

## TASMANIAN DISCOMYCETES.

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The students of Tasmanian Fungi have very insufficient means of becoming acquainted with described species, and, further, such a small number of those indigenous in the State have been described that there is fair reason to justify a paper to bring our knowledge up to date. It is probable that some, perhaps many, of those described as new may eventually be recognised to be identical with forms already named elsewhere, but if we wait till we shall commit no errors the purpose of this paper will not have been met. It is essentially one to afford a student an easy means of recognising the local species of the large fungus group known as *Discomycetes*. The only work already available to students is Cooke's *Handbook of Australian Fungi*, and the information in that book is too fragmentary, and often erroneous, to be of much assistance. The *Gymnoascaceæ* have been included at the end of the paper, though they belong to another group, *Plectomycetes*. The disc-fruiting fungi, which have adopted a parasitic habit, commonly known as Lichens, are excluded from convenience, and not from any supposition that they are genetically distinct. The *Histeriales* are almost continuous with some of the smaller plants of our group, but their distinction may soon be recognised.

## Order DISCOMYCETES.

Ascophore an erect stipitate or sessile cup, plate, cushion, or club; the ascigerous layer or disc lining the upper or external surface, freely exposed on maturity.

The Order contains the following families:—

PHACIDEÆ. Ascophore minute, sunk in the matrix usually blackish; at maturity splitting above into a linear or radiate fissure exposing the disc.

STICTEÆ. Ascophore minute sunk in the matrix, urceolate then expanding; exciple very thin and whitish opening in a stellate manner exposing the disc, which is waxy clear coloured and pale.

PATELLAREÆ. Ascophore minute erumpent when quite young soon becoming superficial and often discoid, sessile glabrous, horny, or leathery often blackish.

DERMATEÆ. Erumpent, corky coriaceous or horny; externally scurfy, usually cæspitose from a common stroma; colour black or dingy.

BULGAREÆ. Ascophore sessile or nearly so; gelatinous; horny when dry; turbinate or discoid, often bright coloured.

ASCOBOLEÆ. Ascophore minute, sessile, fleshy; asci projecting above the disc at maturity.

PELIZEÆ. Ascophore cup-shaped or discoid, often stipitate, fleshy or waxy; asci not projecting above the surface of the disc at maturity; often bright coloured.

HELVELLEÆ. Ascophore usually stalked, rarely minute and sessile; hymenial surface on a cushion, club, pitted or irregularly shaped body, exposed from the first except in *Cyttaria*; substance fleshy, rarely waxy or gelatinous.

GYMNOASCACEÆ. No defined ascophore. Asci forming an undefined plane.

## Family PHACIDEÆ.

Ascophore usually minute, leathery, dark, more or less immersed; disc circular, at first immersed then exposed by the exciple splitting; disc exposed and gaping at maturity; spores 8, filiform and arranged in a fascicle.

Members of this family often resemble forms of the Order *Hysteriaceæ*, from which they differ by the ascophore being more fully exposed and not being of a carbonaceous character.

*Coccomyces*. Ascophore 3-4 angled, disc fuliginous.

*Ccrion*. Ascophore peltate, disc crimson.

*Colpoma*. Ascophore oblong, black.

*Coccomyces*.

Ascophores immersed, minute, bursting at maturity in a stellate manner, the epidermis of the host connate with the exciple; when dry more or less closed and angular; disc waxy, protruding at maturity.

*C. trigonous*, Karsten. Ascophores black, 3-4 angled, about 0.5 mm. diameter.

On decolourised areas of dead Eucalyptus leaves.

*Cerion.*

Ascophore immersed bursting through the bark at maturity, the exciple black and usually stellate; disc waxy, crimson; spores multiseptate.

*C. coccineum*, *Mass et Rod.* Disc usually 2-3 mm. diameter, bright crimson.

On dead twigs.

*f. album.* Disc white.

*Colpoma.*

Ascophore immersed becoming superficial, oblong, black, scattered, opening in two lips, disc soft, pale protruding; spores septate.

