xvi. p. 26.

On damp paper that had come from Ceylon, hence the fungus may possibly be an introduced species, although first noticed at Kew.

## PERICONIA. Bon. (fig. 14, p. 358.)

Sterile hyphae creeping, often obsolete, fertile brown, simple or with one or two short branches; conidia usually globose, brown, not catenulate, forming a compact head at the apex of the stem.

*Periconia*, Bonord., Hdbk., p. 112; Sacc., Syll., iv. p. 270.

Distinguished from *Sporocybe* by the stem consisting of a single hypha, whereas in the last-named genus the stem is composed of a compacted bundle of hyphae. Differs from *Stachybotrys* in the absence of conidiophores or short branchlets bearing the conidia at the apex of the stem.

**Periconia byssoides.** Pers.

Forming small black patches; fertile hyphae simple, erect, up to 1 mm. high, slightly attenuated upwards, apex, whitish and slightly inflated, remainder dark brown, septate; head globose, compact; conidia subglobose, apiculate, 5–7 $\mu$ diameter, dark brown, smooth (Berkeley says minutely echinulate).

*Periconia byssoides*, Pers., Syn., p. 686; Sacc., Syll., n. 1310.

On decaying herbaceous stems, leaves, &c.

The discrepancy between rough and smooth conidia may very possibly be due to difference of age in the specimens examined.

**Periconia atra.** Corda. (fig. 14, p. 358.)

Forming blackish-brown, very thin stains; fertile hyphae very delicate, wavy, septate, sooty, somewhat incrassated at the base; head almost globose; conidia subglobose, with an apiculus, brown, rather pellucid, smooth, 4–5 $\mu$ diameter.

*Periconia atra*, Corda, Icon. Fung., vol. i. p. 19, f. 258; Sacc., Syll., vol. iv. n. 1311.

On culms of grass, dead herbaceous stems, &c.

**Periconia nigrella.** Sacc.

Very minute, black, scarcely $\frac{1}{2}$ mm. high, fertile hyphae simple, very slender and rather attenuated upwards, 3–5-septate, dark brown; conidia globose, smooth, brown, 5 $\mu$ diameter, forming a compact globose head.

*Periconia nigrella*, Sacc., Syll., iv. 1328.

*Sporocybe nigrella*, Berk., Ann. Nat. Hist., n. 226, t. xiii. f. 16.

On fallen grass, leaves.

**Periconia alternata.** Sacc.

Forming minute, greyish-black, suborbicular tufts; sterile hyphae decumbent, slender, fertile ascending or erect, branched in a zigzag manner; tips of fertile branches swollen; conidia oblong, truncate at both ends, brown, 7–8 × 5 $\mu$, compacted to form a globose head.

*Periconia alternata*, Sacc., Syll., iv. n. 1332.

*Sporocybe alternata*, Berk. in Cooke's Hdbk., n. 1698.

On damp paper.

**Periconia podospora.** Corda.

Tufts brown; hyphae erect, flexuous or wavy, brown, semipellucid; septate, inflated and club-shaped at the apex; conidia subglobose or obovate, brown, with a minute hyaline pedicel, 8–9 $\mu$ diameter, aggregated to form an oblong or elliptical head.

*Periconia podospora*, Corda, Ic. Fung., i. p. 19, f. 255; Sacc., Syll., iv. n. 1317.

On stems of *Heracleum spondylium*, and other Umbellifers.

**Periconia minutissima.** Corda.

Tufts minute, brown, not much effused; fertile hyphae blackish-brown, pellucid, sparingly septate, erect and straight or subflexuous, rarely branched, apex with numerous nipple-like projections that bear the globose, dark brown conidia, 8 $\mu$ diameter, compacted to form a globose head.

*Periconia minutissima*, Corda, Icon. Fung., i. p. 19, fig. 256; Sacc., Syll., iv. n. 1320.

On alder.

**Periconia minima.** Sacc.

Black, effused; fertile hyphae erect or ascending, often forked, about 4–5 $\mu$ thick, brown, septate, apices hyaline, obtuse but not inflated; heads of conidia rather large, more or less spherical, black; conidia subglobose with a basal apiculus, brown, smooth, 6–7 $\mu$ diameter.

*Periconia minima*, Sacc., Syll., iv. n. 1333.

*Sporocybe minima*, Cooke.

On damp millboard.

(Described from the type specimen).

## CEPHALOTRICHUM. Berk. (fig. 23, p. 358.)

Fertile hyphae erect, brown, the apex divided into a number of irregularly branched, spine-like, spreading branches that collectively form a head; conidia subglobose, coloured, borne by the branchlets.

*Cephalotrichum*, Berk., Outl., p. 344; Sacc., Syll., vol. iv. p. 275 (not of Link).

Distinguished from *Periconia* and *Stachybotrys* by the crown of irregular, divided branchlets.

**Cephalotrichum curtum.** Berk. (fig. 23, p. 358.)

Scattered, very minute, brown; fertile hyphae erect, short, slender, 1–2-septate, brown, apex branching to form a head, branches 2–3-furcate, with acute spine-like branchlets; conidia subglobose, smooth, 3–4 $\mu$ diameter, brown.

*Cephalotrichum curtum*, Berk., Ann. Nat. Hist., n. 222, t. xi., f. 13; Sacc., Syll., n. 1336.

On dead leaves of *Carex*.

## CAMPTOUM. Link. (fig. 8, p. 358.)

Sterile hyphae obsolete; fertile simple, hyaline, marked at regular intervals with brown rings; conidia more or less boat-shaped, typically curved or inequilateral, continuous, brown.

*Camptoum*, Link, Spec. Pl. Fungi, i. p. 44; Sacc., Syll., iv. p. 276.

Readily distinguished by the hyaline fertile hyphae being marked with brown rings at regular intervals, and the terminal head of oblique spores.

**Camptoum curvatum.** Link. (fig. 8, p. 358.)

Tufts jet-black, velvety, often running into each other, hyphae filiform, slightly thickened at the base, hyaline, marked with prominent black rings, apex minutely verruculose, and bearing the conidia, which are collected into a subglobose head, but soon disperse; conidia ovate-oblong, variously curved, sooty-black, 18–20 × 7–8 $\mu$.

*Camptoum curvatum*, Link, Sp. Pl. Fungi, i. p. 44; Sacc., Syll., n. 1337.

On dead leaves of *Carex paludosa*, *Scirpus lacustris*, *Scirpus sylvaticus*.

## ACROTHECA. Fuckel.

Sterile hyphae creeping or almost obsolete; fertile hyphae erect, simple brown; conidia fusoid or cylindrical, brown or subhyaline.

*Acrotheca*, Fuckel, Symb. Myc., p. 380; emended by Saccardo, Mich., ii. p. 24; Sacc., Syll., iv. p. 276.

**Acrotheca solani.** Sacc.

Fertile hyphae springing from dry spots, ochraceous, erect, slender, 80–90 × 3 $\mu$, sparingly or not at all septate, brown, paler at the slightly attenuated tips, conidia cylindrical,

subacute at both ends, many guttulate, not septate, hyaline, 18 × 4 $\mu$, in clusters of 2–4 at the tips of the hyphae.

*Acrotheca solani*, Sacc., Syll., iv. n. 1342.

On fading leaves of potato (*Solanum tuberosum*).

## Tribe 5. *Arthrineae.* Sacc.

### ARTHRINIUM. Kunze. (fig. 21, p. 358.)

Sterile hyphae creeping or obsolete; fertile somewhat simple, hyaline, with thick black septa; conidia lateral, whorled, often in fours, fusoid, oblong, or columnar, continuous, brown.

*Arthrinum*, Kunze, Heft i. p. 9; Sacc., Syll., vol. iv. p. 279.

Distinguished from *Camptoum* by the lateral whorls of conidia.

**Arthrinium caricicolum.** K. & S. (fig. 21, p. 358.)

Forming small jet-black tufts; fertile hyphae ascending, rod-like, 50 × 4 $\mu$, apex obtuse, transverse septa crowded, thick, black, remainder hyaline; conidia fusiform, ends obtuse, smoky, 50 × 8 $\mu$, springing from the apex and lateral septa in a verticillate manner.

*Arthrinium caricicolum*, Kunze and Schm., Myk., Heft i. p. 9, t. 1, f. 4; Sacc., Syll., n. 1349.

On dead leaves of *Carex.*

**Arthrinium sporophleum.** Kze.

Forming small black tufts, hyphae slender, hyaline, nodulose and with crowded black septa, simple, base sometimes slightly inflated; conidia oblong or ovoid, somewhat inequilateral, rather acute at both ends and with a colourless apiculus, in verticels of four, 9–14 $\mu$ long.

*Arthrinium sporophleum*, Kunze, Myk., Heft ii. p. 104; Sacc., Syll., iv. n. 1350.

On leaves of *Carex* and *Juncus.*

### GONIOSPORIUM. Link. (figs. 27, 28, p. 358.)

Fertile hyphae erect, distinctly nodulosely-septate; conidia lateral, opposite or verticillate, angular or globosely-angular, sooty, minutely stipitate.

*Goniosporium*, Link, Spec. Pl. Fungi, i. p. 45; Sacc., Syll., vol. iv. p. 280.

Distinguished by the fertile hyphae being distinctly swollen or nodulose at the septa, and the more or less angular spores.

**Goniosporium puccinioides.** Link. (fig. 27, 28, p. 358.)

Forming small, gregarious, rounded, black, somewhat shining tufts; hyphae distinctly swollen at the nodes, nyaline, 3–4 $\mu$ thick, simple, bearing the conidia about the middle, often sterile above, apex obtuse; conidia globosely cuboid or variously angular, 10–14 $\mu$ diameter, sooty brown.

*Goniosporium puccinioides*, Link, Sp, Pl. Fungi, i. p. 45; Sacc., Syll., vol. iv. n. 1354.

On dead leaves of *Carex stricta*.

## Tribe 6. *Trichosporieae.* Sacc.

### VIRGARIA. Nees. (fig. 22, p. 358.)

Sterile hyphae creeping; fertile erect, simple or forked, or with a few erect branches, rather rigid, septate; conidia inserted near the tip of the stem and the branches, globose or elliptical, sooty-brown.

*Virgaria*, Nees, Syst., xi. p. 14; emended, Sacc., Syll., vol. iv. p. 280.

**Virgaria nigra.** Nees.

Tufts effused or compact, somewhat circular; fertile hyphae erect, dichotomously divided into slender, erect dark brown branches that are attenuated at the tips; conidia globose, blackish brown, about 3 $\mu$ diameter.

*Virgaria nigra*, Nees, Syst., ii. p. 14; Sacc., Syll., n. 1356.

On rotten bark and wood.

## ACROSPEIRA. B. & Br. (fig. 13, p. 358.)

Sterile hyphae decumbent; fertile erect, branched above, septate; tips of the branches somewhat spirally coiled, with many septa; conidia more or less globose, muriculate produced at the sides of certain of the joints of the spiral tips of the branches.

*Acrospeira*, B. & Br., Ann. Nat. Hist., n. 952; Sacc., Syll., vol. iv. p. 282.

Distinguished by the few rough spores being borne laterally on the joints of the spiral or curved tips of the branches.

**Acrospeira mirabilis.** B. & Br. (fig. 13, p. 358.)

Fertile hyphae vaguely branched above, and closely septate; branches spirally coiled or curved at the tip, and one or more of the cells near the apex bearing a more or less globose, dark brown, minutely warted spore 15–20 $\mu$ diameter.

*Acrospeira mirabilis*, B. & Br., in Berk. Intr. Crypt. Bot., p. 305, f. 69A; Sacc., Syll., iv. n. 1366.

On fruit of *Castanea vesca*.

A most curious fungus, in which the dark granulated spores are formed by a transformation of the second joint from the top of the branchlets. All the four terminal joints swell, but the second one only in general proves fertile, though in a few instances the terminal joint is also transformed. (Berk. & Broome.)

## ZYGODESMUS. Corda. (fig. 9, p. 358.)

Hyphae creeping, irregularly branched, brown or pale with numerous lateral swellings, the transverse septa appearing as if they did not extend across the hypha; conidia globose or elliptical, coloured, epispore usually ornamented, rarely smooth, springing from minute tooth-like prickles, or from short, lateral branchlets, or sometimes from basidium-like bodies bearing sterigmata.

*Zygodesmus*, Corda, Icon. Fung., i. p. 11; Sacc., Syll., iv. p. 283.

The species usually form more or less dry, loosely interwoven patches on rotten wood, colour various shades of brown.

**Zygodesmus fuscus.** Corda.

Effused, brown, somewhat crustaceous, surface velvety; hyphae branched, septate, reddish-brown, anastomosing and interwoven; conidia globose, echinulate, yellowish brown, 9–11 $\mu$ diameter, borne singly on short, slender, lateral conidiophores.

*Zygodesmus fuscus*, Corda, Icon. Fung., iv. p. 26, f. 81; Sacc., Syll., iv. n. 1370.

On rotten wood, branches, &c.

Saccardo says that an Italian specimen, agreeing with the present species in habit differs from Corda's figure in having basidia with four sterigmata.

**Zygodesmus terrestris.** B. & Br. (fig. 9, p. 358 )

Effused, thin, brown, minutely velvety; conidia somewhat elliptical or lemon-shaped, echinulate at maturity, 12 × 8–9 $\mu$.

*Zygodesmus terrestris*, B. & Br., Ann. Nat. Hist., n. 1915; Sacc., Syll., iv. n. 1372.

On the naked ground.

## OEDEMIUM. Link. (fig. 26, p. 358.)

Fertile hyphae rigid, opaque, simple or slightly branched, with lateral or terminal, subglobose, rather large conidiophores that bear numerous subglobose conidia.

*Oedemium*, Ling, Sp. Pl. Fung., i. p. 42; Sacc., Syll., iv. p. 297.

The structure of the fungi constituting the present genus is not well understood. Berkeley considers, and perhaps correctly, the large lateral structures described above as conidiophores, to be the true conidia, and these are in most species multicellular.

**Oedemium atrum.** Link. (fig. 26, p. 358.)

Hyphae erect, simple or slightly branched septate, blackish with a tinge of reddish-purple, opaque, densely crowded and forming a thickish black, effused layer; conidio-

phores subglobose, black; conidia minute, subglobose or elliptical, scabrid, hyaline.

*Oedemium atrum*, Link, Sp. Pl. Fung., i. p. 43; Sacc., Syll., iv. n. 1448.

On branches and bark of lime (*Tilia*), &c.

### Tribe 7. *Monotosporeae*. Sacc.

### MONOTOSPORA. Corda. (fig. 10. p. 358.)

Sterile hyphae creeping, scanty; fertile hyphae simple, distinct at the base, somewhat elongated, brown; conidia apical, solitary, continuous, brown.

*Monotospora*, Corda, Icon. Fung., i. p. 11; Sacc., Syll., iv. p. 299.

Distinguished from *Hadrotrichum* and *Acremoniella* in the elongated, distinct, erect fertile hyphae.

**Monotospora sphaerocephala.** B. & Br.

Forming a dense, effused, black layer; fertile hyphae erect, simple, sparingly septate; conidia globose, smooth, blackish-brown, more or less opaque, 21–26 $\mu$ diameter.

*Monotospora sphaerocephala*, B. and Br., Ann. Nat. Hist., n. 819, t. ix. f. 5; Sacc., Syll., iv. n. 1459.

**Monotospora repens.** Mass.

Forming small black tufts. Threads short, flexuous, simple or shortly branched, closely septate, especially upwards, where the cells are about equal in length and diameter, pale brownish above but hyaline at the base, 8–10 $\mu$ diameter; conidia solitary, apical, globose, dark brown, opaque, 20–25 $\mu$ diameter.

*Periconia repens*, Cke., Grev., vol. xvi. p. 79.

On herb stems.

The solitary apical conidium removes the present species from *Periconia*.

**Monotospora pumila.** Mass. (fig. 10, p. 358.)

Fasciculate or scattered; fertile hyphae simple, subulate, erect, septate, blackish-brown and opaque below, apex paler, conidia broadly obovate, opaque, blackish-brown, shining, 23–25 × 15–17 $\mu$.

*Monotospora pumila*, Sacc., Syll., iv. n. 1463.

*Helminthosporium pumilum*, Mass., Journ. Roy. Micr. Soc., vol. v., p. 758; pl. 13, fig. 4 & 5.

Parasitic on *Graphium flexuosum*, also on rotten wood and bark. Distinguished from *M. megalospora* by the smaller, blackish, shining conidium.

**Monotospora megalospora.** B. & Br.

Forming small blackish tufts; fertile hyphae erect, simple, somewhat equal, septate; conidia obovate, smooth, opaque, brown, 30–35 × 20 $\mu$.

*Monotospora megalospora*, B. & Br., Ann. Nat. Hist., n 759; t. xv. f. 11, n. 943; Sacc., Syll., iv. n. 1460.

On bark of yew (*Taxus*).

*Var.* **fusispora**, B. & Br., l.c., conidia broadly and obtusely fusiform, 28–30 × 23 $\mu$.

On rotten trunks.

**Monotospora asperospora.** Cke. & Mass.

Effused, black, forming thin, velvety patches; threads erect, short, attenuated upwards from a discoid base, without septa, opaque and dark brown below, pale above; conidia globose, minutely warted, brown, 24–28 $\mu$ diameter.

*Monotospora asperospora*, C. and M., Grev., vol. xvi. p. 69.

On dead twigs of *Clematis*.

## HADROTRICHUM. Fckl. (fig. 17, p. 358.)

Hyphae short, simple but thickish, brown, fasciculate at the base; conia globose or somewhat oblong, continuous, brown, apical and solitary.

*Hadrotrichum*, Fuckel, Symb. Myc., p. 221; Sacc., Syll., iv. p. 301.

Fuckel considers the members of the present genus as the conidial condition of species of *Scirrhia*.

**Hadrotrichum arundinaceum.** C. & M. (fig. 17, p. 358.)

Black; at first in small spherical tufts, at length confluent in velvety patches, threads branched, septate, creeping,

sooty, standing up erect, simple, fertile branches, each bearing a subglobose, opaque, nearly black conidium 30 $\mu$ diameter.

*Hadrotrichum arundinaceum*, Cke. & Mass., Grevillea, vol. xvi. p. 11.

On dead *Arundo conspicua*.

## ACREMONIELLA. Sacc. (fig. 16, p. 358.)

Hyphae creeping or oblique, simple or branched, hyaline or coloured, having rather short conidiophores scattered at intervals; conidia globose or elliptical, brown, continuous, solitary, apical.

*Acremoniella*, Sacc., Fung. Ital., t. 713; Sacc., Syll., iv. p. 302.

Agrees in structure with *Acremonium*, but differs in the coloured spores.

### Acremoniella fusca. Sacc.

Hyphae expanded, delicate, cobweb-like, effused, brown, conidiophorous branches attenuate or opposite, approximate, conidia globose, brown.

*Acremoniella fusca*, Sacc., Syll., v. n. 1475.

*Acremonium fuscum*, R. & S., Myk., Heft i. 79, t. 2, f. 23; Grev., Scot. Cr. Fl., t. 124, fig. 1.

On rotten pine-wood, &c.

### Acremoniella pallida. C. & M. (fig. 16, p. 358.)

Somewhat effused, forming pallid spots on dead leaves, mycelium creeping, hyaline, fertile threads short, erect, septate, hyaline, with short, lateral, acuminate branches; conidia terminal, ovate, continuous, clear brown, 30–35 × 25 $\mu$.

*Acremoniella pallida*, Cke. & Mass., Grev., xvi. p. 79.

On dead leaves.

Tribe 8. *Haplographieae.* (fig. 20, p. 358.)

## CATENULARIA, Grove.

Hyphae erect, fuscous, septate, bearing a chain of conidia at the apex; conidia continuous, fuscous.

*Catenularia*, Grove, in Sacc., Syll., iv. p. 303.

Differs from the genus *Cladotrichum* in the non-septate conidia.

**Catenularia simplex.** Grove.

Effused, black; sterile hyphae elongated, creeping, wavy, equal, fuscous, septa rare, somewhat branched, 3–4 $\mu$ thick; fertile hyphae gregarious, erect, although sometimes bent or recurved, yet rigid, simple, 100–200 × 3–4 $\mu$, fuscous, septate, inflated here and there, or cupulate upwards, the cups deeper in colour, and from the centre of the apical one originates a simple, rigid, erect chain of conidia; chain consisting of 2–10 conidia, obovate or obconic, truncate at both ends, olivaceous then fuscous, 10 × 5–6 $\mu$.

*Catenularia simplex*, Grove, in Sacc., Syll., iv. n. 1482.

On rotten wood.

## HAPLOGRAPHIUM. B. & Br. (fig. 12, p. 358.)

Sterile hyphae creeping, scanty, fertile branches erect, septate, brown, bearing a head of very short or elongated branchlets at the summit, these in turn bear chains of simple, coloured conidia.

*Haplographium*, B. & Br., Ann. Nat. Hist., 1859, p. 6; Sacc., Syll., p. 304.

Somewhat resembling *Penicillium* in general habit and structure, but dark-coloured. In some species the terminal branchlets bearing the chains of conidia are very short, in others more or less elongated.

**Haplographium delicatulum.** B. & Br.

Forming dark olive patches; fertile hyphae erect, dark olive-brown, simple or very rarely branched; sterigmata

very short, scarcely distinguishable from the conidia, aggregated at the tips of the hyphae; conidia in simple or slightly branched chains and forming a small dark olive-coloured head, conidia elliptic-oblong, simple, olive, 4–5 × 2·5 μ.

*Haplagraphium delicatulum*, B. & Br., Ann. Nat. Hist., n. 818, t. 9, f. 4; Sacc., Syll., iv. n. 1484.

On dead trunks.

**Haplographium chartarum.** Sacc.

Tufts minute, olive, suborbicular or irregular, 4–16 mm. diameter; fertile hyphae simple or sparingly branched above; chains of conidia simple or branched; conidia oblong, pale olive, 4–5 μ long.

*Haplographium chartarum*, Sacc., Syll., iv. n. 1487.

*Penicillium chartarum*, Cke., Pop. Science Rev., 1871, t. 68, f. 4.

On decaying paper, along with *Sporodesmium alternaria.*

**Haplographium bicolor.** Grove.

Fertile hyphae effused, gregarious, erect, straight, septate sometimes 2–3 connate at the base, blackish-brown, opaque, paler towards the rounded tip, base bulbous, 250–300 × 8 μ; conidiophores numerous, radiating, pale, fasciculately branched; conidia oblong or ovate, subacute, hyaline, 4–5 μ long, involved in mucus and forming an obovate pale honey-coloured head.

*Haplographium bicolor*, Grove, Science Gossip, 1885, p. 197, f. 127, 128; Sacc., Syll., iv. n. 1490.

On decayed wood.

**Haplographium tenuissimum.** Grove.

Effused, delicate, pale brown; fertile hyphae unbranched, ¼ mm. long, straight, filiform, base dilated, brown, semipellucid; head subglobose formed by the yellow fasciculate conidiophores; conidia elliptic-fusiform, 4–5 μ long, in lax chains.

*Haplographium tenuissimum*, Grove, Sc. Gossip, 1885, p. 198, f. 130; Sacc., Syll., iv. n. 1491.

*Graphium tenuissimum*, Cda.

On chips, wood, &c.

**Haplographium saponis.** Sacc.

Black; sterile hyphae creeping, fertile erect, forked at the

tip; branchlets turgid at the apex, each bearing 2–4 rather long chains of conidia; conidia globose, black.

*Haplographium saponis*, Sacc., Syll., iv. n. 1499.

*Penicillium saponis*, B. & Br., Ann. Nat. Hist., n. 1913, t. 3, f. 3.

On soap.

**Haplographium olivaceum.** C. & M. (fig. 12, p. 358.)

Somewhat effused, dark olive, nearly black; threads erect, septate, simple, dark, slightly clavate and paler at the apex; conidia narrowly elliptical, catenulate in simple chains, 12–14 × 4 $\mu$, pale olive, forming a subglobose, rather lax head.

*Haplographium olivaceum*, Cke. & Mass., Grevillea, vol. xvi. p. 11.

On rotten wood.

## DEMATIUM. Pers. (fig. 15, p. 358.)

Sterile hyphae scanty, creeping; fertile hyphae erect, simple or sparingly branched, septate, producing lateral chains of conidia. Conidia sphaeroid or ellipsoid, continuous, brown, sometimes connected by a short isthmus.

*Dematium*, Fries, Syst. Myc., iii. p. 365; Sacc., Syll., iv. p. 308.

*Sporodum*, Corda, Ic. Fung., i. p. 18.

**Dematium hispidulum.** Fr. (fig. 15, p. 358.)

Tufts minute, hemispherical, setulose, black; hyphae simple or sparingly branched, septate, the upper naked portion obtuse or often acute, brownish; conidia globose, dingy ochraceous, at length minutely asperulose, the terminal one largest and darkest coloured, 10–14 $\mu$ diameter.

*Dematium hispidulum*, Fr., S. Myc., iii. p. 365; Sacc., Syll., iv. n. 1500.

*Sporodum conopleoides*, Corda, Ic. Fung., i. p. 18, f. 247, iii. f. 22.

*Conoplea hispidula*, Pers., Sym., p. 235.

*Dematium graminum*, Libert.

On decayed leaves of *Arundo donax* and various grasses.

**Dematium vinosum.** Mass.

Forming broadly extended patches of a chocolate colour. Sterile hyphae creeping, colourless, septate, bearing here and there erect, branched, septate conidiophores; conidia concatenate, terminal on the conidiophores, shortly cylindrical, ends truncate (barrel-shaped), vinous brown, 10–12 × 8 $\mu$.

*Dematium vinosum*, Massee, Grevillea, vol. xxi. p. 7, pl. 182, f. 7.

On damp, gummed paper. Commencing as pure white, waxy-looking patches; the conidia are fully formed and full sized before they become tinged with colour.

## Tribe 9. *Myxotrichea.* Sacc.

### BOLACOTRICHA. B. & Br. (figs. 41, 42, p. 358.)

Sterile hyphae more or less erect, simple, septate, somewhat circinate or curved at the tips; conidia clustered into small heaps, and held together by mucus, subglobose, hyaline, shortly pedicellate.

*Bolacotricha*, B. & Br., Ann. Nat. Hist., n. 506; Sacc., Syll., iv. p. 316.

The sterile hyphae stand up above the mass of spores, and are more or less curled at the tips.

**Bolacotricha grisea.** B. & Br. (figs. 41, 42, p. 358.)

Tufts pulvinate, effused, grey; sterile hyphae flexuous, simple, equal or thickest downward, sparingly septate, pale rufous, apex more or less spirally incurved; conidia crowded into glomerules, globose, granular within, 5–8 times the diameter of the hyphae.

*Bolacotricha grisea*, B. & Br., Ann. Nat. Hist., n. 506, t. v. f. 4; Sacc., Syll., iv. n. 1534.

On rotten cabbage stalks, rotten sacking, &c.

### MYXOTRICHUM. Kunze. (figs. 32, 33, p. 358.)

Sterile hyphae naked above, straight or circinate, very much branched below, dark-coloured; conidia variously

inserted on the branchlets, globose or ovoid, aggregated in clusters and held together by mucus.

*Myxotrichum*, Kunze, Myk., Heft ii. p. 108; Sacc., Syll., iv. p. 317.

Allied to *Bolacotricha*, but distinguished by the sterile hyphae being very much branched near the base.

**Myxotrichum chartarum.** Kunze.

Hyphae very slender, decumbent, divaricately branched below, almost simple upwards, interwoven into blackish-olive tufts, the tips hooked; conidia aggregated in clusters at the tips of the basal branchlets.

*Myxotrichum chartarum*, Kunze, Myk., Heft ii. p. 110; Sacc., Syll., iv. n. 1535.

On damp paper, &c.

**Myxotrichum cancellatum.** Phil.

Tufts minute, subglobose, grey, $\frac{1}{5}$ mm. diameter; hyphae elongated, subulate, blackish, simple, elegantly cancellately branched near the base; conidia elliptical, 3 $\mu$ long, somewhat hyaline, covering the network of branchlets.

*Myxotrichum cancellatum*, Phillips, in Grevillea; Sacc., Syll., iv. n. 1539.

On rotten stem of *Bartsia odontites*.

**Myxotrichum deflexum.** Berk.

Tufts minute, slightly downy, grey, hyphae radiating, branched, branches opposite, deflexed, becoming shorter upwards, branchlets few, short, acute; conidia elliptic-oblong, collected in clusters towards the base of the tufts.

*Myxotrichum deflexum*, Berk., Ann. Nat. Hist., n. 122, t. viii. f. 9; Sacc., Syll., iv. n. 1540.

On paper, rotten wood, &c.

**Myxotrichum ochraceum.** B. & Br. (figs. 32, 33, p. 358.)

Yellow then greenish; hyphae elongated, acute, branchlets deflexed; conidia globose, 3·5 $\mu$ diameter.

*Myxotrichum ochraceum*, B. & Br., Ann. Nat. Hist., n. 1475, t. i. f. 4; Sacc., Syll., iv. n. 1541.

On wood.

Tribe 10. *Chloridieae.* Sacc.

CHAETOPSIS. Grev. (fig. 30, p. 358.)

Hyphae erect, bearing towards the middle irregular whorls of short conidiophores; conidia cylindrical, hyaline.

*Chaetopsis*, Greville, Scot. Crypt. Flora, t. 236; Sacc., Syll., iv. p. 324.

**Chaetopsis Wauchii.** Grev. (fig. 30, p. 358.)

Hyphae gregarious, blackish-brown, rather rigid, subulate, with short branchlets near the middle; conidia cylindric-oblong, abundant, hyaline, aggregated in greyish masses.

*Chaetopsis Wauchii*, Grev., Scot. Cr. Fl., t. 236.

*Chaetopsis grisea*, Sacc., Syll., iv. n. 1569.

On rotten trunks, &c.

MENISPORA. Pers. (figs. 24 and 29, p. 358.)

Sterile hyphae creeping, scanty; fertile erect, septate, brown, furnished with pellucid branches towards the middle; conidia fusoid-falcate, continuous or spuriously septate, hyaline, sometimes (in subg. *Eriomene*) with a delicate spine at each end; soon often bound into clusters by mucus.

*Menispora*, Pers., Myc. Eur., i. p. 32; Sacc., Syll., iv. p. 325.

* *Eu-Menispora;* conidia without spinules at the ends.

**Menispora lucida.** Corda. (fig. 29, p. 358.)

Tufts minute, brown; hyphae erect, lax, unequally septate or nodulose, brown and semipellucid below, paler above; conidia fusoid, sometimes slightly curved, obtuse, hyaline, 4–6 nucleate.

*Menispora lucida*, Corda, Fung. Icon., i. p. 16; Sacc., Syll., iv. n. 1574.

On wood.

** *Eriomene*, Sacc.; conidia ciliate at the ends.

**Menispora ciliata.** Corda. (fig. 24, p. 358.)
Tufts minute, somewhat effused, slightly tawny, with an olive tinge; hyphae erect, somewhat dichotomous, lax, unequally septate, sometimes incurved, olive-brown; conidia fusoid, curved, hyaline 16–17 $\mu$ long, furnished with a very delicate long seta at each end.
*Menispora ciliata*, Corda, Icon. Fung., i. p. 16; Sacc., Syll., iv. n. 1583.
On rotten wood, bark, &c.

VERTICICLADIUM. Preuss. (fig. 31, p. 358.)

Sterile hyphae creeping; fertile erect, septate, verticillately branched above; branches usually in fours, ultimate branchlets subulate; conidia continuous, single at the tips of the branchlets, soon falling away.
*Verticicladium*, Preuss, Fung., Hoyersw., n. 93; Sacc., Syll., p. 327.
Habit of Verticillium, but belonging to the Dematieae.

**Verticicladium trifidum.** Preuss.
Tufts slender, effused, scarcely conspicuous, hoary-brown; fertile hyphae erect, septate, semipellucid, base dilated, with spreading, verticillate branches above, blackish-brown; conidia globose, pellucid, white.
*Verticicladium trifidum*, Preuss, F. Hoyersw., n. 93; Sacc., Syll., iv. n. 1586.
On rotten pine leaves, &c.

**Verticicladium apicale.** B. & Br. (fig. 31, p. 358.)
Effused, olive-black; hyphae erect, septate; branches apical, inflated at the base, whorled, short; conidia globose, brown, 6–8 $\mu$ diameter.
*Verticicladium apicale*, B. & Br.; Sacc., Syll., iv. n. 1588.
*Verticillium apicale*, B. & Br., Ann. Nat. Hist., n. 531, t. vii. fig. 17.
On decorticated oak branches.

Tribe 11. *Stachylidieae.* Sacc.

## GONYTRICHUM. Nees. (fig. 39, p. 358.)

Hyphae decumbent, branched, bearing here and there long, swollen, spinulose nodes; conidia springing from the tips of the spines on the nodes, subglobose, almost solitary or collected into heads, and sometimes involved in mucus.

*Gonytrichum*, Nees, Act. Leop., ix. p. 244, t. 15, f. 14; Sacc., Syll., iv. p. 329.

**Gonytrichum caesium.** Nees. (fig. 39, p. 358.)

Tufts minute, pulvinate, grey at first, then brown; hyphae rather rigid, septate; brown, apex paler, nodulose, spines subulate, almost colourless; conidia elliptical, 2–3 × 1 $\mu$, sometimes 2-guttulate, and looking as if 1-septate, hyaline.

*Gonytrichum caesium*, Nees, Act. Leopol., ix. p. 244, t. 15, f. 14; Sacc., Syll., iv. n. 1592.

On fallen wood and branches.

## STACHYLIDIUM. Link. (fig. 36, p. 358.)

Sterile hyphae creeping, scanty; fertile erect, somewhat verticillately branched; conidia aggregated at the tips of the branchlets, globose or elliptical.

*Stachylidium*, Link, Obs., i. p. 13; Sacc., Syll., iv. p. 331.

**Stachylidium cyclosporum.** Grove. (fig. 36, p. 358.)

Fertile hyphae erect, paler and attenuated upwards, base brown, 200–300 × 4 $\mu$, septate and branched above, branches 2–4 springing from the septa, 2–4 jointed, dividing into opposite or alternate branchlets, ultimate branchlets subulate, hyaline, bearing a head of conidia 8–10 $\mu$ diameter; conidia spherical, somewhat hyaline, 2–2·5 $\mu$ diameter, involved in mucus.

*Stachylidium cyclospora*, Grove, Journ. Bot., 1885, p. 12, t. 257, f. 6; Sacc., Syll., iv. 1607.

On fallen branches.

**Stachylidium extorre.** Sacc.

Effused, fusco-cinereous, velvety; hyphae erect, cylindrical, slightly thickened at the base, gradually attenuated upwards, 50–200 × 4–5 $\mu$, septate, opaque, dark brown, verticillately branched towards the apex; branchlets apical or nearly so, paler, almost hyaline, 3–6 together, attenuated above, bulbous below, simple or rarely again branched; conidia forming spherical translucent globules 6–10 $\mu$ diameter on the apex of the branches, at first involved in mucus, then diffluent, oblong, 3–4 × 1·5 $\mu$, hyaline.

*Stachylidium extorre*, Sacc., Mich., i. p. 84; Sacc., Syll., iv. n. 1603.

On dead wood.

No brown creeping threads at the base; but many of the stems were beaten down by the weather, and the apex curling upwards looked like a very short stem. Occasionally the stem seemed almost non-existent, and the crown of glistening ramuli was seated directly on the wood. (Grove.)

## Tribe 12. *Chalareae.* Sacc.

### CHALARA. Corda. (fig. 35, p. 358.)

Sterile hyphae absent or obsolete; fertile ones simple, short, straight, brown, sometimes flask-shaped; conidia hyaline, cylindrical, truncate at both ends, in chains.

*Chalara*, Corda, Icon. Fung., ii. p. 9; Sacc., Syll., iv. p. 333.

**Chalara longissima.** Grove.

Fertile hyphae densely gregarious, erect, rigid, straight, septate, equal, 150–170 × 4–5 $\mu$, fuscous below, paler and often somewhat inflated upwards, gradually passing into a very long, white, flexuous chain of conidia more than twice the length of the stem; conidia fusoid, irregular, somewhat acute at both ends, almost hyaline, continuous, 1–4-guttulate, 10–15 × 3–4 $\mu$.

*Chalara longissima*, Grove, Journ. Bot., 1885, p. 12, t. 257; f. 8; Sacc., Syll., iv. n. 1615.

On rotten wood.

**Chalara longipes.** Cooke. (fig. 35, p. 358.)
Tufts effused, inconspicuous; mycelium branched, often anastomosing, septate; hyphae simple, septate, brown, pellucid, apex running out into a rigid, very fragile, simple, dichotomous, or rarely trichotomous chain of cylindrical conidia.
*Chalara longipes*, Cooke, Grev., 1881, p. 50; Sacc., Syll., iv. n. 1621.
On damp fallen pine leaves, pericarp of walnut, &c.

## Sect. II. DIDYMOSPORAE. Sacc.

### Subsect. 1. **Micronemeae.** Sacc.

#### Tribe 13. *Bisporeae.* Sacc.

#### DICOCCUM. Corda. (fig. 38, p. 358.)

Conidia oblong or shortly clavate, brown, 1-septate, springing from very short simple hyphae.
*Dicoccum*, Corda, in Sturm, Deutsch. Fl., t. 54; Sacc., Syll., iv. p. 342.

**Dicoccum uniseptatum.** B. & Br. (f. 38, p. 358.)
Tufts minute, black; conidia obovate, 1–septate, vinous-black, shortly pedicellate, 12–13 $\mu$ long, the lower joint shortest and narrowest.
*Dicoccum uniseptatum*, B. & Br.; Sacc., Syll., iv. n. 1628.
*Sporidesmium uniseptatum*, B. & Br., Ann. Nat. Hist., n. 815, t. ix. f. 2.
On twigs of *Clematis vitalba*.

#### BISPORA. Corda. (fig. 37, p. 358.)

Conidia oblong, 1-septate, fuscous, catenulate; springing from very short hyphae.
*Bispora*, Corda, Icon. Fung., i. p. 9; Sacc., Syll., iv. p. 343.
Distinguished from *Dicoccum* by the concatenate conidia.

**Bispora monilioides.** Corda. (fig. 37, p. 358.)
Effused, blackish-brown, powdery; hyphae or conidiophores short, subconical; conidia shortly fusoid, truncate at both ends, 20–22 × 6–7 $\mu$, with one thick septum, not constricted, 2-guttulate, sooty-brown.

*Bispora monilioides*, Corda, Icon. Fung., i. p. 9, t. 11, f. 143; Sacc., Syll., iv. n. 1632.

On oak and beech wood, especially the cut ends of trunks and stumps.

According to Fuckel this is the conidial stage of *Bisporella monilifera*.

Subsect. 2. **Macronemeae.** Sacc.

Tribe 14. *Cladosporieae.* Sacc.

PASSALORA. Fries & Mont. (fig. 40, p. 358.)

Hyphae elongated, filiform, intricate, many-septate, olivaceous; conidia oblong or fusoid, 1-septate, acrogenous.

*Passalora*, Fries & Mont., Ann. Sci. Nat., ser. 2, vol. vi. p. 31; Sacc., Syll., iv. p. 344.

Closely allied to *Fusicladium*, but distinguished by the larger, pluriseptate conidiophores.

**Passalora bacilligera.** M. & Fr. (fig. 40, p. 358.)
Hypophyllous; hyphae somewhat fasciculate, simple, wavy, apex obtuse, olive, septate, intricate, forming minute sooty spots; conidia acrogenous, elongato-obclavate, 1-septate, 30–50 × 5–7 $\mu$.

*Passalora bacilligera*, M. & Fr., Ann. Sci. Nat., ser. 2, vol. vi. p. 31, t. 12, fig. 5; Sacc., Syll., iv. n. 1640.

On the under surface of fading leaves of *Alnus glutinosa*.

FUSICLADIUM. Bon. (fig. 3, p. 397.)

Hyphae short, straight, sparingly septate, somewhat fasciculate, olivaceous; conidia ovoid or subclavate, for a long time continuous, at length often 1-septate, acrogenous, solitary or in pairs.

*Fusicladium*, Bonorden, Hdbk., p. 80; Sacc., Syll., iv. n. 1642.

**Fusicladium dendriticum.** Fckl.

Effused, velvety, olivaceous, often growing on leaves in a dendritic manner; hyphae filiform, erect, fasciculate, 50–60 × 5 $\mu$, sparingly septate; conidia apical, fusoid-obclavate, 30 × 7–9 $\mu$, for a long time continuous, then 1-septate, not constricted, olivaceous.

*Fusicladium dendriticum*, Fuckel, Symb. Myc., i. p. 357; Sacc., Syll., iv. n. 1642.

On fading leaves of apple and pear; sometimes also occurring on the fruit of the above-mentioned.

**Fusicladium depressum.** B. & Br. (fig. 3, p. 397.)

Tufts small, angular, up to 2 mm. across, blackish-brown, composed of roundish fascicles; hyphae simple, short, continuous, scarcely wavy, erect, olivaceous, 60–70 × 6–7 $\mu$; conidia obclavate-fusoid, 50–55 × 7–8 $\mu$, sometimes curved, multiguttulate, olivaceous, continuous, then constricted and apparently 1-septate.

*Fusicladium depressum*, B. & Br., Sacc., Syll., iv. n. 1646.

*Cladosporium depressum*, B. & Br., Ann. Nat. Hist., n. 514, t. v. f. 8.

On under surface of living leaves of *Angelica silvestris*.

SCOLECOTRICHUM. Kze. & Schm. (fig. 34, p. 358.)

Hyphae short, somewhat fasciculate, olivaceous; conidia oblong or ovate, lateral and terminal.

*Scolecotrichum*, Kunze & Schm., Myc., Heft i. p. 10; Sacc., Syll., iv. p. 347.

Allied to *Fusicladium*, but distinguished by the conidia being lateral as well as terminal.

**Scolecotrichum sticticum.** B. & Br. (fig. 34, p. 358.)

Tufts minute, point-like, gregarious, black; hyphae fasciculate, nodulose or irregular; conidia oblong-clavate, 1-septate, 40 $\mu$ long.

*Scolecotrichum sticticum*, B. & Br.; Sacc., Syll., iv. n. 1660.

*Helminthosporium sticticum*, B. & Br., Ann. Nat. Hist., n. 758 t. xv. f. 10.

On dead leaves of grass.

**Scolecotrichum clavariarum.** Sacc.

Hyphae densely aggregated, simple, short, straight, obtuse, septate, blackish; conidia oblong, 1-septate, constricted, pellucid or opaque, 15–20 × 8 $\mu$, cells often unequal, 1-guttulate.

*Scolecotrichum clavariarum*, (Desm.), Sacc., Syll., iv. n. 1661.

Parasitic on *Clavaria rugosa* and *C. fuliginea*.

## POLYTHRINCIUM. Kze. & Schm.

Hyphae erect, fasciculate, short, rather thick, distinctly and regularly wavy or twisted, blackish; conidia obovoid, 1-septate, acrogenous.

*Polythrincium*, Kunze and Schm., Myk., Heft i. p. 13; Sacc., Syll., iv. p. 350.

**Polythrincium trifolii.** Kze. & Schm.

Hyphae rigid, short, regularly twisted or waved, hypophyllous, forming grumous olive-brown patches that often become confluent, seated on yellow spots; conidia obovate, 1-septate, constricted, pale olive, 20–24 × 9–12 $\mu$.

*Polythrincium trifolii*, Kunze, Myk., Heft i. p. 13, t. 1, f. 8; Sacc., Syll., iv. p. 350.

## CLADOSPORIUM. Link. (fig. 2, p. 397.)

Hyphae subdecumbent, branched, olive; conidia at first subglobose, then elliptical and typically 1-septate. Sometimes 2–3-septate and forming terminal or lateral short chains of 2–3 conidia.

*Cladosporium*, Link, sp. pl. Fung., i. p. 39; Sacc., Syll., iv. p. 350.

Erect, hyphae or conidiophores usually erect or ascending, simple, branched, or nodulose, usually forming velvety olive tufts or cloud-like patches on leaves, &c. Less robust than *Helminthosporium* and distinguished by the smaller, usually 1-septate spores.

† *On Dicotyledons.*

**Cladosporium epiphyllum.** Mart.

Tufts minute, forming rather olive-black, circular patches; hyphae at first erect, then more or less declinate, branched, much intermixed, pale olive; conidia elliptic-oblong, continuous, then 1–3-septate, arranged in chains, olive 10–22 × 4–6 $\mu$.

*Cladosporium epiphyllum*, Mart., Erlang., p. 351; Sacc., Syll., iv. n. 1718.

On leaves of *Quercus*, *Platanus*, *Populus*, *Laurocerasus*, *Hedera*, &c., usually appearing on the under surface, under the form of numerous small patches.

**Cladosporium sphaerospermum.** Penz.

Tufts conspicuous, aggregated, confluent, forming a velvety layer; hyphae erect, septate, brown, 150–300 × 3·5–4 $\mu$; conidia terminal or very near the apex, very variable, generally spherical or elliptical, concatenate, rarely 1-septate, smaller form 3–4 × 4 $\mu$; larger 6–14 × 3·5–4 $\mu$, olivaceous, smooth.

*Cladosporium sphaerospermum*, Penzig, Fung. Agrum. in Mich., ii. p. 473; Sacc., Syll., iv. n. 1688.

On fading twigs and leaves of *Citrus*.

**Cladosporium fulvum.** Cooke.

Effused, minutely velvety, reddish-brown; hyphae erect, wavy, sparsely septate, nodulose, sparingly branched, brownish; conidia elliptical, 1-septate, scarcely constricted at the septum, pale fulvous, pellucid, 10–20 × 4–5 $\mu$.

*Cladosporium fulvum*, Cke., in Ravenel's Fung. Amer. Exs., n. 599; Grevillea, 1883. p. 32; Sacc., Syll., iv. n. 1731.

*Cladosporium lycopersici*, Plow.

On living leaves of tomato (*Solanum lycopersicum*).

**Cladosporium lignicolum.** Corda.

Tufts thin, rather compact, black, $\frac{1}{2}$–1 in. across; fertile

threads very short, simple or nearly so; conidia elliptic-oblong, 1-septate, often in chains, dark brown and almost opaque, 8–10 × 5–6 μ.

*Cladosporium lignicolum*, Corda, Icon. Fung., p. 14, t. iii. f. 206; Sacc., Syll., iv. n. 1692.

On rotten wood.

**Cladosporium brachormium.** B. & Br.

Forming thin, effused, grey patches; hyphae erect, wavy, nodulose above; conidia elliptic-oblong, in one or more short terminal chains.

*Cladosporium brachormium*, B. & Br., Ann. Nat. Hist., n. 515; Sacc., Syll., iv. n. 1736.

On leaves of *Fumaria officinalis*.

**Cladosporium juglandinum.** Cke.

Forming small, scattered, sooty patches on the under surface of the leaves; hyphae septate, nodulose, slightly wavy, blackish-brown at the base, paler above; conidia apical, fusoid, 1-septate, pellucid, 35 × 9 μ.

*Cladosporium juglandinum*, Cke., Grev., xvi. p. 80; Sacc., Syll., Suppl., x. n. 7501.

On walnut leaves (*Juglans regia*).

**Cladosporium herbarum.** Link. (fig. 2, p. 397.)

Tufts dense, aggregated, confluent, forming an olive-yellow, then blackish-olive stratum; hyphae erect or ascending, brown or olive, septate, sparingly branched, 5–7 μ thick; conidia springing from near the tips of the hyphae, not at all or very shortly concatenate, pale brown or olive, form and size exceedingly variable, oblong, ovoid, oblong-elliptical, cylindrical, simple or 1–3-septate, constricted at the septa, smooth.

*Cladosporium herbarum*, Link, Obs. Myc., ii. p. 37; Sacc., Syll., iv. n. 1665.

On every portion of decaying herbaceous plants; on wood, paper, fungi, &c.

**Cladosporium nodulosum.** Corda.

Tufts narrowly oblong, olive-brown then blackish; hyphae clustered, long, wavy, pale brown, apex generally incurved, simple, with very short spurious, nodulose branchlets;

conidia oblong or cuneate, simple or 1-septate, pale olive-brown, 15–16 $\mu$ diameter.

*Cladosporium nodulosum*, Corda, Icon., i. p. 15, t. iv. f. 212; Sacc., Syll., iv. n. 1666.

On rotten wood, herbaceous stems, leaves of grass, &c.

†† *On Monocotyledons.*

**Cladosporium Kniphofiae.** Cooke.

Amphigenous; spots olive, caespitose; tufts minute, gregarious or confluent, velvety; hyphae simple, erect, flexuous, confluent at the base and fasciculate, nodulose at the septa, pale yellow-brown; conidia typically 1-septate, afterwards sometimes 2–3-septate, twice the thickness of the hyphae, elliptical, 25–30 × 10 $\mu$, pale olive.

*Cladosporium Kniphofiae*, Cke., Grev., xiv. p. 40; Sacc., Syll., iv. n. 1759.

On dead leaves of *Kniphofiae aloides*.

**Cladosporium fasciculare.** Fr.

Spots oblong, greyish; tufts of hyphae minute, erumpent; tips of the hyphae wavy, black, indistinctly septate; conidia elliptic-oblong, continuous or rarely 1-septate, in chains that break up and form a conglobated mass; conidia numerous, 8 × 4–5 $\mu$.

*Cladosporium fasciculare*, Fries, Syst. Myc., iii. p. 370; Sacc., Syll., iv. n. 1758.

On stems of *Asparagus*, *Lilium*, &c.

**Cladosporium orchidearum.** C. & M.

Tufts erumpent, small, originating principally through the stomata, olivaceous; threads short, sparingly branched, septate, rather slender and flexuous; conidia elliptical, uniseptate, pale olive, 17–18 × 5–6 $\mu$.

*Cladosporium orchidearum*, Cke. & Mass., Grev., xvi. p. 80; Sacc., Syll., iv. n. 7506.

On fading leaves of cultivated orchids.

**Cladosporium sphaeroideum.** Cooke.

Forming minute black, compact, gregarious, spot-like, hemispherical, velvety tufts; hyphae densely fasciculate, short, septate; conidia olive, 20–40 × 7 $\mu$.

*Cladosporium sphaeroideum*, Cke.; Sacc., Syll., iv. n. 1745.
On leaves of grasses.

### ††† *On Acotyledons.*

**Cladosporium epibryum.** C. & M.

Tufts very minute, black; hyphae simple, short, flexuous, septate, olivaceous, paler upwards; conidia elliptical, rounded at both ends, 1-septate, constricted at the septum, pale olive-brown, hyaline, 18–20 × 10–12 $\mu$.

*Cladosporium epibryum*, Cke. & Mass., Grev., xvii. p. 76; Sacc., Syll., x. no. 7509.

In the capsules of mosses. The present species was first found on mosses collected in the United States.

**Cladosporium algarum.** C. & M.

Effused in irregular dark olive patches; threads erect, sparingly branched, septate, olive below, pale and attenuated above; conidia oblong, cylindrical, 1–3-septate, slightly constricted, pale olive, 30–35 × 10 $\mu$.

*Cladosporium algarum*, Cke. & Mass., Grev., xvi. p. 80.

On washed up fronds of *Laminaria flexicaulis*.

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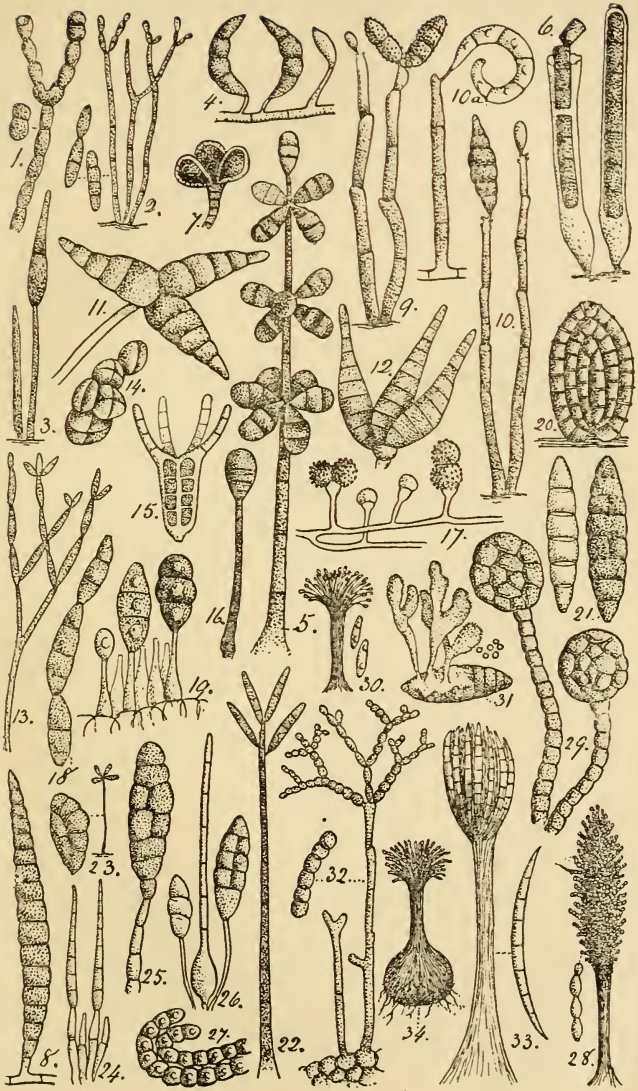
FIGURES ILLUSTRATING THE *DEMATIEAE*.

Fig. 1, *Cladotrichum Cookei*;—Fig. 2, *Cladosporium herbarum*;—Fig. 3, *Fusicladium depressum*;—Fig. 4, *Fusariella atrovirens*;—Fig. 5, *Spondylocladium fumosum*;—Fig. 6, *Sporochisma mirabile*;—Fig. 7, *Sporidesmium lobatum*;—Fig. 8, *Clasterosporium vermiculatum*;—Fig. 9, *Heterosporium typharum*;—Fig. 10, *Helminthosporium fusiforme*;—Fig. 10A, *Helicosporium Mulleri*;—Fig. 11, *Triposporium elegans*;—Fig. 12, *Ceratosporium digitatum*;—Fig. 13, *Dendryphium griseum*;—Fig. 14, *Coniothecium viticolum*;—Fig. 15, *Tetraploa aristata*;—Fig. 16, *Brachysporium obovatum*;—Fig. 17, *Stemphylium asperosporum*;—Fig, 18, *Septonema irregulare*;—Fig. 19, *Napicladium arundinaceum*;—Fig. 20, *Dictyosporium elegans*;—Fig. 21, *Alternaria brassicae*;—Fig. 22. *Acrothecium simplex*;—Fig. 23, *Dactylosporium brevipes*;—Fig. 24, *Cercospora resedae*;—Fig. 25, *Macrosporium nobile*;—Fig. 26, *Septosporium bulbotrichum*;—Fig. 27, *Speira toruloides*;—Fig. 28, *Stysanus stemonites*;—Fig. 29, *Mystrosporium stemphylium*;—Fig. 30, *Harpographium graminum*;—Fig. 31, *Isaria farinosa*;—Fig. 32, *Fumago vagans*;—Fig. 33, *Atractium flammeum*;—Fig. 34, *Grapiothecium parasiticum*. (All the figures are highly magnified.)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## CLADOTRICHUM. Corda. (fig. 1, p. 397.)

Sterile hyphae creeping, fertile ascending, rather rigid, branched, dark-coloured, swollen here and there; conidia 1-septate, coloured, originating from the tips of branchlets; usually in short chains.

*Cladotrichum*, Corda, in Sturm's Deutschl. Fl. t. 20; Sacc., Syll., iv. p. 370.

The dark, branched threads with nodulose swellings here and there, and the 1-septate spores, mark the genus.

### Cladotrichum Cookei. Sacc. (fig. 1, p. 397.)

Effused, black; hyphae branched, forked, nodulose, septate, upper joints inflated or cupulate, conidia oblong, constricted, 1-septate, obtuse, often collapsed at the extremities, and then apparently truncate, 18–20 × 9–10 $\mu$.

*Cladotrichum Cookei*, Sacc., Syll., iv. n. 1784.

*Cladotrichum uniseptatum*, Cke., Grev., v. iii., p. 182, pl. 48, f. 2.

On sticks; forming thick black velvety patches sometimes nearly an inch in length.

### Cladotrichum fuscum. Sacc.

Tufts thin, indeterminate, brown; hyphae intricately interwoven, ascending, branched, wavy, branches diverging, obtuse; conidia oblong, 1-septate.

*Cladotrichum fuscum*, Sacc., n. 1800 (not n. 1786).

*Macrotrichum heterosporium*, Grev., Ed. Phil. Journ., iii. t. 1.

On dead capsules of *Gentiana campestris*.

### Cladotrichum triseptatum. B. & Br.

Forming broadly effused, jet-black minutely velvety patches; hyphae repeatedly forked, septate, olive-brown, 5–7 $\mu$ thick, tips with one or more globose swellings; conidia oblong, tips very obtusely rounded, 3-septate, constricted at the middle septum, 14–16 × 7–8 $\mu$, dark olive-brown, at length nearly opaque.

*Cladotrichum triseptatum*, B. & Br., Ann. Nat. Hist., n. 511, pl. 5, f. 7, ser. ii. vol. vii.

On stumps.

The conidia are distinctly 3-septate in Berkeley's type specimen. The present species so obviously belongs to the present genus that it is retained here in spite of the conidia being 3-septate.

### DIPLOCOCCIUM. Grove.

Fertile hyphae erect, septate, branched, olivaceous; conidia catenulate, 1-septate.

*Diplococcium*, Grove, Journ. Bot., vol. xxiii. p. 167; Sacc., Syll., p. 374.

Allied to *Cladotrichum*, but distinguished by the less rigid hyphae not being furnished with inflations here and there.

**Diplococcium spicatum.** Grove.

Fertile hyphae gregarious, somewhat fasciculate, erect, rather wavy, olive, septate, filiform, 200–300 × 4–5 $\mu$, furnished with a few alternate, long, spreading branches; conidia in chains of 3–4, opposite or verticillate near the tips of the branches; conidia 1-septate, constricted at the septum, oblong, 9–10 × 4–5 $\mu$, olivaceous, pellucid.

*Diplococcium spicatum*, Grove, Journ. Bot., vol. xxiii. p. 167, pl. 257, fig. 7; Sacc., Syll., iv. n. 1802.

On rotten wood.

## Sect. III. PHRAGMOSPORAE. Sacc.

### Subsect. 1. **Micronemeae.** Sacc.

### Tribe 15. *Clasterosporieae.* Sacc.

### CLASTEROSPORIUM. Schw. (fig. 8, p. 397.)

Saprogenous; hyphae creeping, bearing here and there solitary, fuscous, 2- many-septate, somewhat straight, fusoid or cylindrical conidia.

*Clasterosporium*, Schweinitz, Syn. Amer. Fung., n. 2998; Sacc., Syll., iv. p. 382.

**Clasterosporium hirundo.** Sacc.

Densely and indeterminately effused, jet-black; creeping hyphae scanty, filiform, septate, sooty, then disappearing; fertile hyphae very short; conico-cylindrical, erect, sparingly septate, sooty; conidia very long, worm-like, often curved, somewhat constricted here and there, attenuated upwards, apex rounded, base wedge-shaped, truncate, septa crowded, joints numerous (55–65), 200–230 × 15 $\mu$, sooty-black.

*Clasterosporium hirundo*, Sacc., Mich., i. p. 85; Sacc., Syll., iv. n. 1814.

On rotten oak wood.

The typical form has not yet been recorded for Britain.

*Var.* **Anglicum.** Grove, Journ. Bot., 1886, p. 14, t. 267, f. 5.

Forming aggregated, oblong or elongated, velvety, jet-black spots; hyphae somewhat fasciculate, short, cylindrical, septate, 25–50 × 6–8 $\mu$, fuscous; conidia sooty-brown, 300–400 $\mu$ or even up to 450 $\mu$ long, lanceolate below, 15 $\mu$ thick, attenuated upwards into a very long, cylindrical beak 6–8 $\mu$ thick, 50–60-septate, cells of beak quadrate, apex truncate, not paler.

On dead wood.

*Var.* **minus.** Grove, Journ. Bot., 1886, p. 14.

Densely gregarious, forming effused black spots; conidia lanceolate, attenuated into a long, cylindrical beak, 100–200 $\mu$ long, 10–12 $\mu$ (beak 4–5 $\mu$) thick, blackish-brown, semi-pellucid, 30–50-septate; conidiophore short or elongated, rigid, 3–5-septate.