*C. eucalypti*, *n.s.* Ascophores scattered, oblong, 1 mm. long, black. Paraphyses numerous, curved, exceeding the asci.

On dead leaves of *Euc. gigantea*.

## Family STICTEÆ.

Ascophore minute, immersed, cup-shaped; disc waxy, light coloured.

Distinguished from *Phacidæ* by being of waxy consistence and of light colour throughout.

*Stictis.* Disc circular, margin white, stellate; spores filiform in a fascicle.

*Nemacyclus.* Disc elongated and narrow, bordered by two lips; spores in a fascicle.

*Propolis.* Disc roundish; spores shortly cylindrical, obtuse, in two series.

*Stictis.*

Ascophore opening in a white stellate orifice; disc waxy; asci linear, 8-spored; spores filiform in a fascicle, septate when mature.

*S. radiata*, *Pers.* Margin white, stellate, mostly under 0.5 mm. diameter; disc at the base of the cup, waxy pale straw coloured.

On dead twigs.

*Nemacyclus.*

Ascophore elliptic-oblong, exposed by the formation of an elongated slit in the epidermis which forms two spurious lips; disc waxy, pallid; asci clavate, 8-spored; spores hyaline or pale yellow, filiform, arranged in a fascicle, continuous or septate, spores often breaking up while still in the ascus.

*N. gilvus*, *Rod.* Ascophore nearly circular, mostly under 1 mm. diameter; disc ochre.

On *Lepidosperma*.

*Propolis.*

Ascophore minute, immersed, closed at first when opening the rudimentary exciple not forming a distinct margin; disc round or elliptic almost plane light coloured; asci clavate, 8-spored; spores elongated, obtuse, hyaline, continuous, bi-seriate, paraphyses with septate branched tips.

*P. faginea*, *Kars.* Usually under 2 mm. diameter; disc shallow, waxy, white becoming darker; spores cylindrical, obtuse, smooth, hyaline, continuous, 21-23 x 7-9 $\mu$ .

On dead wood.

## Family PATELLARIEÆ.

Ascophore minute, erumpent when quite young, soon becoming superficial and often discoid, sessile glabrous, subcoriaceous or horny, usually blackish.

*Patinella.* Spores 8 continuous, hyaline.

*Patellea.* Spores uniseptate, hyaline.

*Karschia.* Spores septate, brown.

*Patellaria.* Spores 2—many septate, hyaline.

*Phacopsis.* Spores continuous; parasitic on Lichens.

*Patinella.*

Ascophore minute, erumpent, sessile, plane, with a parenchymatous exciple which forms a delicate margin; black or dark; asci clavate, 8-spored; spores elongate, hyaline; continuous, irregularly bi-seriate.

*P. tasmanica*, *Berk.* Black, discoid, plane or concave mostly 1 mm. diameter; disc pale; spores oblong curved, about 12 $\mu$ . diameter.

Common on rails and other dead wood.

*Patellea.*

Ascophore erumpent soon quite superficial, sessile, circular, patellate, coriaceous, contracting more or less when dry, blackish; asci cylindrical, 8-spored; spores elliptic-oblong, hyaline, uniseptate, paraphyses present.

*P. scutata*, *n.s.* Circular, convex, 1 mm. diameter; disc paler than the exciple but becoming black; asci broadly clavate; spores oblong obtuse, uniseptate, hyaline, 16 x 5 $\mu$ .

On bark of *Bedfordia salicina*.

*Karschia.*

Ascophore sessile, erumpent, superficial, and plane when mature, black, waxy, becoming horny; asci clavate, 8-spored; spores oblong smooth brown, uniseptate; paraphyses septate, apex thickened and coloured.

*K. atherospermæ*, *Mass. et Rod.* Ascophores gregarious, black, about 0.5 mm. diameter, discoid; spores oblong nearly black obtuse, usually curved, 18-20 x 7-8  $\mu$ .

On dead leaves and twigs of *Atherosperma moschata*.