On rotten wood.

**Clasterosporium hormiscioides.** Sacc.

Effused, black, velvety; fertile hyphae or conidiophores 2–4 septate, ochraceous, 20–30 × 6 $\mu$: conidia worm-like, conico-cylindrical, 150–180 × 12–15 $\mu$, tortuous, 35–45 joints, smoky-brown, 1–2 terminal joints hyaline and more or less swollen.

*Clasterosporium hormiscioides*, Sacc., Syll., iv. n. 1815.

On rotten wood and branches.

**Clasterosporium vermiculatum.** Cke. (fig. 8, p. 397.)

Effused, thin, black; mycelium creeping, simple or

branched, septate, brown; conidia erect, often fasciculate, cylindric-fusoid, blackish-brown, multi-septate, straight, curved, or geniculate, obtuse and paler at both ends, 150–200 $\mu$ long.

*Clasterosporium vermiculatum*, Cke., Black Moulds, t. 11, f. 10; Sacc., Syll., iv. n. 1817.

On oak wood.

**Clasterosporium fasciculare.** Sacc.

Tufts effused, black, opaque; conidia crowded, erect, obovate, very shortly pedicellate, usually 3-septate, scarcely or not at all constricted at the septa, blackish-brown, almost opaque, 30–40 × 20–25 $\mu$.

*Clasterosporium fasciculare*, Sacc., Syll., iv. n. 1834.

On wood, especially birch.

**Clasterosporium opacum.** Sacc.

Unequally effused, jet black, opaque; conidia very shortly pedicellate, oblong, elliptical, obovate, or otherwise variable, 1–3-septate, more or less constricted at the septa, brown, then almost black and opaque, 25–35 × 13–18 $\mu$.

*Clasterosporium opacum*, Sacc., Syll., iv. n. 1836.

On elm trunks, &c.

**Clasterosporium fungorum.** Sacc.

Tufts effused, plane, jet black, 2–3 mm. across, compact, superficial; conidia densely fasciculate, fusoid, apex rounded, 25–28 × 8 $\mu$, straight or unequal sided, 3-, rarely 4-septate, slightly constricted at the septa, the two intermediate cells smoky and guttulate, attenuated at the base into a short, cylindrical conidiophore.

*Clasterosporium fungorum*, Sacc., Miscell. Myc., i.; Sacc., Syll., iv. n. 1846.

*Sporidesmium atrum*, Grev., Cr. Fl., t. 194.

On various species of *Corticium*, &c.

**Clasterosporium abruptum.** Sacc.

Forming little, black, pulvinate tufts, and externally resembling a hairy *Sphaeria;* conidia oblong or slightly clavate, apex rounded, base attenuated into a very short conidiophore, 3–4-septate, apical and basal joints short; the second from the top very long, 50–75 × 12–18 $\mu$.

*Clasterosporium abruptum*, Sacc., Syll., iv. n. 1849.
*Sporidesmium abruptum*, B. & Br., Ann. Nat. Hist., n. 1042, 1865, p. 11, pl. xiv. fig. 8.

**Clasterosporium clavaeforme.** Sacc.
Tufts small, effused, black, opaque; conidia fasciculately crowded, erect, clavate, unequal, base narrowed, 8–10-septate, pedicellate, blackish-brown, terminal joint paler.
*Clasterosporium clavaeforme*, Sacc., Syll., iv. n. 1859.
On rotten pine wood, &c.

*Var.* **leptopus**, Sacc.
Conidia fusoid, elliptical, or clavate, unequal, 30–40 × 15–20 $\mu$, apex rounded, 3–6-septate, scarcely constricted, sooty, produced into a very short stem of the same colour at the base.
On rotten wood.

**Clasterosporium parasiticum.** Sacc.
Parasitic, black; conidia cylindrical, straight, 6–8-septate, twisted, brown, shortly stipitate, 50–70 × 10 $\mu$.
*Clasterosporium parasiticum*, Sacc., Syll., iv. n. 1863.
*Sporidesmium parasiticum*, Cke., Grev., vol. vi. p. 74.
Parasitic on *Pleospora mori* on leaves of mulberry (*Morus*).

**Clasterosporium caulicolum.** Sacc.
Effused, black; conidia somewhat fasciculate, cylindric-fusoid, sooty, 7–8-septate, slightly constricted at the septa; pedicel obsolete.
*Clasterosporium caulicolum*, Sacc., Syll., iv. n. 1868.
On dry herbaceous stems.

## STIGMINA. Sacc.

Conidia ovoid or oblong, 2- many-septate, coloured, terminal on short conidiophores, that are arranged in small clusters; growing on leaves.
*Stigmina*, Sacc., Mich., ii. p. 22; Sacc., Syll., iv. p. 294.
Differs from *Clasterosporium* in the conidia being crowded into compact patches. *Fusariella* is distinguished by the fusoid, falcate conidia.

**Stigmina Visianica.** Sacc.

Patches minute, scattered or gregarious, erumpent, becoming superficial, flattened, blackish-olive, slightly velvety, hypophyllous; conidia densely packed, but individually distinct at the base, springing from a dark, cellular basal stratum, elliptic-oblong, rather obtuse at both ends, 18–35 × 7–10 $\mu$, 2–4 usually 3-septate, rarely with 1 or more vertical septa, greenish-olive; conidiophores very short, hyaline.

*Stigmina Visianica*, Sacc., Fung. Ital., t. 930; Sacc., Syll., iv. n. 1871.

On fallen leaves of *Platanus orientalis*.

Resembles *Cladosporium epiphyllum* in habit.

## FUSARIELLA. Sacc. (fig. 4, p. 397.)

Fertile hyphae simple or variously branched, short or very short, somewhat hyaline, springing from a creeping mycelium; conidia acrogenous, fusiform, more or less curved, 2- many-septate, olive or fuscous.

*Fusariella*, Sacc., Misc. Myc., i. p. 29; Sacc., Syll., iv. p. 395.

Analogous with *Fusarium* in the structure of the conidia, but resembling a *Torula* in habit.

**Fusariella atrovirens.** Sacc. (fig. 4, p. 397.)

Forming minute patches at first whitish, then black with a tinge of olive, hyphae whitish and radiating; conidia forming a pulverulent central mass, fusiform, olive, 3-septate, 24–32 × 5–7 $\mu$, straight, or usually more or less angularly bent or curved, the bending often due to the larger size of the second joint of the conidium.

*Fusariella atrovirens*, Sacc., Syll., iv. n. 1876.

*Fusarium atrovirens*, Berk., Engl. Flor., v. p. 351.

On stem and leaves of onion (*Allium*).

Tribe 16. *Septonemeae.* Sacc.

SEPTONEMA. Corda. (fig. 18, p. 397.)

Sterile hyphae creeping, often obsolete; fertile hyphae very short or scarcely distinct from the conidia. Conidia oblong, pluriseptate, brown, catenulate.

*Septonema*, Corda, Icon. Fung., i. p. 9; Sacc., Syll., iv. p. 397.

Distinguished from *Torula* and *Hormiscium* by the septate conidia.

**Septonema spilomeum.** Berk.

Tufts minute, scattered, blackish; chains of conidia branched; conidia elliptic-oblong, 3-septate, rugulose, smoky, 25–28 × 8 μ.

*Septonema spilomeum*, Berk., Hook. Journ. 1845, iv. p. 310, t. xi., f. 5; Sacc., Syll., iv. n. 1895.

On fallen wood, sawdust, &c.

**Septonema irregulare.** B. & Br. (fig. 18, p. 397.)

Effused, thin, black, very irregular in outline; conidia concatenate, elliptic-oblong, 3-septate, slightly constricted at the septa, 17–28 × 6–8 μ.

*Septonema irregulare*, B. & Br., Ann. Nat. Hist., n. 942, t. 15, f. 13; Sacc., Syll., iv. n. 1896.

On living branches of *Pyrus malus*.

Subsect. 2. **Macronemeae.** Sacc.

Tribe 17. *Helminthosporieae.* Sacc.

HELMINTHOSPORIUM. Link. (fig. 10, p. 397.)

Hyphae rather rigid, subsimple, often nodulose, brown, usually growing on wood and forming velvety, effused stains; conidia cylindrical, fusoid, or elongato-clavate, smooth, 2- many-septate, rigid.

*Helminthosporium*, Link, Berlin Mag. 1809, iii. p. 10; Sacc., Syll., iv. p. 402.

The species with short subelliptical conidia, formerly included in the present genus will be found under *Brachysporium*.

Distinguished from *Cladosporium* by the conidia being more than 1-septate at maturity.

† *Conidia 2–3-septate.*

**Helminthosporium velutina.** Link.

Effused, black, velvety; hyphae filiform, 200–250 × 6–7 $\mu$, septate, smoky-black; conidia from oblong to ovate-obpyriform, 25–30 × 11–13 $\mu$, 3-septate, smoky, 3-guttulate, lowest cell subacute, hyaline.

*Helminthosporium velutinum*, Link, Obs., i. p. 8; Sacc., Syll., iv. n. 1914.

On rotten wood.

**Helminthosporium cylindricum.** Corda.

Effused, velvety, fuscous; hyphae subfasciculate, filiform, long, simple, septate, sooty, paler upwards, 100–130 × 4–5 $\mu$; conidia cylindrical, apex rounded, base acute, 3–5-septate, 14–15 × 2·5 $\mu$, pale smoke-brown.

*Helminthosporium cylindricum*, Corda, in Sturm, t. ii.; Sacc., Syll., iv. n. 1917.

On rotten wood, beech, &c.

**Helminthosporium simplex.** Nees.

Thin, effused, black, toruloid, hyphae densely crowded, simple or sparingly branched; conidia pale, shortly fusiform, 2–3-septate.

*Helminthosporium simplex*, Nees, Nova. Act. Leop., ix. p. 241, t. v. f. 11; Sacc., Syll., iv. n. 1921.

On willow wood.

**Helminthosporium capitulatum.** Corda.

Tufts minute, somewhat effused, glaucous brown; hyphae quite simple, erect, septate, clear brown, pellucid, apex white, and crowned with an incomplete, whitish head of conidia which are oblong, 3-septate, pellucid and white, 19–20 $\mu$ long, often curved, apical cells minute.

*Helminthosporium capitulatum*, Corda, Icon. Fung., ii. p. 13, t. x. f. 58; Sacc., Syll., iv. n. 1925.
On wood of *Tilia*, &c.

**Helminthosporium molle.** B. & C.
Soft and velvety, black; hyphae simple, septate, wavy, more or less nodulose, obtuse; conidia oblong or elliptic-oblong, 3–5-septate, both ends obtuse, 20–30 × 4–5 μ.
*Helminthosporium molle*, Berk. & Curt., N. Amer. Fung., n. 633; Sacc., Syll., iv. n. 1942.
On branches of holly (*Ilex*), *Passiflora*, &c.

**Helminthosporium exasperatum.** B. & Br.
Hyphae fasciculate, flexuous, nodulose upwards; conidia springing from the nodes, cylindric-oblong, ends rounded, 3-septate, 30–45 × 10–12 μ, smoky olive, base apiculate.
*Helminthosporium exasperatum*, B. & Br., Ann. Nat. Hist., n. 1380, t. vii. f. 4; Sacc., Syll., iv. n. 1945.
On stems of *Dianthus* and *Silene*.

**Helminthosporium parvum.** Grove.
Thinly gregarious, brownish-black; hyphae erect, septate, pale brown, slender, straight, the base sometimes rather incrassated, 80–90 × 3–4 μ, bearing at the apex a single (rarely 2) conidium; conidia oblong, 2-septate, 12–15 × 5–6 μ, apical cell somewhat quadrate and the basal one wedge-shaped, pale yellowish, central cell larger, rounded, brown.
*Helminthosporium parvum*, Grove, Journ. Bot. 1886, p. 203, t. 267, f. 4; Sacc., Syll., Suppl. vols. i.–iv. n. 3626.
On oak wood.
Apical cell of conidium sometimes brownish, basal cell always pale.

**Helminthosporium minimum.** Cke.
Thinly effused, black; threads simple, erect, septate, rather thicker than the diameter of the conidia; conidia fusiform, obtuse at the ends, 3-septate, scarcely constricted, hyaline, 12–14 × 3–4 μ.
*Helminthosporium minimum*, Cooke, Grevillea, vol. xvi. p. 80.
On dead decorticated branches.

†† *Conidia 3–5-septate.*

**Helminthosporium tiliæ.** Fr.

Effused, lax or slightly tufted; conidia cylindric-obclavate, 60 × 15 μ, 5-pseudo-septate, sooty, terminal or fasciculate, filiform, septate; hyphae of equal length.

*Helminthosporium tiliae*, Fries, Syst. Myc., iii. p. 360; Sacc., Syll., iv. n. 1950.

On dead, decorticated branches of *Tilia*.

Quite distinct from *Exosporium tiliae*, although the two bear a superficial resemblance to each other.

**Helminthosporium Rousselianum.** Mont.

Hyphae sooty-black, gregarious, simple, base bulbous, apex pellucid, oblong, incrassated, nodulose, remotely septate; conidia fusiform, hyaline, 3–5-septate, 50 × 5 μ, inverted laterally in the hyphae.

*Helminthosporium Rousselianum*, Mont., Cast., vi. n. 84 Mont., Syll. Crypt., n. 1129; Sacc., Syll., iv. n. 1957.

On wood.

**Helminthosporium subulatum.** Nees.

Hyphae subsimple, subulate, loosely aggregated, straight conidia rather large, clavate, incurved, 3–4-septate.

*Helminthosporium subulatum*, Nees, Nov. Act. N. C., ix. p. 242; Sacc., Syll., iv. n. 1958.

On oak branches.

**Helminthosporium nanum.** Nees.

Hyphae simple or furcate, nodulose, opaque, rigid, erect, short; conidia subcylindrical, ends obtuse, 3–5-septate, equal to or twice as thick as the hyphae.

*Helminthosporium nanum*, Nees, Syst., p. 67, f. 65; Sacc., Syll., iv. n. 1962.

On rotten wood, stems, &c.

**Helminthosporium delicatulum.** Berk.

Tufts soft, thin, black, hyphae subulate, slender, multi-septate, brown, paler above; conidia subhyaline, oblong, ends obtuse, 3–4 septate, curved cells sometimes vertically septate.

*Helminthosporium delicatulum*, Berk., Ann. Nat. Hist., n. 233, t. xiii. f. 20; Sacc., Syll., iv. n. 1964.

On stems of Umbellifers.

**Helminthosporium inconspicuum.** C. & E.

Forming a very thin, cloud-like stain, hyphae elongated, septate, nodulose, pale brown; conidia lanceolate, at first 4–6-nucleolate, then 3–5-septate, 80–120 × 20 $\mu$, epispore thin.

*Helminthosporium inconspicuum*, C. & E., Grev., t. 99, f. 19; Sacc., Syll., iv. n. 1969.

On fading leaves of Indian corn (*Zea mays*).

*Var.* **Britannicum.** Grove, Sacc., Syll., iv. n. 1979.

Effused, brownish, hyphae subflexuous, scarcely nodulose, 4–5-septate, pale brown, 160–180 × 10 $\mu$; conidia oblong, diaphanous, brownish endochroma divided then 3–5-septate, 60–100 × 18–22 $\mu$.

On fading leaves of grass.

The type has not been met with in Europe.

††† *Conidia* 6- *many-septate.*

**Helminthosporium macrocarpum.** Grev.

Broadly effused, black with olive or smoke-brown tinge, velvety; hyphae aggregated, subulate, simple or rarely sparingly branched, septate, 350–500 × 15–20 $\mu$; conidia elongato-clavate, 6–9-septate, not constricted at the septa, dingy olive, 50–90 × 15–20 $\mu$.

*Helminthosporium macrocarpum*, Grev., Scot. Cr. Fl., t. 148; Sacc., Syll., iv. n. 1973.

On branches and trunks of *Carpinus*, *Quercus*, *Fraxinus*, *Castanea*, *Ulmus*, *Corylus*, *Acer*, *Cirsium*, &c.

**Helminthosporium fusiforme.** Corda. (fig. 10, p. 397.)

Effused, blackish-brown, coarsely velvety; hyphae filiform, waved, 100–140 × 5–6 $\mu$, dirty brown, paler upwards, septate; conidia fusiform, 30–40 × 9–12 $\mu$, 7–9-septate, dingy olive, paler generally at both ends.

*Helminthosporium fusiforme*, Corda, Icon. Fung., i. p. 13, f. 194; Sacc., Syll., iv. n. 1974.

On branches and wood of hazel (*Corylus*), *Robinia*, &c.

**Helminthosporium apiculatum.** Corda.

Tufts black, tomentose, effused, hyphae in fascicles, flexuous, unbranched, 120–160 × 8 $\mu$, tip minutely denticulate, brown; conidia elliptic-fusiform, 6–8-septate, brown, 35–40 × 10–13 $\mu$.

*Helminthosporium apiculatum*, Corda, Ic. Fung., i. p. 13, f. 191; Sacc., Syll., iv. n. 1975.

On wood.

**Helminthosporium scolecoides.** Corda.

Tufts broadly effused, indeterminate, black; hyphae branched, angularly bent, rigid, brown, semipellucid; conidia very long, 8–10-septate, brown, subtorulose, 50–60 $\mu$ long, terminal segment pale.

*Helminthosporium scolecoides*, Corda, Ic. Fung., i. p. 13, f. 180; Sacc., Syll., iv. n. 1978.

On wood, herbaceous stems, &c.

**Helminthosporium folliculatum.** Corda.

Tufts minute, indeterminate, tomentose; hyphae lax, branched, slender, flexuous, brown, 150–200 × 8–10 $\mu$; conidia very long, pod-shaped, thickish, brown, semipellucid, 6–7-septate, cells internally cuboid, 40–60 × 11–14 $\mu$, paler at the ends.

*Helminthosporium folliculatum*, Corda, Ic. Fung., i. p. 13, f. 180; Sacc., Syll., iv. n. 1979.

On rotten wood, stems of species of *Brassica*, *Zea*, and various Umbellifers.

**Helminthosporium gongrotrichum.** Corda.

Tufts minute, black, somewhat effused; hyphae simple, curved, rigid, nodulose, at first brown then quite black and opaque; conidia elliptical, 34–35 $\mu$ long, attenuated at both ends, 7–8 septate, brown, pellucid.

*Helminthosporium gongrotrichum*, Corda, Icon. Fung., i. p. 13, t. iii. f. 192; Sacc., Syll., iv. n. 1981.

On rotten beech wood, &c.

**Helminthosporium dendroideum.** B. & Br.

Spots indistinct, scattered, very thin, hyphae erect, attenuated upwards, septate, with short, lateral, conidia-bearing branchlets; conidia oblong-fusoid, slightly curved, 8–10-septate, 55–65 × 8–10 $\mu$, brown, basal cell pale.

*Helminthosporium dendroideum*, B. & Br., Ann. Nat. Hist., n. 946, t. xvi. f. 14; Sacc., Syll., iv. n. 1983.
On branches of *Acer*.

**Helminthosporium densum.** Sacc. & Roum.
Shortly velvety, dense, blackish-brown; conidia fusoid, somewhat acute at both ends, straight or often vaguely curved, 45–60 × 7–8 $\mu$, 7–8-septate, not constricted, sooty; hyphae cylindrical, somewhat attenuated below, 20–40 × 4–5·5 $\mu$, more or less septate and constricted, olivaceous.
*Helminthosporium densum*, Sacc. & Roum., Rev. Myc., 1881, p. 29; Sacc., Syll., iv. n. 1985.
On *Morus alba*.

**Helminthosporium obclavatum.** Sacc.
Effused, forming black spots; hyphae erect, filiform, base slightly swollen, 60–70 × 6–7 $\mu$, sparingly septate, smoke-brown; conidia solitary at the apex, obclavate-fusoid, becoming considerably attenuated above, 90 × 15 $\mu$, apex rounded, base truncate, 18–24-septate, brownish-black.
*Helminthosporium obclavatum*, Sacc., Mich., i. p. 85; Sacc., Syll., iv. n. 1989.
On rotten alder wood, &c.

**Helminthosporium Smithii.** B. & Br.
Forming broadly effused coarsely velvety patches on wood, or sometimes forming lines, or erumpent and forming reticulated patches on bark, black; hyphae unbranched, flexuous, septate; conidia apical, very long, multi-septate, straight or wavy, olive brown, cells cuboid, epispore very thick, 80–150 × 8–12 $\mu$.
*Helminthosporium Smithii*, B. & Br., Ann. Nat. Hist., n. 507, t. v. f. 5; Sacc., Syll., iv. 1991.
On dead branches of holly, &c.

**Helminthosporium fusisporum.** Berk.
Hyphae densely aggregated, sparingly branched, obtuse, blackish; conidia fusoid, 6–7-septate, narrower than the hyphae.
*Helminthosporium fusisporum*, Berk., Eng. Fl., v., p. 336; Sacc., Syll., iv. n. 2000.
On rotten wood and branches.

**Helminthosporium macilentum.** Cooke.
Broadly effused, black; hyphae erect, septate, olive-brown; conidia fusoid or subclavate, 7–10-septate, terminal on the hyphae and for a long time persistent, 50–65 × 10 $\mu$.
*Helminthosporium macilentum*, Cooke, Grev., t. 97, f. 18; Sacc., Syll., iv. n. 2002.
On rotten wood.

**Helminthosporium turbinatum.** B. & Br.
Tufts thin, effused, velvety, brown; hyphae slender, simple, straight, obscurely septate, pale brown; conidia broadly turbinate, dark brown, subtruncate and apiculate at the apex, the apiculus often falling away, 3–7-septate, 21–26 × 14–15 $\mu$.
*Helminthosporium turbinatum*, B. & Br., Ann. Nat. Hist., n. 508, t. 5, f. 6; Sacc., Syll., iv. n. 2005.

**Helminthosporium velatum.** Corda.
Mycelium effused, black, subtomentose; hyphae simple, short, thick somewhat nodulose, septate and opaque below, apex thickened, continuous, semipellucid, furnished with a white, diaphanous veil, blackish-brown; conidia oblong, 5–6-septate, laterally adnate then deciduous, 36–37 $\mu$ long, yellowish brown, pellucid.
*Helminthosporium velatum*, Corda, Icon. Fung., i. p. 13, t. 111, f. 183; Sacc., Syll., iv. n. 2006.
On rotten wood.

**Helminthosporium rhabdiferum.** B. & Br.
Forming variously sized and rounded, intensely black patches, sparingly branched, septate, very short; conidia straight, at first oblong and pale, 1–2-septate, then elongating and becoming sublinear, 7–11-septate, deep brown, torulose, 50–100 $\mu$ long.
*Helminthosporium rhabdiferum*, B. & Br., Ann. Nat. Hist., n. 1053, (1865); Sacc., Syll., iv. n. 2010.
On ripe peaches.

**Helminthosporium rhopaloides.** Fres.
Effused, velvety, blackish-olive; hyphae terete, 150 × 9 $\mu$, straight, septate, smoky-brown; conidia cylindric-clavate,

obtuse at the ends, 9–12-septate, 60 × 10–11, produced at the tips of terminal branchlets, brown, terminal cell pale.

*Helminthosporium rhopaloides*, Fres., Beitr. Myk., p. 50, t. vi., f. 15–21; Sacc., Syll., iv. n. 2013.

On rotten stems of *Dianthus*, *Brassica*, &c.

## BRACHYSPORIUM. Sacc. (fig. 16, p. 397.)

Hyphae rigid, subsimple, brown; conidia ovoid or piriform, brown, 2- or few-septate, brown. Often growing on wood.

*Brachysporium*, Sacc., Syll., iv. p. 423.

*Helminthosporium*, of authors (in part).

Distinguished from *Helminthosporium* by the shortness of the conidia. It is very doubtful whether relative size of conidia is sufficient to constitute a valid generic character when all other characters are common; however, we have accepted Saccardo's genus, as in the present group any character that tends to individualise a group is of service, whether of generic value or not.

**Brachysporium stemphylioides.** Sacc.

Tufts effused, black, velvety; hyphae short, simple, pale, crowded; conidia terminal, solitary, large, obovate, 5–6-septate, not constricted at the septa, the two central cells dark, the terminal ones colourless or yellowish, 35–37 × 16–18 $\mu$.

*Brachysporium stemphylioides*, Sacc., Syll., iv. n. 2037.

*Helminthosporium stemphylioides*, Corda, Prachtfl., p. 7, t. 4.

On dead wood.

**Brachysporium Salisburiae.** Sacc.

Hyphae torulose, 4–5 $\mu$ diam., yellow-brown, aggregated into minute blackish-olive tufts; conidia at first ovoid, hyaline, 2-guttulate, afterwards larger, 2–3-septate, 14–21 × 6–7 $\mu$.

*Brachysporium Salisburae*, Sacc., Syll., iv. n. 2037.

On fallen leaves of *Salisburia*.

**Brachysporium oosporum.** Sacc.

Tufts small, black, hyphae scattered, simple, blackish

brown, rather pellucid; conidia oblong-ovoid, yellow-brown, pellucid, 18–20 $\mu$ in length.

*Brachysporium oosporum*, Sacc., Syll., iv. n. 2040.

*Helminthosporium oosporum*, Corda, Icon. Fung., i. p. 14, f. 200.

On decaying trunks, branches, &c.

**Brachysporium altum.** Sacc.

Tufts effused, tomentose, black; hyphae slender, elongated, simple, subpellucid then very black and opaque, bearing conidia at the apex; conidia oblong or piriform, attenuated below, 7–9-septate, blackish-brown, pellucid, lowest cell very small, uppermost one much larger.

*Brachysporium altum*, Sacc., Syll., iv. n. 2044.

*Helminthosporium altum*, Preuss, Fung. Hoyersw., n. 59; and in Sturm's Deutschl. Cr. H., t. 17.

On rotten wood.

**Brachysporium hyalospermum.** Sacc.

Tufts somewhat effused, black; hyphae simple, straight, rigid, fuscous, more or less pellucid; conidia minute, obovate, 3-septate, 18–20 $\mu$ long, colourless.

*Brachysporium hyalospermum*, Sacc., Syll., iv. n. 2047.

On rotten wood.

**Brachysporium apicale.** Sacc.

Hyphae simple, equal, septate, attenuated upwards, terminal cell verruculose and conidia-bearing; conidia apical, elliptical, 3-septate, brown, dark in the centre and hyaline at either extremity, 17–18 $\mu$ long.

*Brachysporium apicale*, Sacc., Syll., n. 2048.

*Helminthosporium apicale*, B. & Br., Ann. Nat. Hist., n. 947, t. xvi. f. 15.

On fallen branches.

**Brachysporium Bloxami.** Sacc.

Sparingly effused, black, hyphae erect, rigid, opaque, slender, simple or rarely furcate, base generally slightly inflated; conidia terminal, elliptic-clavate, 3-celled, brown, 25–27 $\times$ 12–14 $\mu$, epispore thin.

*Brachysporium Bloxami*, Sacc., Syll., iv. n. 2049.

*Helminthosporium Bloxami*, Cke., Grevillea, xii. p. 36.

On naked wood.

**Brachysporium obovatum.** Sacc. (fig. 16, p. 397.)
Forming dense black velvety patches, hyphae erect, simple, septate, subulate, base slightly incrassated; conidia apical, solitary, obovate, 2-septate, slightly constricted at the septa, brown, upper cell large, rounded at the free end, lowest cell minute, acute, 23–26 × 11–14 μ.

*Brachysporium obovatum*, Sacc., Syll., iv. n. 2052.

*Helminthosporium obovatum*, Berk., Ann. Nat. Hist., n. 232, t. xiii. f. 19.

On rotten wood. The conidia are opaque and black and highly polished, shining like black glass beads when examined *in situ* under a 1-in. objective.

**Brachysporium tingens.** Sacc.
Forming slightly effused, thin black patches that tinge the matrix of a purple colour; hyphae long, rigid, erect, septate, simple, cells short, brown; conidia generally terminal, elliptic-clavate, 3 or rarely 4-septate, paler than the hyphae, epispore thin, 30 × 10 μ.

*Brachysporium tingens*, Sacc., Syll., iv. n. 2053.

*Helminthosporium tingens*, Cke., Grev., vii. p. 37.

On rotten wood, Remarkable for imparting a purplish tinge to the matrix.

**Brachysporium biseptatum.** Sacc. & Roum.
Tufts minute, black, hyphae fasciculate, filiform 300 × 10 μ, septate, almost straight, rounded at the tip, deep smoky-brown; conidia elliptical, 25–30 × 15 μ, rounded at both ends, 2-septate, not constricted, smooth, smoky-olive.

*Brachysporium biseptatum*, Sacc. & Roum., Mich., ii. p. 641; Sacc., Syll., iv. n. 2061.

On putrid stems.

**Brachysporium ellipticum.** B. & Br.
Tufts black, very minute; fertile threads short, erect, simple or rarely forked above, septate, dark and opaque below, paler upwards; conidia elliptical, smooth, brown, 1-septate at maturity, terminal, sometimes 1–2 also spring from minute lateral spicules near the apex, 12–15 × 6 μ.

*Monotospora elliptica*, B. & Br., Ann. Nat. Hist., n. 1909, t. iii. fig. 4.

On dead herbaceous stems.

## CERCOSPORA. Fres. (fig. 24, p. 397.)

Hyphae not rigid, simple or branched, brown, often parasitic and forming spots on leaves; conidia elongated and slender, brown or olive, rarely subhyaline, septate.

*Cercospora*, Fres., Beitr., p. 90; Sacc., Syll., iv. p. 431.

*Virgasporium*, Cke.

*Cladosporium* and *Helminthosporium* of various authors (in part).

Distinguished by the vermiform septate spores.

* *On herbaceous Dicotyledons.*

**Cercospora Bloxami.** B. & Br.

Forming pale orbicular spots, conidia elongato-fusiform, acute at both ends, multiseptate.

*Cercospora Bloxami*, B. & Br., Ann. Nat. Hist., n. 1979; Sacc., Syll., iv. n. 2082.

On fading leaves of *Brassica napus* and *B. sinapis*.

**Cercospora resedae.** Fckl. (fig. 24, p. 397.)

Forming minute grey, gregarious tufts on dry spots of the leaf, 2–4. mm. diameter; hyphae densely crowded, unbranched, continuous or sparingly septate, straight below, subtortuous above, 50–70 × 4–5 $\mu$, brown; conidia borne at the tips of the hyphae, obclavate-linear, 4–5 septate, hyaline, 100–140 × 2·5–3 $\mu$.

*Cercospora resedae*, Fuckel, Symb. Myc., p. 353; Sacc., Syll., iv. n. 2092.

*Virgasporium maculatum*, Cke., Grev., iii. p. 182, t. xlviii. f. 4.

On living leaves of *Reseda odorata*.

**Cercospora calthae.** Cke.

Spots orbicular, epiphyllous, brown; hyphae short, hyaline; conidia cylindrical, somewhat attenuated, septa scarcely distinct, 30–35 × 2 $\mu$.

*Cercospora calthae*, Cke., Grev., xvii. p. 65; Sacc., Syll., vol. iv. n. 7571.

On fading leaves of *Caltha*.

**Cercospora ferruginea.** Fckl.

Tufts thin, delicate, broadly effused; hyphae very long, slender, creeping, branched, septate, ferruginous; conidia variable in length, often very long, elongato-clavate, often curved, 3–7-septate, brown, 40–100 × 6–7 $\mu$.

*Cercospora ferruginea*, Fckl., Symb. Myc., p. 354; Sacc., Syll., iv. n. 2138.

On the under surface of living leaves of *Artemisia vulgaris*, also on species of *Erigeron* in Canada.

**Cercospora mercurialis.** Pass.

Spots rounded, silvery-white with a fuscous border; tufts minute, hypophyllous, gregarious, often occupying the central portion of the spots; hyphae pale smoky, continuous, contorted, nodulose, short, 20–40 × 5–6 $\mu$; conidia cylindric rod-shaped, attenuated upwards, 2–7-septate, wall thick, hyaline, 70–80 × 4–6 $\mu$, straight or slightly curved.

*Cercospora mercurialis*, Passerini, in M. U., n. 783; Sacc., Syll., iv. n. 2193.

On living or fading leaves of *Mercurialis perennis*.

** *In woody Dicotyledons.*

**Cercospora moricola.** Cke.

Hypophyllous; spots orbicular, reddish-brown; hyphae fasciculate, short, olive; conidia attenuated upwards, 3–4-septate, hyaline, 70 × 3 $\mu$.

*Cercospora moricola*, Cke., in Rav. Amer. Fung., n. 587; Sacc., Syll., iv. n. 2281.

On leaves of *Morus alba* and *M. rubra*.

*** *On Monocotyledons.*

**Cercospora concentrica.** C. & E.

Spots large, subcircular or elliptical, ferruginous, at length greyish; hyphae fasciculate, pustulate, arranged concentrically, flexuose, unbranched, continuous or septate, 12–20 × 4; conidia cylindrical, thinner towards the tip, straight or curved, 3–5-septate, 40–70 × 3–4, reddish-brown at maturity.

*Cercospora concentrica*, Cke. & Ellis, Grev., v. p. 90; Sacc., Syll., iv. n. 2302,

*Cercospora yuccae*, Cke. in Grev., vii. p. 35.

On half-dead leaves of *Yucca gloriosa* and *Y. filamentosa*, in gardens.

## HETEROSPORIUM. Klotzsch. (fig. 9, p. 397.)

Fertile hyphae, erect, fasciculate, septate, simple or branched, often nodulose, olive or blackish; conidia terminal or lateral, septate, olive, epispore minutely warted, at first catenulate in some species, but soon becoming free.

*Heterosporium*, Klotzsch, Herb. Myc., i. n. 67; Cke., Grev., v. p. 122; Sacc., Syll., iv. p. 480.

Resembling *Helminthosporium* in general habit and structure, in fact only distinguished by the minutely warted conidia. Growing on fading leaves or herbaceous stems, on algae, and fungi.

* *On Dicotyledons.*

### Heterosporium echinulatum. Cke.

Clusters small, often numerous, seated on brown spots, usually on the upper surface of the leaf; hyphae fasciculate, springing from a small aggregation of cells, 100–200 × 8–10 $\mu$, dusky olive, nodulose above, septate; conidia terminal or lateral, springing from the nodes, olive, minutely warted, 2–5-septate, cylindrical, constricted at the septa, 30–50 × 10–15 $\mu$.

*Heterosporium echinulatum*, Cke., Grev., v. p. 123; Sacc., Syll., iv. n. 2311.

*Helminthosporium echinulatum*, Berk., Gard. Chron., 1870, p. 382.

*Heterosporium dianthi*, Sacc. et Roum., Mich., ii. pp. 559 and 643.

On leaves of species of *Dianthus*.

### Heterosporium variabile. Cke.

Forming distinct, small, more or less circular, densely velvety, dusky olive patches; hyphae slender, 5–6 $\mu$ thick,

septate, nodulose, olive, fasciculate; conidia cylindrical, olive, 1–3-septate, minutely warted, 15–35 × 6–10 μ.

*Heterosporium variabile*, Cke., Grev., v. p. 123; Sacc., Syll., iv. n. 2310.

Forming small scattered patches on the upper surface of fading spinach leaves. Spots often numerous and becoming more or less confluent.

**Heterosporium laricis.** Cke. & Mass.

Tufts scattered, suborbicular, woolly, sooty; threads thick, septate, with the joints swollen, 15–18 μ thick, conidia 1–3-septate, elliptical, obtuse at the ends, minutely warted, pale fuliginous, 50–60 × 20 μ.

*Heterosporium laricis*, C. & M., Grev., xvi. p. 80.

On fading larch leaves.

** *On Monocotyledons.*

**Heterosporium minutulum.** C. & M.

Forming velvety, dark olive patches of variable size and form; threads somewhat fasciculate, short, flexuous, sparingly septate, pale olive; conidia 1–2-septate, elliptical, rounded at the ends, not constricted, pale olive, epispores rough, 16–20 × 6–8 μ.

*Heterosporium minutulum*, Cke. & Mass., Grev., xvi. p. 11.

On palm leaves (*Chamaerops humilis*).

**Heterosporium ornithogali.** Klotzsch.

Forming broadly effused, olive, cloudy spots on the upper surface of leaves; fertile hyphae erect, simple or rarely branched, septate, nodulose, olive, often flexuous, 100–250 × 8 × 14 μ, fasciculate, originating from a basal aggregation of hyphal cells resembling a minute sclerotium; conidia olive, cylindrical, 1–5-septate, very minutely warted, 25–90 × 8–14 μ.

*Heterosporium ornithogali*, Klotzsch, Herb. Myc., i. n. 69; Cke., Grev., v. p. 123; Sacc., Syll., n. 2311.

*Helminthosporium exasperatum*, B. & Br., Ann. Nat. Hist., n. 1380, t. 7, f. 4; Sacc., Syll., n. 1945.

On fading leaves of *Ornithogalum*, *Convallaria*, *Smilax*, and other liliaceous plants.

**Heterosporium typharum.** C. & M. (fig. 9, p. 397.)
Tufts erumpent, elongated, gregarious, sooty; threads erect, mostly simple, septate, nodulose; conidia 1–3-septate, elliptical, ends somewhat acute, rough with minute granules, pale olive, 30–40 × 10–14 $\mu$.

*Heterosporium typharum*, Cke. & Mass., Grev., xvi. p. 80.

On leaves of *Typha angustifolia*.

*** *On Acotyledons.*

**Heterosporium epimyces.** C. & M.
Occurring in more or less effused, dense, velvety, olive patches; threads sparingly furcate, often simple, sparsely septate, pale fuscous; conidia 1–3-septate, elliptical, minutely warted, pale olive, 25–30 × 8 $\mu$.

*Heterosporium epimyces*, Cke. & Mass., Grev., xvi. p. 80.

On old specimens of *Polyporus squamosus*, *Boletus felleus*, *Russula nigricans*, &c.

NAPICLADIUM. Thumen (emended). (fig. 19, p. 397.)

Fertile hyphae fasciculate, erect, short, not rigid; conidia rather large, solitary at tip of hyphae, septate, smooth, coloured.

*Napicladium*, Thumen, Hedw., 1875, p. 3; Sacc., Syll., iv. p. 481.

Somewhat resembling *Helminthosporium* and *Brachysporium*, but distinguished by the less rigid fertile hyphae, and the large solitary conidia.

On living or fading leaves.

**Napicladium arundinaceum.** Sacc. (fig. 19, p. 397.)
Forming broadly effused, velvety, blackish-olive patches; hyphae fasciculate, short, thickened at the base, 1–2-septate, 50–60 × 7–8 $\mu$, olive; conidia obclavate, 40–50 × 15–18 $\mu$, 1–2-septate, olive.

*Napicladium arundinaceum*, Sacc., Syll., iv. n. 2317.

*Helminthosporium arundinaceum*, Corda, Ic. Fung., iii. p. 10, f. 25.

On fading leaves of *Phragmites communis*.

Tribe 18. *Acrothecieae.* Sacc.

SPONDYLOCLADIUM. Martius. (fig. 5, p. 397.)

Sterile hyphae creeping, septate, fertile erect, simple, rather rigid. Conidia spindle-shaped, or pear-shaped, coloured, generally 2-septate, produced in distant whorls on the hyphae.

*Spondylocladium*, Martius, Erl., p. 355; Sacc., Syll., iv. p. 482.

Distinguished by the verticillate arrangement of the conidia.

**Spondylocladium fumosum.** Martius. (fig. 5, p. 397.)

Forming effused blackish patches, creeping mycelium septate, fertile erect, septate, not branched, tapering upwards; conidia brownish-olive, 2-septate, pear-shaped or broadly spindle-shaped, in 2–4 verticils of 3–6 conidia each, produced towards the apex of the hypha, a single conidium usually terminates the hypha, 21–25 × 10–12 $\mu$.

*Spondylocladium fumosum*, Martius, Erl., p. 355; Berk. & Broome, Ann. Nat. Hist., n. 1314, t. xviii, f. 7 (1870); Sacc., Syll., iv. n. 2319.

On rotten branches.

ACROTHECIUM. Preuss. (fig. 22, p. 397.)

Sterile or vegetative hyphae creeping, fertile erect, unbranched; conidia septate, coloured or almost colourless, springing in a cluster from the tip of the hypha.

*Acrothecium*, Preuss, F. Hoyersw., n. 99, emended by Saccardo in Michelia, p. 29 (not of Corda). Sacc., Syll., iv. p. 483.

**Acrothecium delicatulum.** B. & Br.

Effused, blackish, fertile hyphae erect, septate, slightly bulbous at the base, rarely forked at the tip; conidia colourless, springing just below the tip of the hypha, cylindrical,

curved, 2–3 septate, not constricted at the septa, 12–20 × 4 μ.

*Acrothecium delicatulum*, B. & Br., Ann. Nat. Hist., n. 1055, t. xiv., f. 11; Sacc., Syll., iv. n. 2328.

On decayed beech wood, also on bramble twigs. In the last habitat the hyphae are much scattered.

**Acrothecium simplex.** B. & Br. (fig. 22, p. 397.)

Effused, brownish-olive, erect hyphae simple, wavy, septate, brown; conidia few, springing from the apex, oblong or subclavate, 4–5-septate, at first colourless, then pale brown, 16–20 × 5–6 μ.

*Acrothecium simplex*, B. & Br., Ann. Nat. Hist., n. 950, t. xvi. f. 16; Sacc., Syll., iv. n. 2330.

*Var.* **elatum**, Grove. Hyphae simple, erect, rather wavy, equal, brown, paler above, 240–280 × 6–7 μ; conidia 3-septate, often in threes, hyaline, subclavate, 20–22 × 6 μ.

On nettle stems.

**Acrothecium obovatum.** Cke.

Black, effused, velvety; fertile hyphae simple, septate, sooty, 150 × 5 μ; conidia obovate, 2-septate, 18–20 × 7–8 μ, slightly constricted at the septa, sooty, terminal on the fertile hyphae in groups of 4–5.

*Acrothecium obovatum*, Cke., Grev., v. p. 50, t. 80, f. 13; Sacc., Syll., iv. n. 2322.

On dead wood.

**Acrothecium tenebrosum.** Sacc.

Tufts broad, black, fertile hyphae, gregarious, 200 × 3–4 μ, erect, septate, simple, base thickened or dilated, blackish-brown, paler upwards; conidia oblong, ends rounded, curved, tinged brown, somewhat diaphanous, 3–5-septate, 20–25 × 5–6 μ, springing from minute spinous processes, and forming a terminal head.

*Acrothecium tenebrosum*, Sacc., Mich., i. p. 74; Sacc., Syll., iv. n. 2323.

On dead wood.

Spores at first hyaline, guttulate, then pale brown. It does not differ much from *Helminthosporium apicale*, B. & Br., except in the more numerous and uniformly coloured spores. (Grove.)

**Acrothecium xylogenum.** Grove.

Hyphae erect, straight or curved, equal, brown below, paler above, apex almost colourless, 120–150 $\mu$ high, bearing a crown of 6–8 conidia at the apex; conidia cylindrical, apex rounded, base acute, 4-guttulate, at length with three delicate septa, 14–17 × 3 $\mu$, hyaline.

*Acrothecium xylogenum*, Grove, Journ. Bot., 1886, p. 203, tab. 67, fig. 2; Sacc., Syll., iv. n. 3635.

On rotten wood.

Allied to *A. caulium*, but known by the persistently hyaline, 3-septate conidia.

## Tribe 19. *Sporoschismeae.* Sacc.

### SPOROSCHISMA. B. & Br. (fig. 6, p. 397.)

Fertile hyphae erect, simple; conidia cylindrical, septate, coloured, produced in chains within the erect hyphae, and eventually escaping through the ruptured apex.

*Sporoschisma*, B. & Br., in Gard. Chron., 1847, p. 540; Sacc., Syll. iv., p. 486.

Distinguished at once by the conidia being produced within the erect hyphae, and somewhat resembling an ascus containing spores, if in reality this is not the case.

**Sporoschisma mirabile.** (B. & Br.) (fig. 6, p. 397.)

Forming velvety, black patches, hyphae unbranched, cylindrical, abruptly narrowed at the base, erect, 200–250 × 14–15 $\mu$: within these hyphae the conidia are formed in a chain; conidia brown, 3-septate, cylindrical, truncate, not constricted at the septa, 40–50 × 12 $\mu$. Along with the conidia-forming hyphae are others that are sterile, septate, and frequently thickened at the tip.

*Sporoschisma mirabile*, B. & Br., Gard. Chron., 1847, p. 540; Sacc., Syll., iv. n. 2333.

Forming coarsely velvety blackish patches in rotten wood, and on stems of herbaceous plants.

Tribe 20. *Dendryphieae.* Sacc.

DENDRYPHIUM. Wallr. (fig. 13, p. 397.)

Vegetative hyphae creeping or almost absent, fertile hyphae erect, more or less branched at the tip; conidia coloured, more or less cylindrical, septate, springing from the tips of the branches, usually produced in simple or branched chains.

*Dendryphium*, Wallr., Fl. Crypt., ii. p. 300; Sacc., Syll., iv. p. 487.

**Dendryphium comosum.** Wallr.

Broadly effused, blackish, hyphae septate, 9–12 $\mu$ thick, dark brown, septate, simple, bearing at the apex simple or branched chains of cylindrico-fusoid, straight or slightly curved, yellowish-brown, 3–5 septate conidia, 25–35 × 6–7 $\mu$, slightly constricted at the septa.

*Dendryphium comosum*, Wallr., Fl. Crypt., n. 1943; Sacc., iv. n. 2335.

Forming blackish stains on decaying herbaceous stems, especially nettle.

**Dendryphium fumosum.** Fr.

Tufts small blackish-brown, hyphae erect, short, dark brown, septate, paler upwards, branchlets towards the apex pale, closely septate, spreading; conidia catenulate, cylindric-fusoid, pale brown, 9–13 septate, not constricted at the septa, 25–35 × 5–6 $\mu$.

*Dendryphium fumosum*, Fr., Summa Veg. Scand., 504; Sacc., Syll., iv. n. 2337.

On herbaceous stems, especially umbellifers.

**Dendryphium griseum.** B. & Br. (fig. 13, p. 397.)

Tufts minute, sometimes more or less confluent, blue-grey, hyphae sparingly dichotomously branched above; conidia cylindrical, tips apiculate, arranged in branching chains, 1-septate, 14–17 × 4–5 $\mu$, almost colourless.

*Dendryphium griseum*, B. & Br., Ann. Nat. Hist., n. 540 t. vi. f. 11; Sacc., Syll,, iv. n. 2344.

On putrid nettle stems.

**Dendryphium ramosum.** Cke.

Forming blackish effused stains on stems of herbaceous plants, erect hyphae dark brown, closely septate, branched above, branches paler, forked; conidia straight, cylindrical, 3–5-septate 24–28 × 6–8 $\mu$, pale brown.

*Dendryphium ramosum*, Cke., Hdbk., n. 1690; Sacc., Syll., iv. n. 2147.

On stems of *Papaver*, *Hesperis*, &c., forming broadly effused black stains.

**Dendryphium curtum.** B. & Br.

Forming blackish stains, hyphae short, septate, 7–8 $\mu$ thick, blackish brown below, paler above, as are also the few short branchlets; conidia cylindrical, 3–5-septate, slightly constricted at the septa, 20–25 × 4–6 $\mu$, pale brown.

*Dendryphium curtum*, B. & Br., Ann. Nat. Hist., n. 538, tab. vi. f. 9; Sacc., Syll., iv. n. 2348.

On stems of herbaceous plants, woody branches of trees, &c.

**Dendryphium laxum.** B. & Br.

Forming effused blackish, velvety patches, erect hyphae short, closely septate, branched above, branches often wavy; conidia linear-oblong or obclavate, 7–11 septate, slightly constricted at the septa, brown, 25–35 × 4–5 $\mu$, springing from the tips of the branchlets.

*Dendryphium laxum*, B. & Br., Ann. Nat. Hist., n. 539, t. vi., f. 10; Sacc., Syll., iv. n. 2350.

Forming black velvety patches on putrid stem of *Inula viscosa*.

## Sect. IV. DICTYOSPORAE. Sacc.

### Subsect. 1. **Micronemeae.**. Sacc.

### SPORODESMIUM. Link. (fig. 7, p. 397.)

Mycelium generally scanty; conidia from ovoid to oblong, often rather large, almost sessile, or shortly stipulate, muriformly septate, dark coloured.

*Sporodesmium*, Link, Sp. Pl. Fung., xi. p. 120; emended Sacc., Mich., xi. p. 23; Sacc., Syll., iv. p. 497.

Distinguished by the somewhat large, subsessile conidia being muriformly septate, *i.e.*, having both transverse and vertical septa.

**Sporodesmium melanopodum.** B. & Br.
Tufts ample, black; conidia subglobose, opaque, multiseptate, springing from a cellular base of variable size.
*Sporodesmium melanopodum*, B. & Br., Ann. Nat. Hist., n. 455; Sacc., Syll., iv. n. 2356.
On bark.

**Sporodesmium lobatum.** B. & Br. (fig. 7, p. 397.)
Tufts minute, black, pulvinate; conidiophores short, articulated, hyaline below, broken up into subquaternate, subglobose joints above; conidia terminal, 15 $\mu$ long.
*Sporodesmium lobatum*, B. & Br., Ann. Nat. Hist., n. 1146, t. iii. f. 7; Sacc., Syll., iv. n. 2364.
On pine wood.

**Sporodesmium scutellare.** B. & Br.
Tufts small, scattered, minute, shield-like; conidia broadly obovate, muriformly septate, brown, pedicel short, one or few-celled.
*Sporodesmium scutellare*, B. & Br., Ann. Nat. Hist, n. 456; Sacc., Syll., iv. n. 2366.
On larch bark.

**Sporodesmium antiquum.** Corda.
Tufts black, minutely downy, often effused; irregularly cylindrical and sometimes slightly wavy, 100–150 × 20 $\mu$ muriformly septate, and broken up into numerous small cells, smoky brown, base narrowed into a minute stem, somewhat fasciculate.
*Sporodesmium antiquum*, Corda, Icon. Fung., iii. f. 11; Sacc., Syll., iv. n. 2368.
On trunks, wood, &c.

*Var.* **compactum**, B. & Br., Ann. Nat. Hist., n. 453.
Our species agrees in general character with Corda's, of which we have a specimen from the author, but it is more compact and composed of smaller cells (B. & Br.)
On hard wood.

**Sporodesmium polymorphum.** Corda.

Tufts black, opaque, effused, pulverulent; conidia ovoid or angularly elliptical, 40–50 × 25–30 $\mu$, variously muriformly septate, blackish-brown, almost opaque; sporophores short, terete, septate, paler than the conidia.

*Sporodesmium polymorphum*, Corda, Icon. Fung., i. p. 7, f. 119; Sacc., Syll., iv. n. 2377.

On bark and wood of oak, birch, &c.

**Sporodesmium piriforme.** Corda.

Effused and somewhat crustaceous, black; conidia obovate, at first septate, then cellular, 28–30 $\mu$ long, brown, semi-pellucid, 2-4-celled; sporophores colourless, short or of medium length, filiform, flaccid, sometimes slightly curved.

*Sporodesmium piriforme*, Corda, Icon. Fung., i. p. 116; Sacc., Syll., iv. n. 2384.

On rotten saw-dust.

**Sporodesmium cladosporii.** Corda.

Tufts effused, olive; conidia ovoid, continuous, at length opaque brown and densely reticulately septate, scarcely constricted, 20–24 $\mu$ long; conidiophores obsolete.

*Sporodesmium cladosporii*, Corda, Icon. Fung., i. p. 7, t. 11, f. 118; Sacc., Syll., iv. n. 2405.

On dry pods of *Phaseolus vulgaris*, stems of *Scrophularia*, &c.

**Sporodesmium triglochinis.** B. & Br.

Tufts point-like, bright brown, springing from a cellular base; conidia obovate when young, then subglobose and obliquely septate, at length oblong and muriformly septate, 8–16 $\mu$ diameter; conidiophores short, thickened upwards.

*Sporodesmium triglochinis*, B. & Br., Ann. Nat. Hist., n. 1607, t. x., fig. 4; Sacc., Syll., iv. n. 2407.

On *Triglochin palustre*.

**Sporodesmium chartarum.** B. & C.

Tufts small, black, velvety, often concentrically arranged and forming small patches; conidia elliptical or subglobose, at first 2–3-septate, then muriformly septate, 10–16 $\mu$ diameter; conidiophores short, colourless.

*Sporodesmium chartarum*, B. & C., N. Amer. Fung., n. 531; Sacc., Syll., iv. n. 2413.
On damp paper.

## CONIOTHECIUM. Corda. (fig. 14, p. 397.)

Conidia very irregular and variable in form, cruciate or radiately septate, several often coalescent and forming black points or spots on leaves or wood.
*Coniothecium*, Corda, Icon. Fung., i. p. 2; Sacc., Syll., iv. p. 508.
Conidia usually very variable, resembling irregular conglomerations of cells of variable size. A very badly defined genus, and it is doubtful whether many of the so-called species are such in reality.

### Coniothecium effusum. Corda.

Black, broadly effused; conidia subglobose or irregular, sessile, brown, semipellucid, clustered into irregular masses.
*Coniothecium effusum*, Corda, Icon. Fung., i. p. 2, t. 1, f. 21; Sacc., Syll., iv. n. 2420.
*Sporodesmium lepraria*, Berk.
On wood.

### Coniothecium conglutinatum. Corda.

Tufts small, black, subglobose or confluent; conidia minute, ovoid, brown, 4–5 $\mu$ diam., aggregated in clusters.
*Coniothecium conglutinatum*, Corda, Icon. Fung., i. p. 2, t. 1, f. 20; Sacc., Syll., iv. n. 2421.
On birch wood, &c.

### Coniothecium amentacearum. Corda.

Tufts pulvinate, black; springing from a brown, fleshy, lactiform stroma, conidia somewhat oblong, brown, 13–14 $\mu$ diameter, clustered.
*Coniothecium amentacearum*, Corda, Ic. Fung., i. p. 2, t. 1, f. 26; Sacc., Syll., iv. n. 2426.
On dead branches of willow.

### Coniothecium betulinum. Corda.

Tufts small, solitary, black, innate in the wood, at first covered, then erumpent, scarcely 1 mm. in diameter; conidia black, subglobose, 4–6 $\mu$ diameter, clustered.

*Coniothecium betulinum*, Corda, Icon. Fung., i. p. 2, t. 1, f. 25; Sacc., Syll., iv. n. 2428.

On dead branches of *Betula alba*.

**Coniothecium viticolum.** C. & M. (fig. 14, p. 397.)

Tufts erumpent, hemispherical, black, rather compact, loosely gregarious; conidia rounded, subglobose, variously agglutinated together, with 2–4 cells, usually in fours, pale olive, 12–15 $\mu$ diameter.

*Coniothecium viticolum*, C. & M., Grev., xvi. p. 9.

On dead twigs of vine (*Vitis vinifera*).

## DICTYOSPORIUM. Corda. (fig. 20, p. 397.)

Conidia ovoid, or more or less cordate, formed of agglutinated, parallel rows of articulated filaments that do not separate from each other, without appendages.

*Dictyosporium*, Corda, Icon., Fung., ii., p. 87; Sacc., Syll., iv. p. 513.

**Dictyosporium elegans.** Corda. (fig. 20, p. 397.)

Growing on wood; tufts effused, black; conidia tongue-shaped, apex acute or rounded, rarely more or less contracted at the centre, base attenuated or cordate, cells diaphanous, yellow 4–5 rows, walls rather thick, brown or blackish, 57–60 $\mu$ long.

*Dictyosporium elegans*, Corda, Icon. Fung., ii. p. 87; Sacc., Syll., iv. n. 2451.

On rotten wood of oak, pine, &c.

## SPEIRA. Corda. (fig. 27, p. 397.)

Conidia muriformly septate, sooty, formed of chains of cells that eventually separate, without appendages, base shortly stipitate or almost sessile.

*Speira*, Corda, Icon. Fung., i. p. 9; Sacc., Syll., iv. p. 514.

Somewhat like *Dictyosporium*, but distinguished by the chain of cells forming the spore opening out at maturity.

**Speira toruloides.** Corda. (fig. 27, p. 397.)

Clusters of conidia irregular, brown; sterile hyphae obsolete or none; conidia more or less ovoid, formed of 6–7 longitudinal rows of articulated filaments, at first in contact with each other, but eventually separating, 50–60 $\mu$ long, single joints 8–9 $\mu$ diameter.

*Speira toruloides*, Corda, Icon. Fung., i. fig. 140; Sacc., Syll., iv., n. 2454.

On rotten leaves, stems, wood, &c.

## TETRAPLOA. B. & Br. (fig. 15, p. 397.)

Conidia ovoid-oblong, muriformly septate, apex furnished with four slender spines, dingy brown; mycelium obsolete.

*Tetraploa*, Berk. & Broome, Ann. Nat. Hist., n. 457; Sacc., Syll., iv. p. 516.

Distinguished from allies by the delicate spines at the apex of the conidium.

**Tetraploa aristata.** B. & Br. (fig. 15, p. 397.)

Tufts effused, blackish-olive; conidia oblong, muriformly septate, smoky ochraceous, 30 × 20–22 $\mu$, apex crowned with four slender spicules 60–90 × 3–4 $\mu$, septate and divergent.

*Tetraploa aristata*, B. & Br., Ann. Nat. Hist., n. 457, tab. xi. fig. 6; Sacc., Syll., iv. n. 2463.

On herbaceous stems, grass, &c.

### Subsect. 2. **Macronemeae.** Sacc.

## STEMPHYLIUM. Wallr. (fig. 17, p. 397.)

Hyphae decumbent, intricately branched, hyaline or smoky; conidia elliptical or subglobose, 2- many-septate and muriform, smoky.

*Stemphylium*, Wallr., Fl. Cr., p. 300; Sacc., Syll., iv. p. 519.

**Stemphylium macrosporoideum.** B. & Br.

Effused, thin, greyish-black; hyphae thin, effused, unequally branched, branches sometimes anastomosing in a rectangular manner; conidia subglobose or resembling a

mulberry, cruciately or radiately septate, 12–18 $\mu$ diameter, colourless at first then brown.

*Stemphylium macrosporoideum* (B. & Br.), Sacc., Syll., iv. n. 2478.

*Epochnium macrosporoideum*, B. & Br., Ann. Nat. Hist., n. 131, t. viii., f. 14.

On rotten branches of *Ribes*, &c.

**Stemphylium alternariae.** Cke.

Tufts irregular, dendritic, shining, brown; mycelium abundant, creeping, delicate, hyaline, branched, septa scanty; conidia irregular, ovate, somewhat pyriform or cylindrical; 1- many-septate, brown.

*Stemphylium alternariae* (Cke.), Sacc., Syll., iv. n. 2497.

*Sporodesmium alternariae*, Cke., Hdbk., n. 1440.

On damp wall-paper, along with *Sporodesmium chartarum*.

**Stemphylium asperosporum.** Cke. & Mass. (fig. 17, p. 397.)

Wholly mouse-grey. Tufts irregular, confluent, and somewhat effused. Threads creeping, septate, branched, hyaline, fertile branches erect, slender, more or less branched near the tips, which are swollen into a depresso-globose torus, bearing the sessile, subglobose conidia, which consist of 2–4 sooty-brown, warted cells, each cell about 12 $\mu$ diameter.

*Stemphylium asperosporum*, Cke. & Mass., Grev., xvi. p. 11.

On damp wall-paper.

Resembling in some respects *Stemphylium alternariae*, but the conidia are supported upon a distinct, pyriform, hyaline, terminal receptacle, and they are warted, and consist of but a few cells.

**Stemphylium Magnusianum.** Sacc.

Tufts flattened, spot-like, indeterminate, rufescent-brown; hyphae delicate, creeping, vaguely branched, continuous, hyaline or yellowish; conidia subglobose, 20–30 $\mu$ diameter, presenting a reticulated appearance from the walls of the numerous cells, clear, rufous-colour.

*Stemphylium Magnusianum*, Sacc., Mich., i. p. 132; Sacc., Syll., iv., n. 2484.

On bark, rotting paper, dung, &c.

## MACROSPORIUM. Fries. (fig. 25, p. 397.)

Hyphae subfasciculate, rather flaccid, erect or ascending, simple or branched, coloured, bearing at or near the tips oblong or clavate, muriform, coloured conidia.

*Macrosporium*, Fries, Syst. Myc., iii. p. 373; Sacc., Syll., iv. p. 523.

On trunks, herbaceous stems, leaves, &c.; usually saprophytes, but sometimes on living or languid portions. Often forming olive-black, more or less extended patches.