*Patellaria.*

Ascophore almost superficial from the first, discoid and nearly plane on maturity, blackish, somewhat coriaceous, margin not prominent; asci cylindric, 8-spored; spores elliptic to fusoid, hyaline, 2—many, septate; paraphyses present.

*P. masseæ*, *Rod.* Gregarious, sessile, concave then plane, dark green then black, 1-2 mm. diameter, margin thin, collapsing when dry; asci clavate, 8-spored, staining blue with iodine, 150 x 10  $\mu$ .; spores bi-seriate, oblong elliptic, 3-6 often 5 septate, hyaline, 18-22 x 5  $\mu$ .; paraphyses filiform, ramose, apex thickened.

Massee says of this species:—Allied to *Patinella tasmanica* but distinguished by the larger size of the ascophore, also by the larger and many septate spores.

*Phacopsis.*

Ascophore parasitic on the apothecia of crustaceous lichens; pulvinate, dark chestnut brown, narrowed at the base; asci broadly cylindric, 8-spored; spores ellipsoid, continuous, hyaline, smooth; paraphyses numerous exceeding the asci; tips broad branched, brown, agglutinate, turning blue with iodine.

*P. pulvinata*, *n.s.* 0.2-0.4 mm. diameter, nearly spherical with a narrow base, nearly black; spores ellipsoid to oblong, hyaline, continuous, narrow at one end; 12 x 5  $\mu$ .

On dead wood.

## Family DERMATEÆ.

Ascophores erumpent, sessile, or narrowed to a very short stem-like base, usually cæspitose and springing in numbers from a common stroma; corky or coriaceous, never gelatinous, blackish or brown, often scurfy or mealy extern-

ally; asci 4-8 spored; spores 1—many septate, or in some genera containing very numerous minute continuous spores, paraphyses present.

*Cenangium.* Spores continuous.

*Cenangella.* Spores uniseptate, hyaline.

*Triplidiella.* Spores black, 1-3 septate.

*Cenangium.*

Erumpent, often many ascophores arise from a common stroma, at first closed then becoming urceolate or patellate; coriaceous or somewhat horny; spores oblong, continuous hyaline.

*C. furfuraceum*, *De Not.* Dry and leathery, at first closed then expanding; margin continuing more or less incurved, entire; disc pale brown, externally densely covered with rust-coloured scurf or meal; 0.5-2 cm. diameter; asci clavate, 8-spored; spores oblong, hyaline, smooth, continuous, 6-12 x 2.5-3  $\mu$ .

On dead wood.

*C. recurvum*, *n.s.* Ascophores usually a few together on a common stroma, flat to convex, margin obtuse, dark chestnut-brown, externally paler glabrous, substance tough almost corky; disc when fresh bright yellow-brown; externally pale straw; spores continuous, hyaline, smooth or granular, paraphyses filiform, 12-16 x 4-7  $\mu$ .

*Cenangella.*

Ascophores cup-shaped and crowded, several arising from a common stroma, cartilaginous; asci cylindric, 8-spored; spores hyaline, smooth, uniseptate.

*C. tasmanica*, *Rod.* Purple, 1-3 mm. diameter; spores ellipsoid, uniseptate, 10-12 x 5  $\mu$ .; paraphyses filiform, often branched above.

On dead wood.

*Triplidiella.*

Densely cæspitose, corky, erumpent, black, arising from a common stroma, narrowed below; asci broadly cylindric, 8-spored; spores uniseriate, sooty black smooth, uniseptate or occasionally 3 septate; paraphyses filiform branched.

*T. biconica*, *Rod.* Ascophores about 1 mm. diameter; spores ellipsoid, ends subacute 17-17.7  $\mu$ .

Bursting through bark of *Phyllocladus rhomboidalis*.

## Family BULGARIACEÆ.

Ascophores gelatinous soft or firm, cup-shaped to plane, stipitate, erumpent or superficial, cæspitose on a common stroma, sometimes free; spores continuous or septate, hyaline or coloured.