### Macrosporium commune. Rabh.

Tufts numerous, densely gregarious, brownish; hyphae subfasciculate, ascending, septate, not constricted at the septa, brown, 80–90 × 4–6; conidia variable in form, oblong, obovate, or clavate, attenuated at the base, 3–5-septate, septa transverse, oblique or longitudinal, olivaceous, epispore sometimes minutely granular, 18–35 × 8–14 $\mu$.

*Macrosporium commune*, Rabh., Fung. Eur. Exs., n. 1360; Sacc., Syll., iv. n. 2499.

On the decayed portions of various plants.

Considered to be the conidial condition of *Pleospora herbarum*.

### Macrosporium sarcinula. Berk.

Forming compact patches $\frac{1}{4}$–$\frac{1}{2}$ in. across, white and downy, then blackish-olive; hyphae suberect, delicate, sparingly branched, soon disappearing after maturity; conidia clavate, at length divided by septa into cuboid portions, yellow, then olive-brown, 14–24 × 8–10 $\mu$.

*Macrosporium sarcinula*, Berk., Ann. Nat. Hist., n. 125, t. 8, fig. 10; Sacc., Syll., iv. n. 2500.

On rotten cucumber fruits, also on dry grass leaves.

### Macrosporium cladosporioides. Desm.

Spots large, irregular, fulvous, tufts velvety, minute, numerous; hyphae erect, simple, nodulose, septate, semi-hyaline, fasciculate, 150–200 × 5; conidia olive-brown, semi-pellucid, sometimes torulose, unequal, 2–3, or up to 10-septate, ovoid, oblong or elongated, club-shaped, attenuated below and shortly pedicellate, 15–75 $\mu$ long.

*Macrosporium cladosporioides*, Desm., Plant. Crypt., 1857, p. 3, and xxiv. p. 3; Sacc., Syll., iv. n. 2501.

On fading leaves of beet, onion, lettuce, &c.

The conidia are not vertically or murali-divided, hence the present species differs from the typical condition of *Macrosporium*.

**Macrosporium heteronemum.** Sacc.

Spots scattered, reddish-white, irregular, often confluent, on both surfaces of the leaf; hyphae erect, septate, of two forms, crowded into minute, distinct bundles; the conidiophores short, nodulose, 50 × 5 μ, brown; sterile hyphae simple, elongated, rather flexuous, whitish, obtuse above, attenuated towards the base, 150–200 μ long; conidia large, pedicellate, oblong-clavate, brown, divided into cells by 3–7 septa, 50–60 μ long, pedicel hyaline.

*Macrosporium heteronemum*, Sacc., Syll., iv. n. 2502.

*Septonema heteronema*, Desmaz., xxii. Not. p. 4.

On dead or fading leaves of *Sagittaria sagittifolia*.

**Macrosporium brassicae.** Berk.

Forming small pustules; hyphae fasciculate, simple, rather flexuous, septate, slightly constricted at the septa, brown, pale towards the apex, 50–70 μ long; conidia solitary and terminal on the conidiophores, clavate, 5–10-septate transversely, afterwards vertically septate, brownish, 50–70 × 10–16 μ.

*Macrosporium brassicae*, Berk., Engl. Flor., vol. v. p. 339; Sacc. Syll., iv. n. 2506.

On decaying stems, leaves, fruits, &c., of cabbage.

**Macrosporium nobile.** Vize. (fig. 25, p. 397.)

Hyphae fasciculate, short, erect, septate, brown, simple, in minute tufts; conidia rather large, subpiriform, or irregular, 4–10-septate, unequally divided by 2–6 vertical septa, brown, constricted at the septa, 60–80 × 40 μ.

*Macrosporium nobile*, Vize, in Grevillea, also in Cooke's 'Black Moulds,' pl. 26, f, 20; Sacc., Syll., iv. n. 2525.

On dead stems and leaves of *Dianthus*.

**Macrosporium concinnum.** B. & Br.

Spots velvety, black; hyphae flexuous, septate, minute, brown, pellucid above and sometimes with a small lateral

branch; conidia obovate, pedicellate, generally 3-septate and muriformly divided, at length oblong.

*Macrosporium concinnum*, Berk., Ann. Nat. Hist., n. 235, t. xii. f. 21; Sacc., Syll., iv. n. 2536.

On dead decorticated branches of willow.

**Macrosporium tomato.** Cke.

Patches orbicular, $\frac{1}{4}$–$\frac{1}{2}$ in. across, blackish; hyphae short, thick, flexuous or subangular, septate; conidia clavate, apex rather pointed, attenuated downwards, pedicel very short, brown, broken up into several cells by transverse and vertical septa, 100–120 × 16–24 $\mu$.

*Macrosporium tomato*, Cke., Grevillea, xii. p. 32; Sacc., Syll. iv. n. 2525.

Forming blackish patches on ripe tomatoes.

**Macrosporium alliorum.** Cke. & Mass.

Effused in thin fuliginous patches; hyphae flexuous, simple, septate, nodulose, collapsing when dry; conidia elliptical, triseptate, then divided into quadrate, muriform cells, amber-coloured, with a tinge of olive, 40–50 × 20–25 $\mu$.

*Macrosporium alliorum*, Cke. & Mass., Grev., xvi. p. 80.

On onion leaves.

**Macrosporium delicatulum.** B. & Br.

Tufts soft, delicate, black; hyphae subulate, slender, many-septate, brown, paler upwards; conidia somewhat hyaline, oblong, obtuse at both ends, usually 5-celled, cells irregular in form, one or other usually vertically septate.

*Helminthosporium delicatulum*, B. & Br., Ann. Nat. Hist., n. 233, t. xiii, f. 20; Sacc. Syll., iv. n. 1964.

On dead stems of umbellifers.

**Macrosporium ramulosum.** Sacc.

Effused, velvety, black; hyphae ascending, filiform, $\frac{1}{2}$ mm. high, 10–13 $\mu$ thick, slightly thickened below, apex simple or repeatedly shortly branched, everywhere closely septate, intense sooty-brown, joints 2-guttate; conidia apical, oblong or obpiriform, 35–50 × 18 $\mu$, 5–7-muriformly septate, crowded with guttulae, smoky-brown.

*Macrosporium ramulosum*, Sacc., Fung. Ital., t. 854; Sacc., Syll., iv. n. 2512.

On rotten stem of *Apium petroselinum*, &c.

**Macrosporium cheiranthi.** Fr.

Hyphae erect, simple, pellucid, somewhat nodulose, septate; conidia very abundant, large, piriform, ovato-clavate, muriformly septate, blackish-olive, about twice as thick as the hyphae.

*Macrosporium cheiranthi*, Fries, Syst. Myc., iii. p. 374; Sacc., Syll., iv. n. 2505.

On fading leaves and fruit of species of *Cheiranthus* and *Draba*.

**Macrosporium convallariae.** Fr.

Spots rather silky, indeterminate, olivaceous, easily removable and soon disappearing; hyphae erect, fugacious; conidia obovate, blackish-olive, paler and narrowed at the base, muriformly septate; pedicel short, hyaline.

*Macrosporium convallariae*, Fries, Syst. Myc., iii. p. 373; Sacc., Syll., iv. n. 2574.

On fading leaves of *Convallaria multiflora*.

**Macrosporium scolopendri.** Cke.

Spots brown, orbicular or irregular; tufts small, scattered over the spots, olive; threads short, seldom branched, septate, slender; conidia 3–4-septate, with 1–2 transverse septa, pale brown, 40 × 15 $\mu$.

*Macrosporium scolopendri*, Cke., Grev., xvi. p. 81.

On fading fronds of *Scolopendrium vulgare*.

## MYSTROSPORIUM. Corda. (fig. 29, p. 397.)

Conidiophores simple or sparingly branched, rather short and rigid, septate, typically brown; conidia elliptical, subglobose, or oblong, many-septate, muriform, blackish, acrogenous, subsolitary.

*Mystrosporium*, Corda, Icon. Fung., i. p. 12.

Allied to *Macrosporium*, but distinguished by the more rigid and darker-coloured hyphae and conidia.

**Mystrosporium stemphylium.** Corda. (fig. 29, p. 397.)

Tufts thin, broadly effused, blackish; conidiophores short, flexuous, erect, olive-brown; conidia obovate, variable in

form, cellular, unequal, 35–40 $\mu$ long, olive, yellow, or brown, pedicel short.

*Mystrosporium stemphylium*, Corda, Icones Fungorum, ii. p. 13, t. x. f. 61.

On stems and leaves of dahlia and mallow, also on rotten wood.

**Mystrosporium alliorum.** Berk.

Conidiophores flexuous, septate; conidia terminal or sometimes lateral, oblong, constricted in the middle, subpiriform, multiseptate and muriform, septa sometimes oblique.

*Mystrosporium alliorum*, Berk., Gard. Chron., 1878, p. 192; Sacc., Syll., iv. n. 2592.

On onions.

I cannot find the type specimen in Berkeley's herbarium, hence cannot give more information, measurements, &c.

## SEPTOSPORIUM. Corda. (fig. 26, p. 397.)

Hypha of two kinds—fertile short, sterile elongated; conidia elliptical or piriform, brown, murali-septate.

*Septosporium*, Corda, in Sturm's Deutschl. Fl., t. 17; Sacc., Syll., iv., p. 543.

**Septosporium bulbotrichum.** Corda. (fig. 26, p. 397.)

In effused, slender, brown tufts; sterile hyphae unbranched, base bulbous, septate, obtuse, brown below, yellowish upwards, pellucid; conidia pedicellate, springing up amongst the sterile hyphae, oblong-clavate, yellow; pedicel septate, attenuated, 35–36 $\mu$ long.

*Septosporium bulbotrichum*, Corda, Ic. Fung., i. p. 12, f. 176.

On rotten wood.

**Septosporium atrum.** Corda.

Tufts minutely downy, effused, black; hyphae erect, almost simple, wavy, grey, 2–3-septate, semipellucid; conidia large, pedicellate, oblong or clavate, glaucous, somewhat pellucid; apiculus white or sometimes obsolete; pedicel filiform.

*Septosporium atrum*, Corda, in Sturm's Deutsch. Fl., t. 17; Sacc., Syll., iv. n. 2600.

## DACTYLOSPORIUM. Harz. (fig. 23, p. 397.)

Hyphae erect, simple; conidia obovate, muriformly septate, brown, collected into a terminal head.

*Dactylosporium*, Harz, Hyph., p. 44; Sacc., Syll., iv. p. 545.

**Dactylosporium brevipes.** Grove. (fig. 23, p. 397.)

Gregarious, black; hyphae erect, short, flexuous, fuscous, paler upwards, densely septate, subtorulose (cells subquadrate), simple or furcate towards the apex, 50–70 × 5 $\mu$, bearing a jet-black head consisting of 5–8 conidia closely compacted; conidia obovate, deep fuscous, almost opaque, 20–22 × 10–13 $\mu$, angularly cellular, one septum longitudinal, the remainder oblique or radiating.

*Dactylosporium brevipes*, Grove, Journ. Bot., 1886, p. 204, tab. 267, f. 7; Sacc., Syll., Suppl. 1–4, n. 3641.

On wood of sycamore.

Closely allied to *D. macropus*, of which it is perhaps a variety. (Grove.)

## ALTERNARIA. Nees. (fig. 21, p. 397.)

Hyphae fasciculate, somewhat erect, almost simple, short; conidia clavately flask-shaped, muriformly septate, catenulate and connected by slender portions, soon separating.

*Alternaria*, Nees, Syst. d. Pilze, ii. p. 72; Sacc., Syll., iv. p. 545.

Distinguished by the clavate, or flask-shaped muriformly septate olive conidia being united in chains and connected by narrow isthmus-like portions.

**Alternaria brassicae.** Sacc. (fig. 21, p. 397.)

Hyphae short, continuous, very shortly branched, tips equal, in small tufts; conidia in chains, deciduous, elongated,

fusoid or clavate, muriformly septate, olive-green, 50–85 × 12–18 $\mu$.

*Alternaria brassicae*, Sacc., Syll., iv. n. 2613.

On dry spots on the leaves of *Brassica oleracea*.

## FUMAGO. Pers. (fig. 32, p. 397.)

Hyphae decumbent, intricately wefted, often moniliform and muriformly divided, usually forming black crust-like patches that fall away when dry; fertile hyphae erect, branched, conidia elliptical, oblong, or deformed, 1–2-septate, typically produced in chains.

*Fumago*, Persoon, Myc. Eur., i. p. 9; Sacc., Syll., iv. p. 547.

Forming black, sooty, crust-like patches on living leaves and stems.

Probably nothing more than a stage of development of the genus *Capnodium*.

**Fumago vagans.** Pers. (fig. 32, p. 397.)

Sterile creeping hyphae vaguely branched, free or more or less fasciculate, often confluent in cellular muraliform or multicellular masses, olive or smoky-brown; fertile hyphae ascending, short, corymbosely branched above; conidia formed at the tips of the branches, shortly catenulate, generally 2-celled, rarely continuous or 2-septate, 6–18 $\mu$ long.

*Fumago vagans*, Pers., Myc. Eur., i. p. 9; Sacc., Syll., iv. n. 2618.

Forming sooty patches on living leaves of various trees.

Very variable, and undoubtedly the conidial phase of *Capnodium*.

## Sect. V. STAUROSPORAE. Sacc.

## CERATOSPORIUM. Schw. (fig. 12, p. 397.)

Sterile hyphae slender, creeping; conidia sessile, attached to each other in small clusters at the base, ascending, rigid, many-septate, brown.

*Ceratosporium*, Schweinitz, Syn. Amer. Bor., t. 19, f. 3; Sacc., Syll., iv. p. 552.

Distinguished from *Triposporium* by the conidia being sessile, and the sterile hyphae almost obsolete.

**Ceratosporium digitatum.** Sacc. (fig. 12, p. 397.)
Forming effused, black, dense velvety patches; conidia in fascicles of 2–4, attached at the base, sessile on the slender creeping threads, obclavate, wavy, many-septate, pale then dark brown, 80–120 × 12–16 $\mu$.
*Ceratosporium digitatum*, Sacc., Syll., iv. n. 2625.
*Sporidesmium digitatum*, Cke.
On holly branches.

** *Macronemeae.*

TRIPOSPORIUM. Corda. (fig. 11, p. 397.)

Sterile hyphae scanty, creeping; fertile hyphae erect, brown, rigid, septate; conidia terminal, brown, stellate with 3–4 rays.
*Triposporium*, Corda, Icon. Fung., i. p. 16; Sacc., Syll., iv. p. 554.
Distinguished by the coloured, stellate, 3–4-rayed conidia.

**Triposporium elegans.** Corda. (fig. 11, p. 397.)
Mycelium very slender, effused, brown; fertile hyphae erect, slender, simple or sparingly branched, brown, translucent, distantly septate; conidia stellate, central point dark brown, the three or four rays paler, each ray 4–6-septate, tip subhyaline, 48–50 $\mu$ long.
*Triposporium elegans*, Corda, Icon. Fung., i. p. 160, fig. 220; Sacc., Syll., iv. n. 2631.
On rotten wood.

**Triposporium ficinusium.** Preuss.
Tufts broad, black; hyphae erect, simple, septate, long, blackish-brown, dilated at the base, attenuated and paler upwards; conidia solitary, inserted at the apex of the conidiophore, pedicellate, tri-radiate, central portion blackish-brown, rays paler, apiculus white, obtuse, 4–5-septate.
*Triposporium ficinusium*, Preuss, Fung. Hoyersw., p. 54; Sacc., Syll., iv. n. 2634.
On rotten wood.

## Sect. VI. HELICOSPORAE. Sacc.

### HELICOSPORIUM. Nees. (figs. 10, p. 397, and 29, p. 443.)

Sterile hyphae creeping, fertile ascending, dark-coloured, furnished here and there with small spine-like ongrowths that bear the conidia. Conidia terminal or lateral, spirally coiled, hyaline or coloured, pluriguttulate or pluriseptate, coloured.

*Helicosporium*, Nees, Syst. der Pilze, p. 68; Emend., Sacc., Mich., ii. p. 29; Sacc., Syll., iv., p. 557.

Some pale coloured species connect the present genus with *Helicomyces* in the *Mucedineae*.

**Helicosporium pulvinatum.** Fr.

Tufts broadly effused, dingy yellowish-white, becoming dusky; hyphae slender, septate, branched, dingy olive, 3–4 $\mu$ diameter; conidia in spirals with 2–3 turns, 2 $\mu$ diameter, 70–80 $\mu$ long, not septate but multinucleate, hyaline.

*Helicosporium pulvinatum*, Fr., Syst. Myc., iii. p. 354; Sacc., Syll., iv. n. 2638.

On rotten wood, especially oak.

*Var.* **effusum**, Berk. Tufts effused, exceedingly thin; conidia colourless.

**Helicosporum Mülleri.** Sacc. (fig 10, p. 397.)

Tufts broadly effused, rather woolly, dark olive; sterile hyphae creeping, fertile ascending, fasciculate, 10 $\mu$ thick, not branched, septate, smoky or brownish, towards the tip with minute branchlets or tooth-like projections that give origin to the conidia. Conidia cylindrical, sparingly septate, 6–7 $\mu$ thick, colourless, spirally coiled, diameter of entire coil about 25 $\mu$.

*Helicosporium Mülleri*, Sacc. Mich., ii. p. 129; Sacc., Syll., iv, n. 2639.

*Helicoma Mülleri*, Corda.

On rotten wood of poplar, oak, &c.

**Helicosporium viride.** Sacc.

Tufts effused, olive-green; mycelium olive, interwoven, fertile threads erect, septate, olive, tips paler; conidia large,

cylindric-clavate, septate, hyaline, coiled in 1–2 loose spirals.

*Helicosporium viride*, Sacc., Syll., iv. n. 2640.

*Helicocoryne viridis*, Corda.

On rotten wood.

**Helicosporium lumbricoides.** Sacc.

Effused, forming greyish-white spots; hyphae creeping, slender, branched and more or less anastomosing, 4–5 $\mu$ diameter, remotely septate, pale sooty-grey, with hyaline denticulations at the insertion of the conidia; conidia worm-like, coiled in 2–3½ loose spirals, 150 × 4 $\mu$, with many guttulae in a single row, hyaline.

*Helicosporium lumbricoides*, Sacc., Mich., i. p. 86; Sacc., Syll., iv. n. 2642.

On rotten oak wood.

**Helicosporium vegetum.** Nees.

Tufts broadly and vaguely effused, golden, then yellow, at length olivaceous, sometimes black; fertile hyphae straight, simple, rather closely septate, 300 × 4 $\mu$, pallid at first, at length sooty-black, studded laterally with minute hyaline points to which the conidia are attached; conidia filiform, in a spiral of 2–3 turns, 45–65 × 1–1·5 $\mu$, furnished with many guttulae in a single row, septate, greenish, pellucid.

*Helicosporium vegetum*, Nees, Syst. d. Pilze, p. 68, fig. 69; Sacc., Syll., iv. n. 2643.

On rotten wood, especially oak.

**Helicosporium ramosum.** Mass. (fig. 29. p 443.)

Tufts effused, often large, downy, dingy brown with an olive tinge; sterile hyphae creeping, fertile ascending, vaguely branched, brownish, septate, 5–7 $\mu$ thick, bearing short lateral branches that gradually increase in length and form a close spiral, the whole forming an olive brown conidium varying from elliptical to obtusely fusiform, 60–80 × 30–40 $\mu$, consisting of 7–9 coils.

*Helicoryne ramosum*, Berk. and Smith, Gard. Chron., 1882, April 8th.

On wood.

## Fam. III. STILBEAE. Fr.

Byssoid fungi, pallid or brown. Sterile hyphae creeping, scanty; fertile hyphae or conidiophores collected in erect, stem-like fascicles (stromata), bearing the conidia at their tips.

The present family differs from the two preceding in having the fertile hyphae agglutinated into erect, stem-like bundles, the tips of the hyphae usually becoming free near the apex of the fascicle, and bearing the spores. There are two primary groups, one resembling the *Mucedineae* in having the hyphae and conidia pallid; the other resembling the *Dematieae* in having the hyphae and conidia dark coloured.

### Series I. **Hyalostilbeae.** Sacc.

Hyphae and conidia pale.

#### Sect. 1. **Amerosporae.** Sacc.

Conidia globose, elliptical, or oblong, continuous, hyaline or pallid.

#### Sect. 2. **Phragmosporae.** Sacc.

Conidia oblong, or fusiformly-elongated, 2- many-septate or guttulate.

### Series II. **Phaeostilbeae.** Sacc.

Hyphae and conidia (or one or the other) brown, rigid.

#### Sect. 1. **Amerosporae.** Sacc.

Conidia globose, oblong, or elongated, continuous.

#### Sect. 2. **Phragmosporae.** Sacc.

Conidia oblong or cylindrical, 2- many-septate.


FIGURES ILLUSTRATING THE *STILBEAE*.

Fig. 1, *Exosporium tiliae;* section of fungus and conidium;—Fig. 2, *Epidochium atrovirens;* section of fungus, and portion of hyphae with a conidium;—Fig. 3, *Myrothecium inundatum;* general appearance of fungus, and portion of section showing conidiophores bearing conidia;—Fig. 4, *Atrobotryum atrum;*—Fig. 5, *Aegerita candida;*—Fig. 6, *Dendrodochium affine;*—Fig. 7, *Tuberculina persicina;*—Fig. 8, *Volutella ciliata;* —Fig, 9, sterile hypha and two conidiophores bearing conidia, of same

## Fam. III. **STILBEAE.**

### Series I. **Hyalostilbeae.** Sacc.

### Sect. 1. *Amerosporeae.* Sacc.

### STILBUM. Tode. (figs. 20–22, p. 442.)

Stroma subterete, usually elongated and stem-like, composed of agglutinated hyphae that become free above and form a more or less swollen head; conidia minute, continuous, borne on the tips of the hyphae forming the head, at first involved in mucus.

*Stilbum*, Tode, Fung. Mechl., i. p. 10; emended by Saccardo in Mich., ii. p. 32; Sacc., Syll., iv. p. 564.

The distinct, simple or branched stem bearing a single head, and the conidia involved in mucus characterise the genus. Small fungi, rarely exceeding $\frac{1}{6}$ of an inch in height.

**Stilbum orbiculare.** B. & Br.

Forming white patches an inch or more in diameter, springing from a white, thin, pulverulent stratum, stem cylindrical, tomentose, often with a torn frill-like structure at the apex; head globose; conidia cylindrical, $5 \times 2\ \mu$.

*Stilbum orbiculare*, B. & Br., Ann. Sci. Nat., n. 1714; Sacc., Syll., iv. n. 2676.

On *Lindbladia effusa*.

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fungus;—Fig. 10, *Epicoccum purpurascens*, section of;—Fig. 11, conidium of same;—Fig. 12, *Endodesmia glauca*;—Fig. 13, *Bactridium helvellae*, spore of:—Fig. 14, *Fusarium solani*;—Fig. 15, *Graphium subulatum*;—Fig. 16, *Isaria citrina*, and portion of a branch showing origin of conidia;—Fig. 17, *Periola tomentosa*;—Fig. 18, *Hymenula rubella*;—Fig. 19, *Sporocybe byssoides*;—Fig. 20, *Stilbum citrinellum*;—Fig. 21, section of head of same, showing it to consist of hyphae spreading from the stem;—Fig. 22, hyphae bearing conidia, from head of same;—Fig. 23, *Ceratium hydnoides*;—Fig. 24, *Tubercularia euonymi*; section of fungus and curved condiophore;—Fig. 25, *Cylindrocolla urticae*;—Fig. 26, *Illosporium roseum*;—Fig. 27, *Fusarium betae*;—Fig. 28, *Sphacelia segetum*;—Fig. 29, *Helicosporium ramosum*. (All the figures are highly magnified.)

**Stilbum tomentosum.** Schr.

Gregarious, every part pure white, stem slender, tomentose; head subrotund becoming opaque; conidia globose, 2–3 $\mu$ diameter. The plants spring from an effused white, creeping mycelium.

*Stilbum tomentosum*, Schr., Journ., 1799, ii. p. 65, t. 3, f. 2; Sacc., Syll., iv. n. 2677.

Very minute. Parasitic on various species of *Myxogastres*, as *Trichia*, *Didymium*, *Arcyria*, &c.

**Stilbum erythrocephalum.** Ditm.

Gregarious or scattered, stem rather thick, tomentose, whitish, terminating in a turbinato-globose, rosy or deep red head; conidia elliptical, 4–6 × 2–2·3 $\mu$, hyaline, borne on slender, septate, colourless conidiophores that are nodulose at the apex, 50–60 × 3–3·5 $\mu$.

*Stilbum erythrocephalum*, Ditm. in Sturm. D.C., t. 45; Sacc., Syll., iv. n. 2680.

On damp dung of rabbits, pigeons, &c.

**Stilbum vulgare.** Tode.

Stems gregarious, fibrous, smooth, elongated, becoming thinner upwards, white, then yellowish; head globose, white, then yellowish; conidia elliptical, hyaline, 8 × 5–6 $\mu$.

*Stilbum vulgare*, Tode, Mecklenb., i. p. 10, t. 2, f. 16; Sacc., Syll., iv. n. 2682.

On rotten wood, oak cupules, &c.

**Stilbum pellucidum.** Schrad.

Scattered; head white, from turbinate to subglobose; stem equal, rigid, hyaline.

*Stilbum pellucidum*, Schrad., Journ., 1779, p. 65; Sacc., Syll., iv. n. 2685.

On rotten wood, decaying fungi, &c.

Scarcely 2 mm. high. Allied to *S. vulgare*.

**Stilbum acicula.** Sacc.

Mycelium obsolete; stems scattered, scarcely 2 mm. high, gregarious, white or pallid, splitting longitudinally; head subglobose, white; conidia ellipsoid, minute.

*Stilbum acicula*, Sacc., Syll., iv. n. 2691.

*Pachnocybe acicula*, Berk., Engl. Flora, vol. v. p. 334.

On herbaceous stems.

**Stilbum vaporarium.** B. & Br.

Stems clustered, fasciculate, more or less connected at the base, grey; heads flesh-coloured; conidia elliptic-oblong, 7–8 × 3 μ.

*Stilbum vaporarium*, B. & Br., Ann. Nat. Hist., n. 493; Sacc., Syll., iv. n. 2968.

On wood.

Distinguished from *S. fasciculatum* more especially by the larger size of the conidia.

**Stilbum fasciculatum.** B. & Br.

Stems flabellato-fasciculate, joined at the base, grey; heads flesh-colour; conidia elliptical, 5 × 2 μ.

*Stilbum fasciculatum*, B. & Br., Ann. Nat. Hist., n. 492; Sacc., Syll., iv. n. 2699.

On fallen wood.

According to Cooke the present species is the conidial condition of *Sphaerostilbe gracilipes*.

**Stilbum fimetarium.** B. & Br.

Slender, clear-red, head at first subconic then becoming flattened and angular; conidia ellipsoid, 6–7 μ long.

*Stilbum fimetarium*, B. & Br., Ann. Nat. Hist., n. 494; Sacc., Syll., iv. n. 2710.

Small; on the dung of various animals.

**Stilbum aurantiacum.** Bab.

Subfasciculate, orange; stem smooth, darker at the base; head subclavate; conidia oblong, obtuse, subtruncate, 12–14 μ long.

*Stilbum aurantiacum*, Babington, Linn. Soc. Trans., 1839; Sacc., Syll., iv. n. 2714.

On dead elm branches.

**Stilbum turbinatum.** Tode.

Head variable, globose, oval, or obpiriform, whitish or golden; stem yellow, base greenish, pellucid; conidia globose.

*Stilbum turbinatum*, Tode, Meckl., p. 12, t. 2, f. 20; Sacc., Syll., iv. n. 2718.

*Stilbum citrinum*, Pers., Syn., p. 681.

On rotten beech trunks.

**Stilbum ramigenum.** Sacc.

Stem citrin-yellow, cylindrical, formed of filiform, septate, fasciculated hyphae, expanding at the apex into a subglobose head; hyphae attenuated at the apex, bearing numerous short, lateral conidiophores; conidia globose, echinulate, 10 $\mu$ diameter, collecting in masses.

*Stilbum ramigenum*, Sacc., Syll., iv. n. 2719.

*Acremonium ramigenum*, B. & Br., Ann. Nat. Hist., n. 1319, t. 18, f. 10.

On rotten branches.

**Stilbum melleum.** B. & Br.

Minute; pale yellow; stem short, hispid, dilated above; conidia globose, 1·5–2 $\mu$ diameter; globose, warted, honey-coloured, crystallised bodies 12–15 $\mu$ diameter are mixed with the conidia.

*Stilbum melleum*, B. & Br., Ann. Nat. Hist., n. 1609, t. 10, fig. 5; Sacc., Syll., iv. n. 2667.

On bark.

**Stilbum citrinellum.** Cke. & Mass. (figs. 20–22, p. 442.)

Minute, scattered, stem erect, cylindrical, whitish, a little attenuated upwards; head subglobose, lemon-yellow; compacted hyphae furcate at the tips; conidia solitary, elliptical, continuous, hyaline, 7–9 × 4 $\mu$.

*Stilbum citrinellum*, Cke. & Massee, Grev., vol. xvi. p. 81.

On fading leaves of *Lycopodium*. Whole fungus about 2 mm. high.

## ISARIA. Pers. (fig. 31, p. 397.)

Stroma erect, clavate and simple or variously branched or fimbriated, consisting of loosely compacted hyphae, everywhere bearing conidia that are borne at the tips of the hyphae; conidia minute, globose or elliptical, continuous, colourless.

*Isaria*, Persoon, Tent. Disp., p. 41; Sacc., Syll., iv. p. 584.

On the pupa, larval, or imago condition of insects, also on wood, dung, leaves, &c. The species on insects are mostly conidial conditions of species of *Cordyceps*.

* *On insects.*

**Isaria farinosa.** Fr. (fig. 31, p. 397.)

Subcaespitose; white, 1 in. or more high, stem distinct, simple, glabrous, fertile, upper portion thickened, more or less branched, powdery; conidia globose, hyaline, 2 $\mu$ diameter.

*Isaria farinosa*, Fries, Syst. Myc., iii. p. 271; Sacc., Syll., iv. n. 2772.

On dead, putrescent chrysalis form of various insects, especially those buried amongst fallen leaves.