The family differs from *Dermateæ* in little beyond consistency.

Spores continuous.

*Bulgariella*. Black.

*Ombrophila*. Orange to purple or brown; externally smooth.

*Orbilina*. Bright coloured; externally cellular.

Spores septate.

*Calloria*. Uniseptate.

*Coryne*. Spores 2-many septate, hyaline.

*Bulgariella*.

Ascophore densely gelatinous, sessile, glabrous, plane or convex, open from the first, black; asci cylindrical, 8-spored; spores uniseriate, elliptic, dark, continuous, smooth.

*B. pulla*, Karsten. Convex, black, sessile, patellate, 1-2 mm. diameter, often densely crowded; asci cylindrical, spores dark brown to olive, nearly globose, 11 x 9  $\mu$ .

On rotting wood.

*Ombrophila*.

Ascophore firm gelatinous to cartilaginous when moist, rigid and horny when dry, more or less stipitate, disc concave to convex; asci cylindrical, 8-spored; spores elliptic, continuous, smooth, hyaline.

Closely resembling other yellow Elf-cups, but distinguished by the more or less viscid surface when fresh.

*O. aurantiaca*, Mass. Ascophore orange-yellow, externally paler, margin revolute, convex, substipitate, up to 1 cm. diameter, glabrous; asci cylindrical; spores uniseriate, hyaline, elliptic, 10-12 x 7-8  $\mu$ , continuous.

On stem of *Dicksonia antarctica*.

*O. discoidea*, n.s. Gregarious, plane to convex, of a firm gelatinous consistency, sessile, discoid, mostly 2-3 mm. diameter, disc orange, margin paler, translucent, exciple rather prominent parenchymatous; asci 60-80  $\mu$ ; 8-spored, spores narrow-oblong almost linear, hyaline, smooth, 8 x 2  $\mu$ ; paraphyses filiform.

On moss and dead wood.

*O. bulgarioides*, Sacc. Ascophores gregarious, cup-shaped to concave, undulate, gelatinous, yellow, becoming umber-brown when dry, pellucid, externally mealy; sessile to shortly stipitate, stem dark, 0.5-2 mm.; spores narrow-oblong, hyaline, continuous, smooth, 6 x 1.5  $\mu$ .

On rotting wood.

*O. nigripes* (Pers.). Ascophores cartilaginous when fresh, concavo-convex, undulate to plane 1-3 mm. diameter, disc crimson-orange, surface mucilaginous, lower surface and stalk black, stem about as long as diameter of the disc; asci cylindrical; spores narrow oblong, 8 x 1.5  $\mu$ , hyaline, smooth; paraphyses filiform straight, slightly thickened towards the apex. Resembling *Helotium citrinum*.

On rotting wood, chiefly on the ends of logs.

*O. crenulata*, n.s. Sessile, flat, discoid, rather undulate, dingy orange-yellow, 2-4 mm., margin thick and strongly crenated; externally nodulose otherwise glabrous, substance cartilaginous; asci clavate, 8-spored; spores biseriate fusiform; smooth, hyaline, 23 x 4  $\mu$ .

On dead wood.

*Orbilina*.

Ascophore gelatinous, sessile, attached by a central point, globose at first then expanding into a flat disc above, at first the margins are connected by a thin white membrane covering the disc, always of a bright colour, exciple of large cells; asci cylindrical, 8-spored; spores uniseriate, hyaline, smooth, continuous.

The spherical ascophore with a small white membrane in the middle has the appearance of an eye.

*O. crystallina*, Rod. Globose and closely cæspitose, bases more or less confluent and several ascophores arising from a common stroma, 1-2 mm. diameter, surface crystalline with large prominent, pellucid, cells; disc at first covered by a delicate white membrane; as it expands the membrane bursts in the middle and remains as a toothed margin; spores elliptic with acute ends, 18-25 x 7-8  $\mu$ .

Amongst dead leaves. Much the appearance of *Humaria muelleri*.

*Calloria*.

Ascophore somewhat gelatinous, more or less pellucid when dry; small, subglobose at first becoming plane to convex, mostly sessile and fixed by a central point, erumpent or

superficial, glabrous, bright coloured; asci cylindrical, 8-spored; spores uniseriate, hyaline, smooth; paraphyses present.

*C. tasmanica*, Rod. Ascophore plane on a short stalk, mostly 1-2 mm. diameter, dull ochre-yellow; spores narrow oblong,  $8 \times 1 \mu$ .

On stem of *Dicksonia antarctica*.

#### *Coryne*.

Ascophore gelatinous, sessile or narrowed below into a short stem-like base, often many arising from the same stroma; disc plane; glabrous; asci cylindrical, 8-spored; spores hyaline at length, 2—many septate.

*C. sarcoides*, Jacq. Cæspitose, gelatinous, red-purple, up to 1 cm. diameter, erumpent; spores ellipsoid, 2—many septate,  $15-18 \times 4.5 \mu$ ; paraphyses clubbed at the apex.

Conidial form similar but without the expanded disc, and commonly referred to *Tremela*.

#### Family ASCOBOLEÆ.

Ascophore fleshy or rather gelatinous; disc plane or convex rough with the projecting tips of the asci at maturity; exciple parenchymatous; cortical cells large irregularly polygonal; asci usually broadly clavate, dehiscing by an apical operculum; 8—many spored; spores continuous, elongated, rarely globose, hyaline or coloured; paraphyses present. Mostly growing on decomposing leaves or animal refuse. The plants are minute and delicate.

*Ascobolus*. Spores 8, dark purple.

*Ascophanus*. Spores 8, hyaline.

#### *Ascobolus*.

Ascophore soft and translucent when fresh; disc plane or convex at maturity studded with the tips of protruding asci, externally glabrous or pilose; spores elliptical, at first colourless then dark purple or brown, generally rugulose at maturity.

*A. furfuraceus*, Pers. Ascophore pale yellowish-green; externally densely scurfy; spores elliptical, purple, at maturity longitudinally furrowed,  $20-27 \times 10-11 \mu$ .

On animal rejecta.

*A. glaber*, Pers. Ascophore glabrous, up to 1 mm. diameter, reddish purple or brown; spores elliptical, obtuse, deep purple, usually longitudinally furrowed,  $26 \times 13 \mu$ .

On animal rejecta.

*A. barbatus*, Mass. et Crossl. Disc crimson, externally paler, pilose, the hairs brown, thick-walled septate, conical, pointed, smooth,  $80-130 \times 10-12 \mu$ , largest and most abundant near the margin; asci cylindrical, apex rounded; spores elliptical, obtuse, smooth, hyaline for a long time then the epispore becomes violet and finally violet-brown and marked with delicate anastomosing lines,  $16-18 \times 9 \mu$ .

On cow dung.

*A. immersus*, Pers. Erumpent and not entirely exposed; disc expanded, plane, yellowish-green and watery 0.5-0.7 diameter; externally minutely hairy, the hairs scattered or fasciculate; spores elliptic-oblong, smooth, continuous, hyaline, then purple and lastly brown; epispore sometimes longitudinally cracked,  $50-70 \times 35-45 \mu$ .

On animal excreta.

*A. archeri*, Berk. Plane-convex externally pruinose, livid-green; spores elliptic, smooth, purple,  $12 \times 6 \mu$ .

On excreta of small marsupials.

*A. nitidus*, Rod. Discoid, attached by a short slender stem, pale, dull, greenish-ochre, waxy, smooth; asci pyriform, 8-spored; spores in an irregular group, oblong, sooty-black, smooth, uniseptate,  $10 \times 6 \mu$ .

On rotting *Poria*.

#### *Ascophanus*.

Ascophore somewhat fleshy, sessile, the disc becoming plane; externally glabrous or pilose; exciple parenchymatous; asci broadly clavate to ovate, 8-spored; spores hyaline, free, elongated.