The conidial condition of *Cordyceps militaris.*

**Isaria floccosa.** Fr.

Caespitose; subulate, simple, white, 2–4 mm. high, everywhere floccoso-tomentose; conidia subglobose, 2 $\mu$ diameter.

*Isaria floccosa*, Fries, Syst. Myc., iii. p. 274; Sacc., Syll., iv. n. 2778.

On larvae and pupae of *Bombyx Jacobaea.*

**Isaria sphingum.** Schw.

Gregarious; stromata erect, very long, filiform, often compressed, subpulverulent, springing from a silky fibroso-crustaceous mycelium; conidia subglobose, 2 $\mu$ diameter.

*Isaria sphingum*, Schweinitz, Syn. Fung. Carol., p. 126, n. 1298; Sacc., Syll., iv. n. 2781.

On the pupa of a dipterous insect in Scotland. In other countries on *Sphingum* and various Orthopterous and Lepidopterous insects.

The ascigerous form, *Cordyceps sphingum*, Sacc., has not yet been recorded for this country.

**Isaria arachnophila.** Ditm.

Caespitose, springing from a whitish stroma, cylindrical, unbranched, white or with a suggestion of pink; conidia linear-oblong, 3–4 × 2 $\mu$.

*Isaria arachnophila*, Ditm. in Sturm, D. C. Fl., t. 55; Sacc., Syll., iv. n. 2791.

On various spiders.

** *On dung or on the ground.*

**Isaria felina.** Fr.

Tufted, slender, elongated, branched, white, consisting of more or less parallel hyphae firmly compacted in the centre, becoming loose at the periphery, tips of branches sometimes fimbriate; conidia about $3 \times 2$ $\mu$.

*Isaria felina*, Fries, Syst. Myc., iii. p. 271; Sacc., Syll., iv. n. 2793.

On dung of cats and dogs. From $\frac{1}{4}$–$\frac{1}{2}$ in. high.

**Isaria sulphurea.** Fiedl.

Gregarious, clavate pale sulphur-colour; stem formed of a bundle of interwoven hyphae; conidia borne on the minute branchlets of the hyphae, that are variously branched above, subglobose, with a yellow tinge, 5–6 $\mu$ diameter.

*Isaria sulphurea*, Fiedl., in Rab. Fung., Eur., n. 60; Sacc., Syll., iv. n. 2794.

On the dung of various mammals, and on manured ground.

The flocci of my specimens did not anastomose so much as in Saccardo's drawing [Fung. Ital., t. 845], and they were swollen at intervals, the swelling being very similar to a conidium. (Grove.)

*** *On fungi.*

**Isaria brachiata.** Schum.

Gregarious on a whitish stroma, white, erect, rigid, more or less branched, branches subhorizonal, flocculose; conidia elliptical, hyaline, $3$–$4 \times 2$ $\mu$.

*Isaria brachiata*, Schum., Saell., ii. p. 443; Sacc., Syll., iv. n. 2800.

On various putrescent fungi; also said to have occurred on leaves, roots, &c.

**Isaria intricata.** Fr.

Caespitose, thread-like, branched, white, 2–6 mm. high; branches few, erect, intricately interwoven, downy, the threads bearing one conidium at the apex.

*Isaria intricata*, Fries, Syst. Myc., iii. p. 278; Sacc., Syll., iv. n. 2802.

On various species of decaying or dried up fungi.

**Isaria citrina.** Pers. (fig. 16, p. 442.)

Gregarious, springing from a yellow stroma; yellowish, very much branched, villous and powdered with the white conidia, feathery above; conidia subglobose, 3–4 $\mu$.

*Isaria citrina*, Pers., Syn., p. 689; Sacc., Syll., iv. n. 2801.

On decaying fungi, also on trunks, &c.

**Isaria umbrina.** Pers.

Caespitose; clavate, branched, salmon-colour; branches divided, straight, tips rather flattened, everywhere villose; conidia obovate, pale brown, 5–6 × 3 $\mu$.

*Isaria umbrina*, Pers., Syn., p. 687; Sacc., Syll., iv. n. 2807.

About 2 lines high. On *Hypoxylon coccineum*, of which it is the conidial form.

[**Isaria microscopica**, Grev., Scot. Cr. Fl., t. 3 = *Stilbum tomentosum*.]

**** *On wood or bark.*

**Isaria Friesii.** Mont.

Minute, up to 2 mm. high, whitish, fasciculate, erumpent, villous, conidia oblong, 3–4 $\mu$ long.

*Isaria Friesii*, Mont., Ann. Sci. Nat., ser. ii., vi. p. 28, t. 12, f. 3; Sacc., Syll., iv. n. 2809.

On the bark of branches, bursting through the epidermis. Sometimes greyish or yellowish.

**Isaria muscigena.** Cke. & Mull.

Pallid. Stroma erect, simple or forked, compressed, 1–2 lines high, gregarious, but not fasciculate; conidia large, sphaeroidal, 8–9 $\mu$ diameter, hyaline.

*Isaria muscigena*, Cke. & Mull., Grev., vol. xvi. p. 81.

Among *Hypnum serpens*, on trunks.

**Isaria albida.** Fr.

Gregarious, white, club-shaped, about 1 line high, club sometimes forked; conidia elliptical, 6 × 4 $\mu$.

*Isaria albida*, Sacc., Syll., iv. n. 2814.

*Pachnocybe albida* (Fr.), Berk., Eng. Fl., v. p. 335.
On rotten wood and herbaceous stems. Scattered specimens resemble short white hairs.

**Isaria spumarioides.** Cooke.
Densely tufted, white, palmate or infundibuliform, tips crisped, lobed, or serrate, attenuated below into a minute stem; stems more or less connate; conidia subglobose, 4–5 $\mu$ diameter.
*Isaria spumarioides*, Cke., Grev.; Sacc., Syll., iv. n. 2816.
On bark. Superficially resembling *Spumaria alba*.

**Isaria tomentella.** Fr.
Gregarious; simple cylindrical or subclavate, dingy yellow, 1 line high, rather thick, villose.
*Isaria tomentella*, Fries, Syst. Myc., iii. 276; Sacc., Syll., iv. n. 2832.
On rotten wood, also amongst leaves.

**Isaria clavata.** Ditm.
Gregarious; springing from a stroma; simple, clavate, whitish or sometimes brownish, villous; conidia subglobose, 2–3 $\mu$ diameter.
*Isaria clavata*, Ditm. in Sturm, D. C. Fl., t. 56; Sacc., Syll., iv. n. 2826.
On trunks. From 2–3 lines high.

***** *On leaves, flowers, or fruit.*

**Isaria fuciformis.** Berk.
Slender, pale or bright rose-colour, $\frac{1}{2}$ in. high, simple or sparingly branched, branches acute; conidia very minute, globose, 2 $\mu$ diameter.
*Isaria fuciformis*, Berk., Austr. Fung., n. 205; Sacc., Syll., iv. n. 2839.
On leaves and germinating seeds of grass.

**Isaria puberula.** Berk.
Minute, reddish, about 1 line high; stem straight, branches few and simple, tips clavate, subverticillate, mealy.

*Isaria puberula*, Berk., Ann. Nat. Hist., n. 221, t. xii. f. 12; Sacc., Syll., iv. n. 2839.

On dead *Dahlia* flowers.

*Excluded species.*

*Isaria microscopica*, Grev. = *Stilbum tomentosum.*

CERATIUM. Alb. & Schw. (fig. 23, p. 442.)

Stroma club-shaped, simple or variously branched, indistinctly cellular, externally covered everywhere with conidia, borne on very short spicules that give to the stroma a velvety appearance, when the conidia have fallen away; conidia large, continuous, hyaline.

*Ceratium*, A. & S., Comp. Fung. Lus., p. 358; Sacc., Syll., vol. iv. p. 596.

The present genus is considered by some authors as belonging to the *Myxogastres*, differing from the *Hyphomycetes* in the absence of true hyphae, and in the conidia giving origin to active amoeboid bodies on germination. Saccardo considers the genus to be allied to *Isaria*, but the points of agreement appear to be confined to superficial resemblances.

**Ceratium hydnoides.** A. & S. (fig. 23, p. 442.)

Forming minute, or sometimes effused, pure white tufts, consisting of numerous erect, simple or slightly branched spines that deliquesce and almost disappear when touched; conidia hyaline, smooth, broadly elliptical or globose, 10–12 × 8 or 10 $\mu$ diameter.

*Ceratium hydnoides*, A. & S., Com., p. 358, t. 11, f. 7; Sacc., Syll., iv. n. 2845.

On rotten wood.

Sect. 2. *Phragmosporeae.* Sacc.

ATRACTIUM. Link. (fig. 33, p. 397.)

Stroma stem-like, terete, composed of a fascicle of more or less parallel hyphae, expanded to form a conidia-bearing

head at the apex; conidia falcate-vermicular, 2- many-septate, subhyaline.

*Atractium*, Link, Berlin Mag., iii. p. 10 (1809); Sacc., Syll., iv. p. 599.

Distinguished from other compound stemmed, more or less club-shaped genera by the slender, pointed, elongated, many-septate conidia.

**Atractium flammeum.** Berk. & Rav. (fig. 33, p. 397.)

Stroma cylindric-clavate, obtuse, shortly stipitate, 1 mm. high, reddish flame-colour; whitish below, pruinose; conidia fusoid, curved, both ends acute, hyaline, 4–6 septate, not constricted at the septa, 70–75 $\mu$ long; sporophores elongated, septate, 3·5 $\mu$ thick.

*Atractium flammeum*, Berk. & Rav., Ann. Nat. Hist., n. 757; Sacc., Syll., iv. n. 2860.

On bark of living willow, &c.

## Series II. **Phaeostilbeae.** Sacc.

### Sect. 1. *Amerosporae.* Sacc.

### SPOROCYBE. Fries. (fig. 19, p. 442.)

Stem consisting of a fascicle of hyphae, fibrous, apex capitate and bearing the conidia; capitulum globose or elongated; conidia subglobose or ellipsoid, brown.

*Sporocybe*, Fries, emended by Bonorden, Hdbk., p. 138; Sacc., Syll., iv. p. 604.

Somewhat resembling *Periconia* in habit, but in the latter the stem consists of a single hypha, and not of a bundle of hyphae as in the present genus.

**Sporocybe byssoides.** Bon. (fig. 19, p. 442.)

Stems gregarious, subulate, 1 mm. high, rigid, blackish-grey, springing from a common compact base; heads minute, blackish-olive; conidiophores paler, divergent; conidia obovate, 4–6 × 3–4 $\mu$; olive, 1-guttulate.

*Sporocybe byssoides*, Bonorden, Hdbk., p. 138, f. 217; Sacc., Syll., 2877 & 1310.

On stems of herbaceous plants; branches of ivy (*Hedera*), box (*Buxus*), &c.

**Sporocybe brassicaecola.** Sacc.

Stem black, sometimes forked; head globose, at first grey, then black; conidia grey, irregular, more or less attenuated at the ends, 5–10 $\mu$ long.

*Sporocybe brassicaecola*, Sacc., Syll., iv. n. 2878.

*Periconia brassicaecola*, B. & Br., Ann. Nat. Hist., n. 1452, t. 1, f. 3.

Forming dense black patches on the inside of decayed cabbage-stalks.

**Sporocybe cuneifera.** Sacc.

Stem attenuated upwards, brownish, simple or sparsely divided by the separation of the hyphae into two or more bundles from being firmly compacted below; heads ovate; conidia obversely cuneate or narrowly obovate, pale greenish-brown, 10–11 × 3–4 $\mu$.

*Sporocybe cuneifera*, Sacc., Syll., iv. n. 2879.

*Stilbum cuneiferum*, B. & Br., Ann. Nat. Hist., n. 1451, t. 1, f. 2.

On rotten cabbage-stalks.

**Sporocybe calycioides.** Fr.

Black, 4 mm. high; mycelium effused, forming spots; head subglobose, compact; stem slender, subulate, sometimes striate, sometimes flexuous.

*Sporocybe calycioides*, Fries, Syst., Myc., iii. p. 342; Sacc., Syll., iv. n. 2855.

*Periconia calycioides* (Fr.), Berk., Outl., p. 343.

On dead herbaceous stems, trunks of beech, &c.

**Sporocybe atra.** Sacc.

Black. Scattered or gregarious, $\frac{1}{4}$–$\frac{1}{2}$ mm. high; stem erect, opaque, rather rigid; head ovoid, with spreading, short hyaline conidiophores; conidia oblong-fusiform, olive, 10–12 $\mu$ long.

*Sporocybe atra*, Sacc., Syll., iv. n. 2891.

*Graphium atrum*, Desmaz., XVI. Not., p. 343 (1848.)

On dry leaves of *Holcus mollis* and species of *Festuca*.

**Sporocybe Phillipsii.** Sacc.

Minute; stem erect, cylindrical, black; head globose; conidia globose, brown, verruculose, 7–10 $\mu$ diameter.

*Sporocybe Phillipsii*, Sacc., Syll., iv. n. 2894.

*Periconia Phillipsii*, Berk. & Leight., Ann. Nat. Hist., n. 1453; Grev., vol. iv. t. 42.

On naked ground, along with a minute species of *Thelocarpon*. Stem about equal in height to the diameter of the head, thick for the size of the plant. Looks at first sight like a little *Sphinctrina*, so minute that it is quite invisible to the naked eye. (B. & L.).

## GRAPHIUM. Corda. (fig. 15, p. 442.)

Stroma cylindrical, clavate, or capitate, brownish, rather rigid; the upper hyphae paler, lax, and bearing the conidia; conidia elliptical or oblong, hyaline, often involved in mucus at first.

*Graphium*, Corda, Icon. Fung., i. p. 18; Sacc., Syll., iv. p. 609.

Distinguished from *Isaria* and *Stilbum* by the dingy brown colour of the erect stroma.

### I. EU-GRAPHIUM. *Head whitish or glaucose.*

**Graphium stilboideum.** Corda.

Gregarious, scarcely 2 mm. high, stem long, filiform, consisting of parallel sooty hyphae, expanded at the apex into a pale subrotund discoid head; conidia elliptic-oblong, 6 × 3, hyaline.

*Graphium stilboideum*, Corda, Icon. Fung., ii. p. 69; Sacc., Syll., iv. n. 2896.

On branches, cabbage-stems, &c.

**Graphium rigidum.** Sacc.

Stems gregarious, robust, rigid, blackish-olive, fragile, becoming subulate from a thickened base; head at first watery-white, then grey, compact, easily breaking off.

*Graphium rigidum*, Sacc., Syll., iv. n. 2897.

*Stilbum rigidum*, Persoon, in Uster Annal., i. p. 32, f. 2; and Pers., Syn., p. 680.

On rotten trunks.

**Graphium Desmazieri.** Sacc.

Coarsely velvety, sooty, stems erect, 450 × 40, formed of numerous brown septate hyphae; upper hyphae spreading in a paniculate manner, branched, almost hyaline, the small branchlets flexuoso-denticulate and bearing the hyaline, elliptical conidia, measuring 3–4 × 2·5 $\mu$.

*Graphium Desmazieri*, Sacc., Syll., iv. n. 2898; Fung. Ital., t. 394.

**Graphium flexuosum.** Sacc.

Gregarious, blackish, stem elongated, filiform, usually flexuous or geniculate, base slightly incrassated, composed of parallel, septate, brown hyphae; head clavate then subglobose, even; conidia hyaline, subglobose, 2·5 $\mu$ diameter, borne at the tips of repeatedly forked hyaline hyphae.

*Graphium flexuosum*, Sacc., Syll., iv. n. 2902.

*Stilbum flexuosum*, Massee, New Micro-Fungi, Journ. Roy. Microscop. Soc., vol. v. p. 758, figs. 1–3.

On rotten wood, 1–2 lines high, gregarious.

**Graphium subulatum.** Sacc. (fig. 15, p. 442.)

Stems scattered, rigid, 2–4 mm. high, subulate, black; head elongated, cylindric-fusiform, acute, grey; conidia almost globose, hyaline.

*Graphium subulatum*, Sacc., Syll., iv. n. 2910.

*Periconia subulata*, Nees, Act. Leop., ix. t. 5, f. 8.

On trunks, pericarps, &c.

**Graphium Grovei.** Sacc.

Stems subgregarious, erect, 300–500 $\mu$ high, rigid, filiform, shining brown, blackish at the base; head equal to the stem or a little more, also slightly thicker, rather clavate, obtuse or rather acute, never subulate; conidia rounded or oval, very minute, 2 $\mu$ diameter, hyaline.

*Graphium Grovei*, Sacc., Syll., iv. n. 2911.

*Pachnocybe clavulata*, Grove, New or Noteworthy Fungi, Journ. Bot., vol. xxiii. p. 14, t. 256, f. 10.

On rotten decorticated wood.

**Graphium Passerinii.** Sacc.

Stems hair-like, erect, brown, composed of fasciculate

hyphae varying in length, free at the tips and bearing the minute, ovate-oblong, continuous, hyaline conidia.

*Graphium Passerinii*, Sacc., Syll., iv. p. 2912.

*Graphium subulatum*, Pass. et Beltr., Fung. Sic., n. 33 (not of Nees).

On dry corticated branches of *Rubus*.

**Graphium Stevensonii.** Sacc.

Scattered; stem very short, black; head white, globose; conidia very minute, globose, hyaline, about 2 $\mu$ diameter.

*Graphium Stevensonii*, Sacc., Syll., iv. n. 2915.

*Stilbum Stevensonii*, Berk. & Broome, Ann. Nat. Hist., n. 1713.

On rotten wood. Resembling a *Didymium* in habit.

**Graphium griseum.** Sacc.

Densely gregarious, velvety, short; stems black, fibrous, about 2 mm. high, head subglobose, rather large, grey then blackish and globose; conidia greyish, elliptical, 1-guttulate.

*Graphium griseum*, Sacc., Syll., iv. n. 2926.

*Pachnocybe grisea*, Berk., Engl. Flor., v. p. 334.

On decaying stems.

**Graphium glaucocephalum.** Sacc.

Tufts slender, powdery, glaucous, rather inconspicuous; stem short, slender, glabrous, blackish-brown, opaque; head globose, large, glaucous; conidia ovate, yellowish, guttulate.

*Graphium glaucocephalum*, Sacc., Syll., iv. n. 2927.

*Sporocybe glaucocephala*, Bon.

*Periconia glaucocephala*, Corda.

On rotten nettle stems, &c.

**Graphium piliforme.** Sacc.

Stems gregarious, straight, black, glabrous; head spherical, hyaline, very fugacious; conidia hyaline, elliptic-oblong, subcylindrical, at first conglutinated together.

*Graphium piliforme*, Sacc., Syll., iv. n. 2928.

*Stilbum piliforme*, Pers., Syn., p. 581.

On rotten branches and herbaceous plants.

**Graphium nigrum.** Sacc.

Stem short, scarcely 1 mm. high, blackish; head ovate or subglobose; conidia subcylindrical, minute, numerous.

*Graphium nigrum*, Sacc., Syll., iv. n. 2931.

*Stilbum nigrum*, Berk., Engl. Fl., v. p. 330.

On rotten stems of *Eriophorus*.

**Graphium graminum.** Cke. & Mass.

Scattered, minute, dispersed over the leaves and culms, grey; stems erect, composed of delicate septate threads, almost colourless when separated; conidia elliptical, continuous, hyaline, 6 × 3–4 $\mu$.

*Graphium graminum*, Cke. & Mass., Grev., xvi. p. 11.

On *Gynerium*.

**Graphium penicilloides.** Corda.

Stems scattered, black, short, 100–130 $\mu$ high, thick, obtusely clavate above, sometimes swollen below, composed of fasciculate hyphae, paler upwards; conidia acrogenous, linear, hyaline, 4–5 × 1·5 $\mu$, forming a whitish head.

*Graphium penicilloides*, Corda, Icon. Fung., i. p. 18, t. 5, f. 251; Sacc., Syll., iv. n. 2895.

On bark of sycamore, poplar, &c.

II. CHROMOCEPHALUM. *Head brightly coloured.*

**Graphium anomalum.** Sacc.

Minute, hardly 1 line high; head subglobose, yellow; stem black, yellow upwards, generally even, sometimes rather floccose at the base; apex expanded, disciform, conidia almost fusiform.

*Graphium anomalum*, Sacc., Syll., iv. n. 2937.

*Stilbum anomalum*, Berk., Mag. Zool. & Bot., n. 34, t. 111, f. 9.

On dead branches.

**Graphium bicolor.** Sacc.

Exceedingly minute; head rounded, whitish, at length becoming olive; stem rather firm, subulate, pallid, olive-brown at the base.

*Graphium bicolor*, Sacc., Syll., iv. n. 2943.

*Stilbum bicolor*, Pers., Syn., p. 682.
On trunks, branches, &c.

## HARPOGRAPHIUM. Sacc. (fig. 30, p. 397.)

Stroma forming a stem, apex forming a head or equal, sooty-brown, bearing more or less loose paler conidiophores upwards; conidia elongated or falciform, continuous, hyaline.

*Harpographium*, Sacc., Mich., ii. p. 33; Sacc., Syll., iv. p. 619.

Only differs from *Graphium* in the elongated or falciform conidia.

**Harpographium graminum.** Cke. & Mass. (fig. 30, p. 397.)

Solitary, scattered, very minute; stem consisting of a fascicle of septate, olive hyphae, becoming free and spreading above; conidia cylindric-fusiform, 2-guttulate, hyaline, 12 × 5 $\mu$.

*Harpographium graminum*, Cke. & Mass., Grev., xvi. p. 81.
On straw.

## STYSANUS. Corda. (fig. 28, p. 397.)

Stroma erect, cylindrical or clavate, brown, rather rigid; conidia ovoid, lemon-shaped, or somewhat fusoid, subhyaline, concatenate, grouped into an oblong or subglobose, somewhat lax, terminal panicle.

*Stysanus*, Corda, Icon. Fung., i. p. 21; Sacc., Syll., iv. p. 620.

**Stysanus stemonites.** Corda. (fig. 28, p. 397.)

Gregarious, stem simple, thin, blackish-brown, consisting of septate, olive-brown, parallel hyphae, which separate above into a cylindrical head; conidia ovate or lemon-shaped, concatenate, almost colourless, 8 × 5 $\mu$.

*Stysanus stemonites*, Corda, Icon. Fung., i. p. 22, t. vi. f. 283; Sacc., Syll., iv. n. 2951.

On trunks, branches, leaves, &c.

**Stysanus clematidis.** Fckl.

Stems gregarious, slender, striate, black, 1 line high; the conidia-bearing portion elongato-cylindrical, occupying half the length of the stem, grey; conidia elliptical, 8 × 2 $\mu$, hyaline.

*Stysanus clematidis*, Fuckel, Symb. Myc., p. 365; Sacc., Syll., 2960.

On rotting stem of clematis.

**Stysanus putredinis.** Corda.

Tufts, effused, crowded, shining white, then mealy and tinged with pale red; stem straight, slender, wavy, downy and somewhat pilose, white; head large, obovate, snow-white; chains of conidia at first few and distant, then becoming numerous and crowded, short; conidia elliptic-oblong, opalescent.

*Stysanus putredinis*, Corda, Icon., iii. t. ii. f. 36; Sacc., Syll., iv. n. 2965.

On rotten leaves, stems, &c.

GRAPHIOTHECIUM. Fuckel. (fig. 34, p. 397.)

Stroma vertical, composed of fasciculate hyphae, inflated at the base and resembling a perithecium. Conidia springing from the tips of the hyphae, continuous, fusoid, catenulate.

*Graphiothecium*, Fckl., Symb. Myc., p. 366; Sacc., Syll., iv. p. 624.

Distinguished amongst the genera with an elongated vertical stroma composed of fasciculate hyphae by the very much swollen base of the stroma, which resembles a perithecium in appearance.

**Graphiothecium parasiticum.** Sacc. (fig. 34, p. 397.)

Very minute, rather scattered, simple, stem composed of more or less parallel hyphae, very slender, subulate, glabrous, blackish-brown, base spherically incrassated, above cylindrical, white; chains of conidia short, conidia minute, elliptical, colourless, 5–7 $\mu$ long.

*Graphiothecium parasiticum*, Sacc., Syll., iv. n. 2971.

*Stysanus parasiticus*, Desm., Ann. Sci. Nat., ser. iii. v. x. p. 344.

On fading or rotten leaves of various plants.

### Sect. 2. *Phragmosporae.* Sacc.

### ARTHROBOTRYUM. Cesati. (fig. 4, p. 442.)

Conidiophore capitate, on an elongated coloured, rigid stem composed of agglutinated, parallel, septate hyphae, that spread out at the apex and become more or less free, bearing the septate, coloured conidia at their tips.

*Arthrobotryum*, Cesati in Hedw., i. t. iv. f. 1; Sacc., Syll., iv. p. 608.

Usually gregarious, the hyphae forming the compact, rigid, dark-coloured stem becoming free at the tip and forming a head, the tips of the hyphae bearing the conidia.

**Arthrobotryum stilboideum.** Cesati.

Gregarious, blackish brown, stem tapering upwards, blackish, conidia cylindrical, 3-septate, endochrome becoming pale brown, 10–12 × 4 $\mu$.

*Arthrobotryum stilboideum*, Cesati, Hedwigia, i. t. iv. f. 1; Sacc., Syll., iv. n. 2986.

On rotten wood. Whole plant not 1 mm. in height.

**Arthrobotryum atrum.** B. & Br. (fig. 4, p. 442.)

Gregarious, blackish, stem stout, cylindrical, rigid; head large, subglobose; conidia cylindric-ovoid, 3–4 septate, the two end cells pale, remainder brown, 30–40 × 12–16 $\mu$.

*Arthrobotryum atrum*, B. & Br., Ann. Nat. Hist., n. 822, t. ix. f. 6; Sacc., Syll., iv. n. 2987.

On dead stems of various herbaceous plants, and on branches.

### Fam. IV. TUBERCULARIEAE. Ehrenb.

Compact; usually originating from a more or less developed basal stroma; wart-like, globose, discoid; super-

ficial or erumpent; waxy or subgelatinous. Conidia borne laterally or terminal on simple or branched conidiophores that are agglutinated together to form a head; very rarely sessile.

The principal character of the group under consideration consists in the agglutination of the conidiophores to form a waxy or subgelatinous, wart-like or depressed head; conidia usually minute, very numerous.

Series I. **Tuberculariaeae mucedineae.** Sacc.

Hyphae and conidia hyaline or bright coloured (not black).

Sect. 1. **Amerosporae.** Sacc.

Conidia continuous, elliptical, curved, shortly cylindrical, or fusoid.

Sect. 2. **Didymosporae.** Sacc.

Conidia 1-septate, hyaline or pale-coloured.

Sect. 3. **Phragmosporae.** Sacc.

Conidia elongated, fusiform or falcate, typically 2- many-septate.

Series II. **Tuberculariaeae dematieae.** Sacc.

Hyphae olivaceous or smoky-black; conidia similarly coloured, rarely hyaline.

Sect. 1. **Amerosporae.** Sacc.

Conidia continuous, globose, elliptical, elongated, or unequal, for the most part brown.

Sect. 2. **Phragmosporae.** Sacc.

Conidia oblong or cylindrical, 2- many-septate, coloured.

## Fam. IV. TUBERCULARIEAE. Ehr.

### Series I. Tuberculariеae mucedineae. Sacc.

#### Sect. 1. *Amerosporae.* Sacc.

### TUBERCULARIA. Tode. (fig. 24, p. 442.)

Sporodochium wart-like or tubercular, sessile or subsessile, generally some shade of red, waxy, glabrous, very rarely ciliated at the margin; conidia produced at the tips of lateral branchlets or at the apex of the conidiophores, continuous, elliptical or oblong, typically solitary.

*Tubercularia*, Tode, Meckl. Fung., i. p. 18; Sacc., Syll., iv. p. 638.

Many of the so-called species are known to be the conidial stage of species of *Nectria*.

The sporodochium consists of densely compacted, simple or branched, straight or curved conidiophores which spring from a pseudo-parenchymatous base, and become expanded at the apex to form a more or less capitate structure. The minute conidia form a dense waxy layer covering the surface of the sporodochium.

I. *On trunks and branches of trees or woody shrubs.*

**Tubercularia vulgaris.** Tode.

Sporodochia gregarious, rather large, erumpent, margin naked, red, shining, glabrous, globoso-depressed, sometimes flattened and also confluent, more or less shortly stipitate; conidiophores fasciculate, straight, repeatedly forked, with very short lateral branchlets; conidia elliptic-oblong, sometimes slightly curved, 6–8 × 1·5–2 $\mu$, terminal on the branchlets.

*Tubercularia vulgaris*, Tode, Meckl. Fung., i. p. 18, tab. iv. fig. 30; Sacc., Syll., iv. n. 3002.

On branches of various trees.

**Tubercularia granulata.** Pers.

Dingy red, becoming rarely black, granuliform, erumpent;

conidial stratum rugose, margin naked; conidiophores filiform, branched; conidia ovato-oblong, hyaline, borne on the lateral branchlets.

*Tubercularia granulata*, Pers., Syn., p. 113; Sacc., Syll., iv. n. 3006.

On branches of various trees, bursting through the bark.

**Tubercularia nigricans.** Link.

Tubercles rather large, immersed, red, even, margin naked, stratum of conidia red; flesh of tubercle at length black.

*Tubercularia nigricans*, Link, Sp. Pl., xi. p. 102; Sac., Syll., iv. n. 3009.

On dead branches of elm, and other trees.

**Tubercularia versicolor.** Sacc.

Sporodochia minute, sometimes flesh colour, sometimes greenish; conidia ovoid-oblong, 7–9 × 3–3·5 $\mu$, flesh-colour greenish, terminal on filiform conidiophores.

*Tubercularia versicolor*, Sacc., Fung. Ital., t. 961; Sacc., Syll., iv. n. 3036.

On box twigs (*Buxus*).

**Tubercularia sarmentosum.** Fries.

Sporodochia small, emerging in longitudinal lines through the split epidermis, crimson; conidia allantoid, 7–8 × 2–2·5 $\mu$, hyaline.

*Tubercularia sarmentosum*, Fries, Obs., i. p. 208; Sacc., Syll., iv. n. 3042.

On twigs of ivy, &c.

**Tubercularia subpedicellata.** Schw.

Sporodochia minute, pale brick red, narrowed below into a rather long base, epidermis elevated round the pedicel, head emerging above the ruptured cuticle, globose, the pedicel separated from the head by a red line; conidial stratum rugulose; conidia 6–7 × 3–4 $\mu$.

*Tubercularia pedicellata*, Schw., Syn. Amer. Bor., n. 3014; Sacc., Syll., iv. n. 3038.

On *Syringa* and *Lycium*.

**Tubercularia ligustri.** Cke.

Tubercles minute, convex, erumpent, soon black and depressed in the centre, subsessile; conidia very minute, ellip-

tical, hyaline, 2 × 1 $\mu$; conidiophores short, delicate, apparently simple.

*Tubercularia ligustri*, Cke., Grev., vol. xvi. p. 49.

On twigs of *Ligustrum*.

**Tubercularia euonymi.** Roum. (fig. 24, p. 442.)

Tubercles minute, pulvinate, brick-red; conidia cylindrical, 6 × 1 $\mu$, produced laterally on filiform, strongly curved conidiophores.

*Tubercularia euonymi*, Roum., Fung. Gall., n. 55; Sacc., Syll., iv. n. 3013.

On *Euonymus*.

**Tubercularia expallens.** Fries.

Tubercles subglobose, minute; flesh of stroma whitish, stratum of conidia pale rose-colour, then yellowish; conidia ellipsoid, obtuse.

*Tubercularia expallens*, Fries in index of Syst. Myc., iii. p. 197; Sacc., Syll., iv. n. 3015.

On dead branches of horse-chestnut.

**Tubercularia sambuci.** Corda.

Erumpent, rather large, vermilion; stroma somewhat immersed, convex, grumous, yellow inside, externally red; conidia vermilion, minute, oblong, rather acute, diaphanous.

*Tubercularia sambuci*, Corda, Icon. Fung., i. p. 4, f. 69; Sacc., Syll., iv. n. 3020.

On elder (*Sambucus*).

**Tubercularia aesculi.** Opiz.

Erumpent; tubercles short, fuscous inside, often lobed above, stratum of conidia vermilion; conidia rather large, oblong, obtuse, whitish, diaphanous.

*Tubercularia aesculi*, Opiz. in Corda, Icon. Fung., i. p. 4, f. 77; Sacc., Syll., iv. n. 3014.

On dead branches of horse-chestnut.

**Tubercularia confluens.** Pers.

Gregarious, confluent, large, rosy flesh-colour, then pale; conidial layer thick, diffluent; stroma pulvinate, whitish, yellowish inside at the base; conidia large, fusoid-ovate, somewhat obtuse.

*Tubercularia confluens*, Pers., Syn. Fung., p. 113 (in part); Sacc., Syll., iv. n. 3017.

On bark of poplar, willow, sycamore, &c.

**Tubercularia minor.** Link. *Var.* **Syringae,** Cke. & Mass. Minute, erumpent, horn-coloured then flesh-colour or reddish, shining, gelatinous when moist, stroma readily falling away when mature; conidia oblong, straight, rounded at the ends, 12 × 2 $\mu$; conidiophores simple.

Grev., 1889, p. 80.

On twigs of lilac.

II. *On herbaceous stems.*

**Tubercularia herbarum.** Fries.

Erumpent, innate, pallid, minute; the wedge-shaped stroma purple inside, and covered with a pale conidial stratum; conidia ovate, involved in mucus.

*Tubercularia herbarum*, Fries, Syst. Myc., iii. p. 465; Sacc., Syll., iv. n. 3056.

On dead herbaceous stems.

**Tubercularia brassicae.** Lib.

Tubercles superficial, wart-like, minute, red, even; conidia cylindrical, very slightly curved, 8–10 × 1½ $\mu$, hyaline, borne laterally on simple or forked, toothed conidiophores.

*Tubercularia brassicae*, Lib., Herb., n. 1019; Sacc., Syll., iv. n. 3057.

On decaying cabbage stalks.

III. *On leaves.*

**Tubercularia aquifolia.** C. & M.

Tubercles scattered, innate, at length erumpent, pallid flesh-colour, subsessile; conidiophores rather thick, furcate; conidia narrowly elliptical or sausage-shaped, obtuse, 12–15 × 2–3 $\mu$.

*Tubercularia aquifolia*, Cke., & Mass., Grev., xvi. p. 49.

On dead holly leaves.

IV. *On fir cones.*

**Tubercularia conorum.** C. & M.

Tubercles sessile, erumpent in lines, convex, often confluent, rosy; conidiophores long, straight, erect; conidia allantoid, obtuse, 8–10 × 2–3 $\mu$.

*Tubercularia conorum*, Cke. & Mass., Grev., xvi. p. 49.

On fir cones.

## DENDRODOCHIUM. Bon. (fig. 6, p. 442.)

Sporodochium pulvinate or wart-like, variable, white or bright-coloured; conidia elliptical or oblong, hyaline, produced at the tips of somewhat verticillately branched conidiophores.

*Dendrodochium*, Bonorden, Hdbk., p. 135; Sacc., Syll., iv. p. 650.

Allied to *Tubercularia*, but distinguished by the conidiophores being more or less verticillately branched.

**Dendrodochium citrinum.** Grove.

Sporodochium wart-like, $\frac{1}{2}$ mm. diam., circular, very convex, distinctly marginate; disc shining, citrin-yellow, deepest outside the tumid margin; conidiophores repeatedly 2–5-verticillately branched; branches filiform; conidia apical on the branchlets, spherical, yellowish, guttulate 1·75 $\mu$ diameter.

*Dendrodochium citrinum*, Grove, in Sacc., Syll., iv. n. 3083.

On rotten wood of *Pinus sylvestris* (?).

**Dendrodochium affine.** Sacc. (fig. 6, p. 442.)

Sporodochium bursting through from below the cuticle, hence erumpent, depressedly cushion-shaped, reddish, minute; conidia broadly elliptical, 4–5 × 2–3 $\mu$, biguttulate, at first with a faint tinge of rose, then hyaline; conidiophores filiform, fasciculate, 2–3-times forked above, sparingly septate; sterile hyphae creeping, distantly septate.

*Dendrodochium affine*, Sacc., Mich., ii. p. 562; Sacc., Syll., iv. n. 3073.

On dead stems of potato and sunflower.

## TUBERCULINA. Sacc. (fig 7, p. 442.)

Sporodochium minute, plano-convex, often more or less violet, at length becoming hard and sclerotiform; conidia subglobose, acrogenous, conidiophores rather thick, simple, or with a few short branchlets.

*Tuberculina*, Sacc., Mich., vol. ii. p. 34; Sacc., Syll., iv. p. 653; Mass., Brit. Fung., vol. i. p. 203.

The species are remarkable for being parasitic on the members of another family of fungi, the Uredines. The general habit is that of a *Tubercularia*, near to which form-genus it is placed by Saccardo. Gobi, on the other hand, considers the genus as having more affinity with the *Ustilagineae*.

**Tuberculina persicina.** Sacc. (fig. 7, p. 442.)

Sporodochium plano-convex, minute, several often arranged concentrically, violet-brown, paler inside; conidia subglobose, 7–8 rarely 10 $\mu$ diameter, rosy-violet, smooth; conidiophores simple, or with a few scattered branches, aseptate, denticulate at the tips, almost colourless.

*Tuberculina persicina*, Sacc., Fung. Ital., t. 964; Sacc., Syll., iv. n. 3088; Plow., Brit. Ured. and Ustilag., p. 299 (excl. syn. *Tuberculina vinosa*, Sacc.); Mass. Brit. Fung., vol. i. p. 204, fig. 132.

*Tubercularia persicina*, Ditm. in Sturm's Fl. Deutschl., t. 49.

Parasitic on *Uredo*, *Aecidium*, and *Roestelia* stages of various Uredines.

**Tuberculina vinosa.** Sacc.

Closely allied to *Tuberculina persicina*, from which it differs in the larger pustules of a vinous colour; conidia subglobose or ovoid, 11–12 × 10 $\mu$, conidiophores shorter, thicker, septate, simple.

*Tuberculina vinosa*, Sacc., Michelia, i. p. 262, and ii. p. 34; Sacc., Syll., iv. n. 3089; Massee, Brit. Fung., vol. i. p. 204.

Parasitic on *Aecidium* on Coltsfoot, on *Roestelia* on apple and hawthorn, and on *Aecidium* on boraginaceous plants. Rare.

## ILLOSPORIUM. Mart. (fig. 26, p. 442.)

Sporodochium wart-like, pulvinate, or somewhat effused, white or bright-coloured, subgelatinous and waxy, sometimes cracking; conidia variable, globose or sigmoid, agglomerated in irregular clusters by mucus; conidiophores variable.

*Illosporium*, Martius, Fl. Cr. Erlang., p. 325; Sacc., Syll., iv. p. 656.

Differs from *Tubercularia* in the conidia being held together in irregular masses by mucus. Often forming rosy stains on lichens.

### Illosporium roseum. Mart. (fig. 26, p. 442.)

Erumpent, free, gregarious and forming irregular masses, soft, subgelatinous, deep rose-colour, readily becoming powdery and friable; conidia ovoid, unequal, involved in mucus; conidiophores branched and contorted.

*Illosporium roseum*, Mart., Fl. Erl., p. 325; Sacc., Syll., iv. n. 3100.

Growing on the thallus of various species of lichens, *Physcia*, *Parmelia*, &c.

### Illosporium coccineum. Fries.

Sporodochia minute, crowded, globose, scattered everywhere, scarlet, at length breaking up into similarly coloured conidia, which are subglobose and held by mucus in small groups.

*Illosporium coccineum*, Fries, Syst. Myc., iii. p. 259; Sacc., Syll., iv. n. 3101.

On the thallus of various lichens.

### Illosporium corallinum. Rob.

Gregarious, minute, rosy, globose, ovoid or cylindrical, more or less branched and coral-like; conidia variable in shape, somewhat hyaline, agglutinated in groups.

*Illosporium corallinum*, Rob., in Desm., Ann. Sci. Nat., 1848, x. p. 342; Sacc., Syll., iv. n. 3102.

On various species of frondose lichens.

### Illosporium carneum. Fries.

Gregarious, globose, free, soft, powdery, flesh-red; conidia

ovoid, curved, rosy-hyaline, aggregated by mucus into small groups.

*Illosporium carneum*, Fries, Syst. Myc., iii. p. 259; Sacc., Syll., iv. n. 3103.

On lichens, especially belonging to the genus *Peltigera*.

**Illosporium Curreyi.** Berk.

Sporodochia subglobose or pulvinate, scattered or gregarious, formed of interwoven, branched hyphae that are constricted at the septa; conidia bright yellow, globose.

*Arthroderma Curreyi*, Berk., Outl., p. 357.

*Illosporium Curreyi*, Sacc., Syll., iv. n. 3116.

On dead twigs and leaves.

## AEGERITA. Pers. (fig. 5, p. 442.)

Sporodochium subglobose, sessile, delicate, somewhat mealy, superficial, growing on wood; conidiophores white or pallid, short, rather thick, simple, or slightly branched, sometimes obsolete; conidia globose or ovoid, rather large, more or less terminal, solitary.

*Aegerita*, Pers., Disp. Fung., p. 40; Sacc., Syll., iv. p. 661.

**Aegerita candida.** Pers. (fig. 5, p. 442.)

Crowded, granular, subglobose; minute, pure white when growing, yellowish when dry, even, glabrous, minutely mealy from the numerous conidia; sporophores short, fasciculate, rather thick, cylindrical, wavy; conidia elliptical, base sometimes apiculate, 12–15 × 7–8 $\mu$, usually terminal, hyaline.

*Aegerita candida*, Persoon, Syn., p. 684; Sacc., Syll., iv. n. 3124.

On wood and bark of elder in wet places.

**Aegerita virens.** Carm.

Scattered, granuliform, minute, hemispherical, olive; conidiophores fasciculate at the base, radiating, rather thick, flexuous, simple or dichotomous, often clavate at the tips; conidia terminal, globose, pale olive, 15 $\mu$ diameter.

*Aegerita virens*, Carmichael in Herb.; Grev., vol. xvi. p. 81.

On birch bark.

## SPHACELIA. Lév. (fig. 28, p. 442.)

Sporodochium somewhat plane, effused, seated on a fleshy or waxy basal stratum; conidiophores short, somewhat simple, rod-shaped; conidia ovoid, single, acrogenous.

*Sphacelia*, Lév., Mém. Soc. Linn., v. p. 578; Sacc., Syll., iv. p. 666.

Definitely known to be the conidial condition of species of *Claviceps* and *Epichloe*.

**Sphacelia segetum.** Lév. (fig. 28, p. 442.)

Whitish, covering the surface of the young stroma of *Claviceps purpurea* with a somewhat mealy bloom; conidiophores rod-shaped, slightly clavate, densely packed, continuous, hyaline, 9–12 $\mu$ long; conidia solitary at the tips of the conidiophores, elliptical, hyaline, 4–6 × 2–3 $\mu$.

*Sphacelia segetum*, Lév., Mém. Soc. Linn., v. p. 578; Sacc., Syll., iv. 3147.

Covering the surface of the young stroma of *Claviceps purpurea*, of which it is the conidial stage. Springing from the ovary of various species of grass.

**Sphacelia typhina.** Sacc.

Waxy, pale flesh-colour, encircling the leaf-sheaths or stems of grasses for a space of 1–2 in. as a continuous, thin, crustaceous layer; conidiophores 20–24 × 1·5–2 $\mu$, rod-shaped, slightly attenuated upwards; conidia acrogenous, ovoid, 4–5 × 3 $\mu$, hyaline.

*Sphacelia typhina*, Sacc., Mich., ii. p. 297; Sacc., Syll., iv. n. 3150.

On the leaf-sheath or rachis of various grasses, *Dactylus*, *Holcus*, *Triticum*, &c.

The conidial condition of *Epichloe typhina*.

## HYMENULA. Fr. (fig. 18, p. 442.)

Sporodochium disciform, regular, brightly coloured; conidia borne at the tips of simple or rarely forked conidiophores.

*Hymenula*, Fries, Syst. Myc., ii. p. 233; Sacc., Syll., iv. p. 667.

The black species are arranged under the genus *Hymenopsis*, amongst the *Tubercularíae dematiae*.

**Hymenula constellata.** B. & Br.

Sporodochia orbicular, 1·5 mm. across, pallid, compact in the centre, conidiophores branched, compact; conidia elliptical, 5 × 3 $\mu$.

*Hymenula constellata*, B. & Br., Ann. Nat. Hist., n. 1590; Sacc., Syll., iv. n. 3170.

On rotten wood.

**Hymenula rubella.** Fr. (fig. 18, p. 442).

Sporodochium oblong, shining, yellowish-red, agglutinated to the matrix; conidiophores acicular, sometimes furcate, 20–25 × 1 $\mu$; conidia terminal, cylindrical, ends obtuse, straight or slightly curved, 5–7 × 1·5 $\mu$, hyaline.

*Hymenula rubella*, Fries, Elench., ii. p. 38; Sacc., Syll., iv. n. 3171.

On dead stems of *Typha*, *Juncus*, *Phragmites*, *Carex*, &c.

**Hymenula Berkeleyi.** Sacc.

Sporodochium punctiform, pallid, gelatinous, dingy white or pale yellow, about $\frac{1}{2}$ mm, diameter; sometimes subundulate; conidia elliptical, 5 $\mu$ long.

*Hymenula Berkeleyi*, Sacc., Syll., iv. n. 3174.

*Hymenula punctiformis*, B. & Br., Ann. Nat. Hist., n. 729; Berk., Outlines, p. 291.

On fir wood. With the habit of a small *Calloria*.

**Hymenula vulgaris.** Fries.

Sporodochium subgelatinous, naked, slightly elevated, oblong or irregular, 2–6 mm. long, white or with a tinge of blue when fresh, blackish when dry; conidiophores erect, densely crowded, very slender, colourless, simple (?), throwing off conidia at the apex; conidia 5–6 × 1·5–2 $\mu$, obtuse at both ends, colourless, very numerous, slightly curved.

*Hymenula vulgaris*, Fries, Syst. Myc., iii. p. 234; Sacc., Syll., iv. n. 3157.

On rotting stems of *Angelica*, *Urtica*, &c.

## CYLINDROCOLLA. Bon. (fig. 25, p. 442.)

Sporodochium subtremelloid, wart-like, irregular, brightly coloured; conidia terminal on the tips of repeatedly forked conidiophores, concatenate, rod-shaped, truncate at both ends.

*Cylindrocolla*, Bonorden, Hdbk., p. 149; Sacc., Syll., iv. p. 673.

Characterised by the repeatedly dichotomising conidiophores and the concatenate cylindrical truncate conidia.

### Cylindrocolla urticae. Bon. (fig. 25, p. 442.)

Gregarious, irregularly circular, becoming collapsed in the centre, bright orange-red; conidiophores repeatedly forked, elongated; conidia terminal on the branchlets, cylindrical, 8–12 × 1·5 $\mu$, continuous, hyaline.

*Cylindrocolla urticae*, Bon., Hdbk., p. 149; Sacc., Syll., iv. n. 3190.

On dead nettle stems. Forming bright orange-red, subgelatinous, minute patches. Said to be the conidial condition of *Calloria fusarioides*.

## PERIOLA. Fries. (fig. 17, p. 442.)

Sporodochium free, superficial, rounded, variable, surrounded by the cortex; stroma cellular, fleshy or somewhat gelatinous; conidia globoso-ovoid, hyaline, continuous, in peripheral chains mixed with bristles.

*Periola*, Fries, Syst. Myc., ii. p. 266; Sacc., Syll., iv. p. 681.

Allied to *Volutella*, but differing in the peripheral chains of conidia.

### Periola tomentosa. Fries. (fig. 17, p. 442.)

Rounded, deformed, tomentose, white, scattered or conglomerated, often confluent, base adnate, 4–6 mm. across, somewhat fleshy, pallid inside, firm; conidia obovate, minute, 5 × 3 $\mu$, hyaline, (catenulate?), borne on densely crowded, rod-shaped basidia.

*Periola tomentosa*, Fries, Syst. Myc., ii. p. 267; Sacc., Syll., iv. no. 681.

On potatoes that have been stored.

## VOLUTELLA. Tode. (figs. 8 and 9, p. 442.)

Sporodochium disciform, regular, margin with elongated cilia, or in some species everywhere with projecting spine-shaped hyphae or cilia, sessile or stipitate; conidia elliptical, oblong, or subglobose, terminal or slender, simple or branched conidiophores, which constitute the sporodochium.

*Volutella*, Tode, Mecklenb. Fung., i. p. 28; emended by Saccardo in Mich., ii. p. 36; Sacc., Syll., iv. p. 682.

Distinguished by the regular and symmetrical sporodochium, which is either fringed or studded all over with elongated projecting spine-like hyphae. Certain sessile, broadly applanate, more or less irregularly shaped species have been removed to the genus *Psilonia*.

### A. *Sporodochium stipitate or with a narrowed base.*

**Volutella ciliata.** Fries. (figs. 8 and 9, p. 442.)

Sporodochium substipitate or contracted at the base, pale pink or whitish, hemispherical, 150–200 $\mu$ across, disc slightly convex, furnished at the margin with a fringe of scattered, hyaline, continuous or septate, elongated, pointed hyphae 250–500 × 8–10 $\mu$; conidiophores densely crowded, unbranched, colourless or with a tinge of rose-colour; conidia narrowly elliptic-oblong, ends rounded, hyaline, straight, or slightly subinequilateral, 5–7 × 2–2·5 $\mu$.

*Volutella ciliata*, Fries, Syst. Myc., iii. p. 467; Sacc., Syll., iv. n. 3223.

On rotten wood and branches, also on decaying fruits, tubers, &c.

*Var.* **stipitata.** Sacc., Syll., iv. n. 3223. Sporodochium shortly stipitate, stem brownish, or subsessile, hemispherical, rather fleshy, covered above with a rose-coloured layer of conidia, marginal setae scanty, rigid, septate, subulate, hyaline; conidia elliptic-oblong, minute, hyaline, 2-guttulate, 5 × 2·5 $\mu$.

*Psilonia stipitata*, Libert, exs. cent., iii. n. 287.
On rotten branches and stems, and on various sclerotia.

**Volutella roseola.** Cke.
Sporodochium subglobose, rose-colour, seated on a distinct thin stem-like base, cilia marginal, elongated, flexuous, attenuated upwards; conidia cylindrical, $3 \times 1$ $\mu$.
*Volutella roseola*, Cke., in Grevillea; Sacc., Syll., iv. n. 3230.
On branches. Distinguished from *Volutella ciliata* by the much smaller conidia.

**Volutella hyacinthorum.** Berk.
Minute; pure white, shortly but distinctly stipitate; sporodochium surrounded by a row of long, pointed, colourless hairs; conidia colourless, $4 \times 1{\cdot}5$ $\mu$.
*Volutella hyacinthorum*, Berk., Outl., p. 340; Sacc., Syll., iv. n. 3231.
*Psilonia hyacinthorum*, Berk., Engl. Fl., v. p. 353.
On dead bulbs, leaves, herbaceous stems, &c.

**Volutella nivea.** Sacc.
Erumpent; sporodochia gregarious or confluent, snow-white, 1–2 mm. diameter, sessile, hemispherical, hairs hyaline, numerous, wavy, with spreading branches; conidia minute, elongato-cylindrical, curved, hyaline.
*Volutella nivea*, Sacc., Syll., iv. n. 3236 (not of Fries), which is, as pointed out by Cooke, of insect origin, being caused by *Adelges fagi*, as proved by an authentic specimen from Fries.
On bark of beech, emerging through the cracks.

B. *Base of sporodochium broad and flattened.*

* *Growing on Dicotyledons.*

**Volutella setosa.** Berk.
Sporodochium white, sessile on a broad base, margined and its substance interspersed with elongated, continuous, hair-like hyphae; conidia globose, very minute, about 1 $\mu$ diameter.

*Volutella setosa*, Berk., Outl., p. 340; Sacc,, Syll., iv. n. 3235.

*Aegerita setosa*, Grev., Scot. Crypt. Fl., tab. 268. fig. 2.

On rotten herbaceous stems, &c.

**Volutella buxi.** Berk.

Sporodochia gregarious, minute, sessile, pulvinate, the elongated setae clear pale rose. septate, tips obtuse, 100–120 × 4 $\mu$ erecto-divergent, forming a fringe round the sporodochium; conidia oblong-fusoid, acute at both ends, 10–12 × 3–5 $\mu$; pale rose-colour.

*Volutella buxi*, Berk., Outl., p. 340; Sacc., Syll., iv. n. 3237.

*Chaetostroma buxi*, Corda, Icon. Fung., ii. f. 107.

On the under surface of box leaves.

**Volutella gilva.** Sacc.

Sporodochia scattered, erumpent, convex, $\frac{3}{4}$–1 mm. diameter, rather compact, sometimes elongated, dingy yellow or reddish, its substance interspersed with filiform, very wavy, 150–200 × 5–6 $\mu$, septate, ochraceous setae that are rough at the tips; conidia cylindrical, straight, ends obtuse, 10–13 × 1–2·5 $\mu$, basidia fasciculate, filiform, 15–20 × 1·5–2 $\mu$.

*Volutella gilva*, Sacc., Mich., ii. p. 208; Sacc. Syll., iv. n. 3240.

On putrid leaves, stems, &c.

**Volutella discoidea.** Sacc.

Sporodochium 2–4 mm. high, orbicular, elongated, flexuous, pale fulvous then brown, at first setulose all over, disc proliferous, margin rosy-brown; conidia oblong or subcymbiform, 9 × 3–4 $\mu$.

*Volutella discoidea*, Sacc., Syll., iv. n. 3246.

*Psilonia discoidea*, B. & Br., Ann. Nat. Hist., 1866, n. 1150, t. 3. f. 8.

On rotten wood.

** *Growing on Monocotyledons.*

**Volutella arundinis.** Desm.

Sporodochium oblong, pale rose-colour; setae hyaline, fasciculate; conidia elliptical, 5 $\mu$ long.

*Volutella arundinis*, Desm., Obs. Crypt., 1830, p. 12; Sacc., Syll., iv. n. 3261.
On sheaths of *Phragmites communis*.

**Volutella melaloma.** B. & Br.
Sporodochia orange-colour, fringed with black, septate cilia; conidia fusiform, often slightly curved, appendiculate, 8 × 4 $\mu$.
*Volutella melaloma*, B. & Br., Ann. Nat. Hist., n. 496, t. xi. f. 3; Sacc., Syll., iv. n. 3252.
On leaves of a species of *Carex*.

**Volutella festucae.** Sacc.
Sporodochium sessile, epiphyllous, hemispherical, woolly, minute, lax, fugacious, whitish rose-colour; setae subdistant, erect, simple, acute, continuous, hyaline; conidia cylindrical, curved, ends obtuse, pale rose-colour, 5–6 × 2 $\mu$.
*Volutella festucae*, Sacc. Syll., iv. n. 3262.
*Psilonia festucae*, Lib., Exs., n. 286.
On leaves of *Festuca*.

Sect. 2. *Didymosporae.* Sacc.

ENDODESMIA. B. & Br. (emend.) (fig. 12, p. 442.)

Sporodochium subglobose, conidiophores very short and forming a compact basal stratum, each bearing an erect chain of uniseptate conidia; sterile hyphae numerous, elongated, radiating from the base, slender, continuous.
*Endodesmia*, Berk. & Broome, Ann. Nat. Hist., 1871, p 16; Sacc., Syll., iv. p. 691.
An examination of the type specimen shows that the spores are not at all appendiculate. Differs from *Volutella* in the long chains of 1-septate conidia.

**Endodesmia glauca.** B. & Br. (fig. 12, p. 442.)
Sporodochium about 1 line high and across, glaucous; conidiophores very short, rod-like, conidia elliptical, both ends rather acute, 1-septate, smooth, almost or quite hyaline, catenulate, chains more or less erect; sterile hyphae, radiating on all sides, very slender, rather wavy, 200 × 2 $\mu$, continuous, almost hyaline.

*Endodesmia glauca*, Berk. & Broome, Ann. Nat. Hist., 1871, n. 1318, t. xx. f. 9 (conidia wrong shape, and should not be appendiculate); Sacc., Syll., iv. n. 3267.

On old cabbage stalks, forming minute glaucous or greyish, silky-looking tufts under a lens. The above description is drawn up from the type specimen.

Sect. 3. *Phragmosporae.* Sacc.

BACTRIDIUM. Kunze. (fig. 13, p. 442.)

Sporodochium superficial, rather thin, more or less convex; conidia elongated, large, pluriseptate, colourless or coloured; conidiophores simple or branched, terete.

*Bactridium*, Kunze, Mykol., Heft i. p. 5; Sacc., Syll., iv. p. 691.

Distinguished by the very large, elongated, multiseptate conidia.

**Bactridium flavum.** K. & S.

Sporodochium nearly globose, clear orange, 1–1·5 mm. across; conidia fusiform-clavate, 150–180 × 30–50 $\mu$, 5–6-septate, olive with a rufous tinge; sporophores simple, 150–180 × 8–10 $\mu$, colourless.

*Bactridium flavum*, Kunze & Schw., Myk., Heft i. p. 5, t. i. f. 2; Sacc., Syll., iv. n. 3268.

On rotten wood.

**Bactridium acutum.** B. & W.

White; parasitic, conidia attenuated at the base, apex acute, 1–3-septate, penultimate joint tumid.

*Bactridium acutum*, Berk. & White; Scottish Nat., iv. p. 162, t. ii. f. 4; Sacc., Syll., iv. n. 3275.

Parasitic on the hymenium of *Peziza cochleata*. Differs from *Bactridium helvellae* in the conidia being constantly acute at the apex and attenuated towards the base.

**Bactridium helvellae.** B. & Br. (fig. 13, p. 442.)

Sporodochia confluent, thin, minute, subeffused; conidiophores suberect, sparingly branched; conidia clavate, clavato-piriform, subfusiform, colourless, at maturity 6–7-septate, 60–70 × 14–16 $\mu$.

*Bactridium pezizae*, B. & Br., Ann. Nat. Hist., n. 816, t. ix. f. 3; Sacc., Syll., iv. n. 3276.

On the hymenium of a *Peziza*.

**Bactridium atrovirens.** Berk.

Hyphae forked, pellucid; conidia lanceolate, 1–2-septate, dingy green, forming a minutely granular olive-green stratum.

*Bactridium atrovirens*, Berk., Engl. Flora, vol. v. p. 350; Sacc., Syll., iv. n. 3278.

On trunks. There is no specimen in the Berkeley herbarium.

## FUSARIUM. Link. (figs. 14 and 27, p. 442.)

Sporodochium pulvinate or rather effused; conidia fusoid or falcate, typically pluriseptate at maturity, borne at the tips of branched conidiophores.

*Fusarium*, Link, Berl. Mag., iii. p. 10 (1809), emended by Sacc., Mich., ii. p. 35; Sacc., Syll., iv. p. 694.

*Fusisporium*, *Selenosporium* } of many old authors.

Often occurring as more or less effused, orange crusts that are rather gelatinous when moist.

### I. EU-FUSARIUM. *Conidia fusoid, falcate, or cylindrical, one or many-septate.*

**Fusarium lateritium.** Nees.

Sporodochium variable, thick, erumpent, deep brick-red; conidia arcuate, acute at both ends, 39–40 × 4–5 $\mu$, 4–5-septate, borne on oppositely branched conidiophores.

*Fusarium lateritium*, Nees, Syst., f. 26; Sacc., Syll., iv. n. 3283.

On dead branches, galls, &c.

**Fusarium sarcochroum.** Sacc.

Sporodochium erumpent, $\frac{1}{2}$–$\frac{3}{4}$ mm. diameter, fleshy, rather convex, compact, at first white, then flesh-colour or reddish; hyphae densely fasciculate, ascending, septate, repeatedly

dichotomously branched; conidia produced at the tips of the branches, fusiform, slightly curved, acute at both ends, 3–5-septate, rosy-hyaline, 28–40 × 4–6 μ.

*Fusarium sarcochroum*, Sacc., Syll., iv. n. 3281.

*Selenosporium sarcochroum*, Desm., Ann. Sci. Nat., 1850, xiv. p. 111.

On the bark of branches.

**Fusarium pyrochroum.** Sacc.

Sporodochia spot-like or minute, erumpent, remaining partly covered, pale ochraceous, flame-colour when dry, $\frac{1}{3}$–$\frac{1}{2}$ mm. across; conidia produced at the tips of verticillately branched, curved conidiophores, 35–40 × 3–5 μ, spuriously 3–5-septate, acute, rosy-hyaline.