*A. equinus*, Mass. Orange to tawny, margin smooth, sparsely clothed externally with thick-walled, pointed, aseptate hairs, which are more or less swollen at the base, hyaline or with a yellow tinge; about  $200 \mu$  long; asci cylindrical, curved, 8-spored; spores irregularly biseriate, hyaline, smooth, continuous, elliptical, obtuse,  $20 \times 12 \mu$ .

On horse dung.

#### Family PEZIZÆ.

Superficial, rarely erumpent; sessile or stalked, fleshy or waxy, never gelatinous, cartilaginous, nor corky, the hypothecæ and exciple usually formed of interwoven hyphæ rarely parenchymatous; disc cupulate, concave to convex; asci not protruding, generally cylindrical; spores variously marked or smooth, continuous.

The family is very large with no well-marked breaks by which convenient groups may be isolated. In most systematic works they are divided into three lots:—

Section I.—GLABRATÆ. Ascophore glabrous, usually small and growing on dead or living plants.

Section II.—VESTITÆ. Ascophore hirsute or pilose or seated on a subiculum.

Section III.—CARNOSÆ. Ascophore often scurfy externally; from minute to very large, fleshy; growing on the ground.

There are no clear lines of demarkation, but with reasonable acquaintance the student will soon learn the distinctive features.

#### Section I.—GLABRATÆ.

*Pseudopeziza*. Ascophore waxy, erumpent.

*Mollisia*. Ascophore sessile, superficial, waxy; exciple parenchymatous; spores continuous or many septate.

*Belonidium*. Ascophore sessile, spores 3—many septate.

*Helotium*. Ascophore firm, fleshy, sessile or shortly stipitate, glabrous, margin entire, exciple of closely woven hyphæ.

*Phialea*. Similar to *Helotium*, but more stalked.

*Pseudohelotium*. Ascophore plane pellucid, externally downy, asci linear, spores oblong, hyaline continuous.

*Cyathicula*. Margin of the ascophore more or less toothed; sessile or shortly stipitate; spores continuous or septate.

*Ciboria*. Ascophore dark on a long slender stalk.

*Sclerotinia*. Ascophore on a long slender stem springing from a sclerotium.

*Chlorosplenium*. Ascophore concavo-convex, thin membranous, stalked, blue-green, and staining the wood.

#### *Pseudopeziza*.

Ascophore formed in the substance of the host, bursting through the epidermis and forming a superficial, hyaline cushion; exciple parenchymatous; asci narrow, 4-8 spored; spores smooth, hyaline, narrowly elliptic to fusiform, continuous or 1 septate.

*P. trifolii*, Fckl. Clustered on dark spots on the leaves, dingy yellow glabrous, about 0.4 mm. diameter; spores 10-15 x 5-6  $\mu$ . Paraphyses rather stout.

On clover leaves.

*P. medicaginis*, Sacc. On discoloured spots on fading leaves, yellowish-brown, thin and delicate, glabrous 0.4 mm. diameter; spores 8-11 x 4-5  $\mu$ .; paraphyses hyaline, slender, slightly thickened at the tips.

On leaves of *Medicago sativa*.

*P. casuarinæ*, Rod. Subcutaneous but soon bursting through the epidermis and forming a small cushion bearing numerous conidiophores (*Glocosporium*); subsequently the pulvinus extends, asci are formed and the formation of conidia ceases. A mature pulvinus is oblong 0.5-1 mm. in long diameter, dark red-brown of a tough fleshy consistency. Conidia hyaline, broadly oblong; asci cylindric, 8-spored; spores broadly oblong with very obtuse ends, hyaline, 17 x 8  $\mu$ .

On ultimate branchlets of *Casuarinia distyla* and *C. quadrivalvis*, causing yellowing of the segments.

*P. geranii*, n.s. Ascophores on the upper surface of the leaves of *Geranium pilosum* and allied species causing a yellowing of the leaf 0.5 mm. diameter, erumpent, brown; asci small, narrow-cylindric, 4-spored; spores uniseriate, elliptic, hyaline, smooth, 12 x 6  $\mu$ .

#### *Mollisia*.

Ascophore superficial, sessile, and attached by a broad surface, glabrous or minutely pubescent, small to minute, of a waxy watery consistency, cortex parenchymatous, hypothecæ of large brown parenchymatous cells; asci cylindric-clavate, 4-8 spored; spores irregularly biseriate, elongated; narrowly elliptic or fusoid, smooth, hyaline, continuous or uniseptate.

*M. cineria*, Karst. Ascophore plane when mature 1-2 mm. diameter, waxy-fleshy, livid grey, not contorted when dry, margin white, externally delicately pruinose, dark; asci cylindric, 8-spored, spores narrow-elliptic, ends obtuse, straight or slightly curved, 6-10 x 1.5-3  $\mu$ .

Common on dead wood.

*M. undulata*, Rod. Soft waxy becoming hard when dry, sessile, broadly affixed, concavo-discoïd, undulate, 5-8 mm. diameter, livid-grey, turning black when dry; externally black; spores narrow-oblong 6 x 1.5  $\mu$ .; margin not white; collapsing when dry.

*M. ellipsozpora*, n.s. Plano-concave, attached by nearly the whole of the under surface, 1-3 mm. diameter; disc

ochraceous, not collapsing when dry, margin thick, black; exterior surface black; spores ellipsoid, hyaline, smooth, 16 x 6  $\mu$ .

On rotting wood.

*M. melaleuca*, Sacc. Convex and contorted, soft waxy, disc white, 2-4 mm. diameter, margin not thickened, externally brown; spores narrow-oblong, 12 x 2  $\mu$ .

On dead wood.

*M. notofagi*, n.s. Ascophore peltate, sessile, but attached by a narrow centre, soft waxy livid-grey when fresh, nearly black when dry; 0.3 mm. diameter; margin black, verruculose; externally striate by radiate black lines; spores hyaline, smooth, oblong, 10 x 4  $\mu$ ; paraphyses filiform with clavate tips.

On dead leaves of *Notofagus cunninghami*.

*M. ochro-nigra*, n.s. Ascophore sessile, plane, 2-4 mm. diameter, waxy, disc pale brown towards livid; externally black; spores narrow-oblong, hyaline, smooth, obtuse, curved, 17 x 3; near *M. undulata*.

On dead wood.

*M. verrucosa*, n.s. Sessile but attached by a narrow base, concave-undulate, waxy-fleshy; disc pale straw coloured to dull green, mostly 5 mm. diameter; margin thick, chestnut-brown; external surface verrucose becoming black towards the centre; asci cylindrical; spores fusiform, acute, hyaline, smooth, often curved, 24 x 4-5  $\mu$ .

On dead sticks amongst moss, paraphyses long, slender, with globose tips.

*M. carneo-alba*, n.s. Sessile, convex, irregularly undulate, white to pink, delicately waxy, margin not thickened; externally pale smooth or minutely pruinose; spores oblong, very obtuse, hyaline, verruculose, 17 x 8  $\mu$ , paraphyses few, slender, filiform, tip much curved.

On rotting wood.

*M. subglobosa*, n.s. Minute, discoid to convex, pale then smoky-livid to dull green or dull brown, soft waxy, sessile, margin pale, externally black; asci cylindrical; spores hyaline, smooth, subglobose to broadly elliptic, 4-6 x 4-5  $\mu$ .

On dead wood. Amongst *Nectria pulvini*.

#### *Helotium*.

Ascophore shortly stalked or attached by a central point, small seldom exceeding 3 mm. diameter, at first closed then expanding and exposing the disc; glabrous, margin

entire, exciple of interwoven hyphæ, hypothecæ hyaline; asci narrow-cylindric, 8-spored; spores hyaline, smooth, elongated, continuous or uniseptate.

Growing on dead wood which distinguishes it from the small *Carnosæ*.