*Fusarium pyrochroum*, Sacc., Syll., iv. n. 3282.

*Selenosporium pyrochroum*, Desm., Ann. Sci. Nat., 1850, xiv. p. 111.

On dead branches.

**Fusarium vinosum.** Mass.

Sporodochia minute, gregarious, erumpent, deep vinous brown, often becoming confluent and forming a crust, somewhat gelatinous; conidia fusoid, arcuate, acuminate at the ends, 37 × 40 × 4–5 μ, 5-septate, borne on oppositely branched conidiophores.

On decaying beech mast.

**Fusarium viticola.** Thüm.

Sporodochia solitary or scattered, sometimes confluent, large, elevated, originating under the epidermis, which is at length perforated, slightly rugulose, shining, almost flesh-colour; conidia exactly fusiform, slightly curved, sometimes straight, rather acute at both ends, 3–5-septate, not constricted at the septa, subnucleate or granular within, 36–40 × 4 μ, hyaline.

*Fusarium viticola*, Thüm, Weinst., p. 52, t. iii. f. 3; Sacc., Syll., iv. n. 1288.

On dry vine twigs.

**Fusarium tuberculariodes.** Sacc.

Erumpent, minute, purple; stroma fleshy, ochraceous; conidia 45–50 μ long, fusiform, curved, very acute at both ends, 6-septate, white.

*Fusarium tuberculariodes*, Sacc., Syll., iv. n. 3299.
*Selenosporium tuberculariodes*, Corda, Ic., i. p. 7, f. 111.
On rotten branches of *Rubus*.

**Fusarium foeni.** B. & Br.
Golden-red, sporodochium broadly effused, mycelium creeping, sparingly septate, conidiophores very short; conidia oblong, curved, 1–2-septate, 45–50 × 5 μ, hyaline.
*Fusarium foeni*, B. & Br., Ann. Nat. Hist., n. 550; Sacc., Syll., iv. n. 3306.
On damp hay.

**Fusarium myosotidis.** Cke.
Hypophyllous. Spots small, irregular, pallid; stroma thin; conidia fusiform, curved, triseptate, hyaline, 30 × 3–4 μ.
*Fusarium myosotidis*, Cke., Grev., xvi. p. 49.
On fading leaves of *Myosotis*.

**Fusarium inaequale.** Auersw.
Conidia rose-colour, hyaline, variable in shape, oblong, fusiform, and linear, 1–5-septate or continuous, rounded at both ends, 7–15 μ long.
*Fusarium inaequale*, Auersw., in Klot. Herb. Myc., n. 1383; Bot. Ztg., 1850, p. 439; Sacc., Syll., iv. n. 3310.
On various decaying substances.

**Fusarium diffusum.** Carm.
Effused, orange, conidia fusiform, accuminate, slightly fusiform, especially at the extremities, 3–5-septate, hyaline, 60–70 × 3 μ.
*Fusarium diffusum*, Carm. MS., Grev., xiv. p. 81.
On thistle stems. Near *F. roseum*.

**Fusarium roseum.** Link.
Sporodochium minute, sessile, subglobose or rather effused, gregarious, rust-colour; conidia fusiform, pale, very abundant, 30–65 × 4 μ, usually 3-septate.
*Fusarium roseum*, Link., Sp. Pl. Fungi, ii. p. 105; Sacc., Syll., iv. n. 3311.
On decaying leaves and stems.

**Fusarium brassicae.** Thüm.
Sporodochia wart-like, densely gregarious, sometimes but

rarely confluent, compact, rather firm, superficial, opaque brown; conidia lunulate, fusiform, rather acute at both ends, 2-septate, but not constricted at the septa, sometimes guttulate, hyaline, 30-36 × 3–4·5 μ, conidiophores short.

*Fusarium brassicae*, Thüm., Hedw., 1880, p. 191; Sacc., Syll., iv. n, 3314.

On rotten cabbage stalks.

**Fusarium Cordae.** Mass.

Sporodochium broad, orange; hyphae creeping, branched and densely interwoven, 3–5 μ thick, hyaline; conidiophores acicular, branched; conidia fusoid, curved, very acute at both ends, 3–5-septate, rosy-hyaline, 40–55 × 3–5 μ.

*Fusarium aurantiacum*, Corda, in Sturm, t. 8.

*Fusarium oxysporum*, Schlecht, var. *aurantiacum*, Sacc., Syll., iv. n. 3334.

On various decaying vegetable substances, seeds, fruits, &c.

Corda's name is antedated by (Link) Sacc.

**Fusarium caeruleum.** Sacc.

Sporodochium broadly effused, bright violet-blue; conidia fusiform, 2–3-septate, curved, 24–30 × 5–6 μ.

*Fusarium caeruleum*, Sacc., Syll., iv. n. 3335.

*Fusarium violaceum*, Fuckel, Symb. Myc., p. 369.

On rotten tubers of potato.

**Fusarium solani.** Sacc. (fig. 14, p. 442.)

Globose, irregular, tomentose, white; hyphae branched; conidia fusiform-falcate, 3–5-septate, 40–60 × 7–8 μ, almost hyaline.

*Fusarium solani*, Sacc., Mich., ii. p. 296; Syll., iv. n. 3336.

*Fusisporium solani*, Mart., Kartof. Epid., t. 3, f. 25–30.

**Fusarium heterosporum.** Nees.

Sporodochium rather tremelloid, expanded, deep red; conidia fusiform, 3–5-septate, 30–35 μ long.

*Fusarium heterosporum*, Nees, N. A. Cur., ix. p. 135; Sacc., Syll., iv. n. 3343.

On the fruit, glumes, and in the seed of various grasses.

**Fusarium minimum.** Fckl.

Sporodochia very minute, spot-like, hemispherical, often

confluent, vermilion; conidia fusiform, curved, obscurely 3-septate, 14 × 3 μ, hyaline.

*Fusarium minimum*, Fuckel, Symb. Myc., p. 370, t. 1, f. 39; Sacc., Syll., iv. n. 3345.

On fading grass leaves.

**Fusarium insidiosum.** Sacc.

Sporodochia whitish, subglobose, very minute; mycelium creeping; conidiophores simple or branched, torulose; conidia fusiform, falcate, apiculate, 50 μ long, 1–5 septate.

*Fusarium insidiosum*, Sacc., Syll., iv. n. 3346.

*Fusisporium insidiosum*, Berk., Gard. Chron., 1860, p. 480, with a fig.

On leaves and culms of *Agrostis pulchella*.

**Fusarium bulbigenum.** Cke. & Mass.

Effused, whitish, at first somewhat erumpent in small tufts, which become confluent; conidia fusiform, arcuate or incurved at the acute extremities, triseptate, hyaline, 40–50 × 5 μ.

*Fusarium bulbigenum*, Cke. & Mass., Grev., xvi. p. 49.

On bulbs of *Narcissus*.

**Fusarium filisporum.** Sacc.

Sporodochium minute, rosy, developing in the capsules and amongst the leaves of mosses; conidia filiform, multiseptate, breaking up at the septa, 170 μ long.

*Fusarium filisporum*, Sacc., Syll., iv. n. 3348.

*Fusisporium filisporum*, Cooke.

On *Orthotrichum*.

**Fusarium obtusum.** Sacc.

Tremelloid, white; conidia cylindrical, generally attenuated at the ends, obtuse, 3-septate, 40 × 5 μ.

*Fusarium obtusum*, Sacc., Syll., iv. n. 3353.

*Fusisporium obtusum*, Cke., Grev., v. p. 58.

On *Diatrype*.

**Fusarium epimyces.** Cooke.

Sporodochium minute, whitish, gelatinous, often confluent; conidia fusiform, the pointed extreme tips abruptly curved, hyaline, 50–60 × 4 μ, 3-septate.

On *Scleroderma vulgare*.

**Fusarium mucophytum.** Mass.

Mycelium pallid or colourless, thin, somewhat torulose, forming a thin, somewhat gelatinous stratum; conidia very large, curved, fusiform, 3–8-septate, nucleate, at first colourless, then pale brown or salmon-colour.

*Fusisporium mucophytum*, W. G. Smith, Gard. Chron., 1884, p. 245, with a fig.

On gills of living *Agarics*.

**Fusarium roseolum.** Sacc.

Sporodochium rose-red, delicate, flocculose; hyphae short; conidia curved, elongated, rather obtuse, 3–6-septate, slightly torulose.

*Fusarium roseolum*, Sacc., Syll., iv. n. 3363.

*Fusisporium roseolum*, Steph., Berk., Ann. Nat. Hist., n. 549.

On rotten potato tubers.

**Fusarium bacilligerum.** Sacc.

Greyish-white; mycelium obsolete; conidia very long, hyaline, 5–7-septate, obtuse or slightly clavate, rather curved.

*Fusarium bacilligerum*, Sacc., Syll., iv. n. 3370.

*Fusisporium bacilligerum*, B. & Br., Ann. Nat. Hist., n. 548.

On leaves of *Rhamnus*.

Probably a species of *Cercospora*.

**Fusarium heteronemum.** B. & Br.

Hyphae septate at the base, joints broad, continuous upwards, branched, sometimes furcate, slender; conidia oblong, curved, uniseptate.

*Fusarium heteronemum*, B. & Br., Ann. Nat. Hist., n. 1051, t. 14, f. 9; Sacc., Syll., iv. n. 3374.

On decayed pears.

**Fusarium incarcerans.** Sacc.

Pale rose-colour; conidia arcuate, slender, 60–65 $\mu$ long, 3-septate.

*Fusarium incarcerans*, Sacc., Syll., n. 3383.

*Fusisporium incarcerans*, Berk., Intell. Obs., 1863, p. 11, f. 4.

In fruit of *Orthotrichum*.

**Fusarium Kühnii.** Sacc.

Mycelium cobweb-like, white, effused, consisting of slender branched hyphae, at length disappearing; sporodochium irregularly oblong, horny, clay-colour, texture areolate, hardly visible to the naked eye; conidia slightly lunate, 1-septate, hyaline, 12 × 4 $\mu$.

*Fusarium Kühnii*, Sacc., Syll., iv. n. 3384.

*Fusisporium Kühnii*, Fuckel, Symb. Myc., p. 371.

On lichens and mosses, especially when growing on poplars.

**Fusarium betae.** Mass. (fig. 27, p. 442.)

Somewhat tremelloid, orange-red, irregularly lobed and more or less effused; fusiform, slightly curved, 3–5-septate at maturity, hyaline, 35–40 × 4 $\mu$; conidiophores short, branched, slender, septate.

*Fusisporium betae*, Desm., Ann. Sci. Nat., 1830, vol. xix. t. 18, fig. 2.

*Fusicolla betae*, Sacc., Syll., iv. n. 3142.

*Pionnotes betae*, Sacc., Syll., iv. n. 3470.

On decaying beetroot. Forming subgelatinous, effused, orange-red patches. The British fungus agrees exactly with Desmazière's specimens, and is a true *Fusarium*. Saccardo quotes Desm. under both genera given above.

II. FUSAMEN. *Conidia fusiform, falcate or cylindrical; continuous (or septa not indicated).*

**Fusarium salicinum.** Corda.

Stroma subcortical, forming pale patches; hymenium orange, effused, gyrose; sporophores filiform, fasciculate; conidia elongated, 12–15 $\mu$, cylindrical, lunulate, continuous.

*Fusarium salicinum*, Corda, Ic. Fung., iii. p. 33, t. 6, f. 87; Sacc., Syll., iv. n. 3391.

**Fusarium rhabdophorum.** B & Br.

Erumpent, brown, base orbicular; conidia straight, rod-shaped, 15 $\mu$ long.

*Fusarium rhabdophorum*, B. & Br., Ann. Nat. Hist., n. 1612; Sacc., Syll., iv. n. 3395.

On dead branches.

**Fusarium cucumerinum.** B. & Br.

Pale orange, subglobose, subeffused; conidia fusiform, 12–13 $\mu$ long.

*Fusarium cucumerinum*, B. & Br., Ann. Nat. Hist., n. 1611; Sacc., Syll., iv. n. 3410.

On rotten cucumber.

**Fusarium equisetorum.** Desm.

Erumpent, minute, convex, globose or oblong, rufous; gelatinous; conidia for a long time ovoid, then elongated, slightly curved, hyaline, continuous, up to 38 $\mu$ long; conidiophores dichotomously or irregularly branched.

*Fusarium equisetorum*, Desm., Exs., n. 1546; Sacc., Syll., iv. n. 3416.

On stems of *Equisetum*.

**Fusarium aurantiacum.** Sacc.

Sporodochium thin, effused, orange, margin woolly, white; conidia oblong-fusiform, straight, continuous.

*Fusarium aurantiacum*, Sacc., Syll., iv. n. 3428.

*Fusisporium aurantiacum*, Link, Obs., i. p. 17.

On herbaceous stems.

**Fusarium translucens.** B. & Br.

Pellucid, substipitate, margin slightly ciliate, white, at length tinged yellowish, umbilicate above; conidia slender, cylindrical, 7–8 $\mu$ long.

*Fusarium translucens*, B. & Br., Ann. Nat. Hist., n. 1610; Sacc., Syll., iv. n. 3436.

On fir branches.

**Fusarium minutulum.** Corda.

Spot-like, very minute, white; stroma convex, fibrous; conidia minute, oblong, rounded at both ends, 5 $\mu$ long.

*Fusarium minutulum*, Corda, Icon. Fung., ii. p. 4, f. 18; Sacc., Syll., iv. n. 3441.

On chips, &c.

## PIONNOTES. Fr.

Sporodochium gelatinous, rigid when dry, orange-coloured, forming a thick, often lobed mass; conidia rather large, fu-

soid or cylindrical, curved, pellucid, obsoletely septate, (rarely elliptical and one-celled). Hyphae fasciculate, simple or branched.

*Pionnotes*, Fries, Summ. Veg., p. 481; Sacc., Syll., iv. p. 725.

Perhaps too closely allied to the genus *Fusarium*, and distinguished principally by the broadly effused, gelatinous sporodochium that becomes rigid when dry.

**Pionnotes uda.** Sacc.

Broadly effused, tremelloid, dingy orange; hyphae decumbent, sparingly branched, septate; conidia elongated, curved, 3–5 septate, acute at both ends, orange, 40–50 × 5–6 $\mu$.

*Pionotes uda*, Sacc., Syll., iv. n. 3468.

*Fusisporium udum*, B. & Br., Ann. Nat. Hist., n. 245, t. xiv f. 28.

On trunks.

**Pionnotes Biasolettiana.** Corda.

Irregular or effused, fleshy-tremelloid, thick, reddish-orange; stroma floccose; hyphae septate, simple or sparingly branched, fasciculate; conidial stratum rather thick, gelatinous, orange-red, viscid; conidia fusiform, acute at both ends, slightly curved, becoming 2–5-septate, 50–60 × 4–6 $\mu$.

*Pionotes Biasolettiana*, Sacc., Syll., n. 3464.

*Fusarium Biasolettianum*, Corda.

On rose branches.

## MICROCERA. Desm.

Sporodochium conical or pulvinate, slender; conidia narrowly falciform, many-septate, borne at the tips of filiform conidiophores.

*Microcera*, Desm., Ann. Sci. Nat., 1848, p. 359; Sacc., Syll., iv. p. 727.

Closely allied to *Fusarium*, but distinguished by the small, horn-like sporodochium.

**Microcera coccophila.** Desm.

Minute, somewhat caespitose, conical or horn-shaped, simple, rosy, base with a whitish membranaceous sheath;

conidia elongated, acute at both ends, curved, 3–5-septate, hyaline, 70–100 × 4–5 $\mu$; conidiophores long, 2·5 $\mu$ thick.

*Microcera coccophila*, Desm., Ann. Sci. Nat., 1848, p. 359; Sacc., Syll., iv. n. 3473.

On various kinds of *Coccus* attached to branches of trees.

The conidial condition of *Sphaerostilbe*.

## Series II. **Tuberculariеae dematieae.** Sacc.

### Sect. 1. *Amerosporae.* Sacc.

### EPICOCCUM. Link. (figs. 10, 11, p. 442.)

Sporodochium more or less globose or convex, cellular; conidia subglobose, surface minutely warted and sometimes divided into areolae (many-celled), conidiophores very short.

*Epicoccum*, Link, Obs., ii. p. 32; Sacc., Syll., iv. p. 736.

The sporodochia are gregarious, and often seated on a red or purple patch of colour.

**Epicoccum vulgare.** Corda.

Spots variable in colour, greyish, greenish, or with a blue tinge; stroma convex, oblong, blood-red, then blackish; conidia crowded, globose, reticulated, brown, the middle portions of the areolae furnished with black worts, 21–25 $\mu$ diameter, conidiophores very short, white, attenuated downwards.

*Epicoccum vulgare*, Corda, Icon. Fung., i. p. 5, fig. 90 (in part); Sacc., Syll., iv. n. 3482.

On rotting herbaceous stems, leaves, &c.

**Epicoccum granulatum.** Penz.

Sporodochia gregarious, confluent, pulverulent, jet black; stroma hemispherical; hyphae yellow then brown or fuscous, articulated; conidia blackish-olive, sphaeroidal, not pedicellate, many-celled, minutely granular or warted, 20–28 $\mu$ diameter.

*Epicoccum granulatum*, Penzig, Fung. Agrum. in Michelia, ii. p. 487; Sacc., Syll., iv. n. 3484.

On rotting wood, fading leaves of orange, and on *Sorghum cernuum*.

**Epicoccum neglectum.** Desm.

Spots none or obsolete, sporodochia epiphyllous, spot-like, scattered, jet-black; stroma hemispherical, brown or blackish, formed of very short, septate hyphae; conidia globose, blackish-brown, reticulated, 12–16 $\mu$ diameter, furnished with a very short, hyaline, obconic, truncate pedicel.

*Epicoccum neglectum*, Desm., Ann. Sci. Nat., xvii. p. 95; Sacc., Syll., iv. n. 3483.

On fading leaves of grasses, sedges, orange, &c.

**Epicoccum diversisporum.** Preuss.

Minute, gregarious, seated on rosy spots; stroma globose, blackish-purple, purple inside, irregularly cellular, vericulose; conidia crowded, of various size, angularly globose, not reticulated, warted, fuscous, warts darker, pedicel white.

*Epicoccum diversisporum*, Preuss, in Linn., xxv. p. 740; Sacc., Syll., iv. n. 3502.

On leaves of *Phragmites*, *Carex*, &c.

**Epicoccum herbarum.** Corda.

Very minute, gregarious; stroma globose, purple, pale flesh-colour inside, cells six-angled; conidia angularly globose, reticulated, fuscous, 20–23 $\mu$ diameter, areolae darker; pedicel conical, short, immersed in the stroma, tinged fuscous, diaphanous.

*Epicoccum herbarum*, Corda, Icon. Fung., i. p. 5, f. 58; Sacc., Syll., iv. n. 3489.

On herbaceous stems, leaves, &c.

**Epicoccum micropus.** Corda.

Sporodochia gregarious, effused, black; stroma subglobose, then depressed, reddish-brown; basidia projecting, clavate, transversely septate, fuscous; conidia angularly globose, base depressed, sessile or very shortly pedicellate, glabrous, fuscous, 22–23 $\mu$ diameter.

*Epicoccum micropus*, Corda, Icon. Fung., iii. p. 32, f. 82; Sacc., Syll., iv. n. 3492.

On rotten leaves and stems, also on *Lactarius*.

**Epicoccum equiseti.** Berk.

Sporodochia arranged in lines in the grooves of the stem; conidia minute, smooth, black with a blood-red tinge.

*Epicoccum equiseti*, Berk., in Cooke's Hdbk., n. 1679; Sacc., Syll., iv. n. 3504.

On decaying stems of *Equisetum limosum*.

**Epicoccum purpurascens.** Ehrenb. (figs. 10, 11, p. 442.)

Sporodochia blackish-brown, globular, 120–150 $\mu$ diameter, crowded into oblong clusters 2–3 mm. long, seated on an elongated purple spot; conidia large, subglobose, yellowish then brown, reticulated, distinctly areolated and warted, pedicel hyaline, attenuated at the base, 16–22 $\mu$ diameter.

*Epicoccum purpurascens*, Ehr., Sylv., p. 12; Sacc., Syll., iv. n. 3481.

On leaves or dead herbaceous stems.

## EPIDOCHIUM. Fries. (fig. 2, p. 442.)

Sporodochium erumpent, almost superficial, waxy or gelatinous then fleshy, subglobose or wart-like, blackish, rarely pallid, conidiophores filiform and equal or passing into globoso-clavate pseudo-conidia; conidia ovoid, oblong or piriform, solitary or catenulate.

*Epidochium*, Fries, Summa Veg. Scand., p. 471; Sacc., Syll., iv. p. 747.

The subgenus *Eu-Epidochium* is more closely allied to *Dacryomyceteae* than to the *Tubercularieae*. (Sacc.)

**Epidochium atrovirens.** Fr. (fig. 2, p. 442.)

Erumpent, discoid, very minute, papillately rugulose, sooty-green when moist, black when dry, gregarious or confluent, about 1 mm. diameter; sporophores filiform, passing at the apex into tawny, elliptico-clavate pseudo-conidia, 35 × 15 $\mu$; conidia unknown.

*Epidochium atrovirens*, Fries, Sum. Veg. Sc., p. 471; Sacc., Syll., n. 3538.

On dead branches of *Ulex*, *Sarothamnus*, *Fraxinus*, &c.

MYROTHECIUM. Tode. (fig. 3, p. 442.)

Sporodochium shield-like or discoid, black, margin white ciliated, cilia slender, hyaline; conidia minute, elliptical or cylindrical; conidiophores slender, cylindrical.

*Myrothecium*, Tode, Meckl., i. p. 25, in part; Sacc., Syll., iv. p. 750.

Forming small, flattened black patches bounded by a white ciliate margin.

**Myrothecium roridum.** Tode.

Sporodochia flattened, discoid, at length confluent and irregular, black with a white margin, 2–6 mm. diameter; conidiophores simple or branched; conidia cylindrical, ends obtuse, 8–12 × 2 $\mu$, pale olive.

*Myrothecium roridum*, Tode, Meckl., i. p. 25, t, v. f. 38; Sacc., Syll., iv. n. 3550.

On various decaying vegetable substances.

**Myrothecium inundatum.** Tode. (fig. 3, p. 442.)

Sporodochium disc-like, variable in form, disc plane, blackish-olive, with a white margin; conidia broadly elliptical, 3–4 × 1·5–2 $\mu$, olive; conidiophores filiform, fasciculate, hyaline, 40 × 1 $\mu$.

*Myrothecium inundatum*, Tode, Meckl., p. 25; Sacc., Syll., iv. n. 3552.

On decaying species of *Agaricus*, *Cortinarius*, and other fungi.

Sect. 2. *Phragmosporae.* Sacc.

EXOSPORIUM. Link. (fig. 1, p. 442.)

Sphorodochium convex, compact; conidiophores simple, densely fasciculate, blackish, bearing at their tips the oblong or terete pluriseptate conidia.

*Exosporium*, Link, Berlin Mag., iii. p. 9; Sacc., Syll., iv. p. 755.

Distinguished by the coloured pluriseptate conidia. The genus resembles species of *Helminthosporium* springing from a stroma.

**Exosporium tiliae.** Link. (fig. 1, p. 442).

Sporodochia suberumpent, convex, black, $\frac{1}{2}$–1 mm. across, becoming shining, compact; conidiophores thick, short, obclavate, 1-septate, brown, 60–70 × 16–18 $\mu$; conidia smoky-olive, epispore very thick, contents divided into 9–11 cuboid portions, spuriously 8–10 septate.

*Exosporium tiliae*, Link, Obs., i. p. 8, t. 1, f. 8; Sacc., Syll. iv. n. 3569.

*Helminthosporium tiliae*, Cke., Hdbk., p. 572.

On lime branches.

# ADDENDA.

The following species, some of which have been omitted, others have been first observed in this country during the progress of the work, should be notified at the place indicated in the body of the book.

**Corticium nudum.** Fr.

Effused, closely agglutinated, waxy, rather rigid, margin determinate, glabrous; hymenium with a flesh-coloured tinge, pale and cracked when dry, even, very minutely powdery at maturity from the spores, which are elliptic-oblong, slightly curved, 12–14 × 4–5 $\mu$.

*Corticium nudum*, Fries, Epicr., p. 564; Berk., Outl., p. 276.

On bark and wood.

(Should follow *C. confluens*, vol. i. p. 122.)

**Corticium leve.** Pers.

Effused, often for several inches; often separating from the matrix, downy below, margin byssoid but not fibrillosely radiating; hymenium even, glabrous, livid with more or less of a fleshy tinge, buff when dry; spores elliptical, 6 × 3·5 $\mu$.

*Corticium leve*, Pers., Disp., p. 30; Berk., Outl., p. 273.

On rotten wood.

(Follows *C. lacteum*, vol. i. p. 122.)

**Clavaria crassa.** Britzl.

Scattered or solitary, violet or lilac-grey; stem slender, expanding upwards and dividing into several obtuse somewhat compressed branches; spores white, subglobose, 8–10 × 8 $\mu$.

*Clavaria crassa*, Britzl., Hymen. Sudb. Clav., p. 286, fig.

On the ground in woods. Somewhat resembling a much-

branched specimen of *Clavaria rugosa* in size and form, according to Britzelmeyer's fig. ; according to the author, the present species resembles *Clavaria Krombholzii*.

(To follow *C. Krombholzii*, vol. i. p. 78.)

**Clavaria flava.** Schaeff.

Fragile ; trunk up to 1 in. long, and as much thick, white, becoming broken up into numerous terete, even-topped, crowded, obtuse, bright lemon-yellow branches ; spores elliptical, white with a tinge of yellow, 9–10 × 4–5 $\mu$.

*Clavaria flava*, Schaeffer, t. 175.

Somewhat resembling a pollard willow in miniature, hence the German name "pollard fungus." Allied to *C. aurea*, but distinct in its fragility, clear lemon-yellow branches and white spores.

(Should stand first in the genus *Clavaria*, vol. i. p. 75.)

**Hydnum plumosum.** Duby.

Entirely resupinate, snow-white, tomentose, subiculum very delicate ; spines usually crowded, 2 mm. or more long, slender, minutely feathered near the apex ; spores globose, 4–5 $\mu$ diameter.

*Hydnum plumosum*, Duby, Bot. Gall., ii. p. 778 ; Berk., Outl., p. 261.

On dead wood, bark, &c.

Distinguished from allies by the feathered spines.

(Should follow *H. Stevensoni*, vol. i. p. 164.)

**Hydnum (Mesopus) molle.** Fries, Vet. Akad. Forh., 1851, p. 53 ; Fries, Icon., t. 2, f. 1.

Pileus 3–4 in. across, flesh thick, white, soft ; convex then umbilicate or irregularly depressed, often wavy, covered with a dense coat of velvety down, white ; stem 1–1½ in. long, up to ¾ in. thick, about equal, glabrous, white, solid ; spines crowded, uniform, acuminate, about ⅓ in. long, white, unchangeable, slightly decurrent on the stem ; spores globose with a basal apiculus, smooth, 7 $\mu$ diameter.

On the ground, Netherton, Meigle, N.B. (Mrs. Farquharson).

Somewhat resembling *H. repandum* in habit, but quite distinct in the pure white, densely velvety pileus ; white, equal subulate spines that do not become at all discoloured,

and the larger spores. The pileus is not in the least scaly. Flesh becoming slightly tinged yellow when broken. Smell none, taste pleasant.

**Polystictus zonatus.** Fries.

Pileus horizontal, more or less imbricated, rigid, flesh rather thick, tuberculose and gibbous behind, convex, velvety or sometimes almost strigose, somewhat zoned and banded with various colours, opaque, margin whitish; pores short, angularly rounded, obtuse, whitish, small; spores elliptical, 7–9 × 3–4 $\mu$.

*Polystictus zonatus*, Fries, Syst. Myc., i. p. 368.

On trunks.

Pileus 1½–3 in. across; pores about $\frac{1}{3}$ mm. across. Somewhat resembling *P. versicolor* in the colour and zoning of the pileus, but differs in being opaque and without a silky sheen, and in being altogether thicker, and tuberculose or gibbous, and not depressed behind.

(To follow *P. velutinus*, vol. i. p. 214).

**Entoloma porphyrophaeum.** Fr.

Pileus 2½–3½ in. across, flesh rather thin, cracking; campanulate, soon expanded, umbonate, sooty-brown, not hygrophanous, but becoming paler and mouse-colour when dry, very opaque in every condition, even and almost glabrous; stem almost 3 in. long, 4–5 lines thick at the incrassated base, solid, entirely fibrous and readily breaking up into fibres, equally attenuated upwards, soft, naked, but unpolished, opaque sooty purple, base with white down; gills truncate behind, almost free, rather distant, 2–3 lines broad, ventricose, distinct, greyish-white at first, then reddish-grey from the rosy spores; spores irregularly nodulose, salmon colour, 8–9 × 6 $\mu$.

*Agaricus* (*Entoloma*) *porphyrophaeus*, Fries, Monogr., i. p. 473; Fries, Icones, pl. 93, fig. 1.

Among grass.

Large, soft and rather rigid, but at the same time brittle. Margin of pileus wavy and often incised and lobed. (Fries.)

The present species has been confounded in this country with *Ag.* (*Ent.*) *jubatus*, Fr., as shown by Dr. Cooke in the following note.

I have just discovered that by accepting without question the figure in Woolhope Transactions, 1868, pl. 21, as *Agaricus (Entoloma) jubatus*, Fr., I have fallen into error with the plate 317 of my illustrations. We have *Ag. jubatus* in this country but it is *not* the same as my figure, which undoubtedly, as I think, represents *Agaricus (Entoloma) porphyrophaeus*, Fr., on account of the solid stem, purplish in colour, attenuated upwards, pileus neither villose nor squamose, and gills truncate behind, not to mention their colour.

It must be added that the dimensions of the spores given by Saccardo, evidently are on the authority of Britzelmeyer, whose figure cannot be the species of Fries, and hence there is *no* authority for spore measurements in *Ag. porphyrophaeus*. Moreover the delusion was increased by the description given in the Woolhope Transactions, which is *not* the descriptiou given by Fries, and does not represent his *Ag. jubatus*. I believe that it is less derogatory in me to confess this error than to have made it. (M. C. Cooke.)

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THE END.

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