*H. citrinum*, Fries. Usually crowded, sometimes confluent, plane, glabrous, firm, fleshy, light orange-yellow becoming darker when dry; stem short, externally paler, mostly about 2 mm. diameter; asci with a long crooked pedicel; spores hyaline, continuous, elliptical, 9-12 x 3-4  $\mu$ .

Very common on dead wood.

*H. claro-flavum*, Berk. Gregarious, sessile, and attached by a central point, plane when mature; clear lemon-yellow, externally paler, irregular, firm, mostly under 1 mm. diameter; spores hyaline, continuous, straight, elliptical, obtuse, 7-10 x 2.5-3  $\mu$ .

On dead wood.

*H. gratum*, Berk. Ascophore shortly stalked, dull light straw, translucent when fresh, margin upturned obtuse, externally mealy, 1 mm. diameter; spores elliptic, smooth, hyaline, obtuse, 9-10 x 3  $\mu$ .

On dead wood.

*H. sessile*, Rod. Ascophore sessile, arising from a hyphal base concave to convex; pale yellow ochre externally and minutely pruinose, mostly under 1 mm. diameter; spores elliptic, hyaline, smooth, uniseptate, 17 x 8  $\mu$ .

*H. patæriforme*, Berk. Ascophore sessile, rarely stalked, concave, lobed, honey-coloured, translucent, externally slightly rugose and tomentose beneath, up to 4 mm. diameter; spores fusiform, usually slightly curved, hyaline, smooth, at first continuous then 1-2 septate, 28 x 4  $\mu$ .

*H. striatum*, Rod. Ascophore sessile or shortly stalked; soft fleshy, concave, pale cinereous becoming ochre when dry, 1-2 mm. diameter, externally sooty-brown, glabrous, striate; spores oblong, very obtuse, hyaline, smooth, 6 x 3.

Intermediate between *Mollisia* and *Helotium*.

*H. microsporium*, Rod. Ascophore shortly stalked, soft fleshy, disc livid to nearly white, externally smooth; spores broadly oblong, very obtuse, hyaline, smooth, continuous, 4.5 x 2  $\mu$ .

Intermediate between *Helotium*, *Mollisia*, and *Phialea*.

*H. molle*, n.s. Ascophore sessile, concave-undulate, with upturned margin soft, honey-coloured, 0.2-1 mm. diameter;

margin obtuse, pale straw, externally minutely furfuraceous; spores smooth, hyaline, oblong-fusiform, curved, obtuse; 8-12 x 2-3  $\mu$ .

*Phialca.*

Ascophore concave to convex membranous to rather fleshy, externally glabrous or pruinose, on a short slender stem; spores hyaline, smooth, continuous.

Commonly on dead leaves, continuous with *Helotium*, from which it differs in a greater tendency to develop a stalk.

*P. berggrenii*, C. et P. Concave, almost membranous, on a slender stalk; disc livid yellow, 1-3 mm. diameter, externally brown, minutely pruinose; spores oblong, 10-15 x 3-5  $\mu$ .

*P. ceratina*, Berk. Peltate when mature, about 1-2 mm. diameter, disc horny, brown; externally pubescent, stem short, slender; spores oblong, 19-22 x 4-5  $\mu$ .

*P. byssogena*, Berk. Cup-shaped, 1-1.5 mm. diameter, pale ochre-brown; externally delicately pruinose; stem slender, 2 mm., arising from radiating mycelial strands; spores oblong-elliptic, 8-9 x 2-3.

Usually growing on dead wood.

*P. epiphyllum*, Fries. Disc plane to convex from golden yellow to ochre, becoming darker with age, 2-3 mm.; external surface and stem delicately pruinose; stem slender from very short to 3 mm.; spores narrow-oblong, 13-20 x 4-5, continuous but ultimately uniseptate.

*P. notofagi*, Rod. Ascophore arising from a flat, black, sclerotial patch on the back of a leaf; disc plane or concave, dull horny brown, 1-2 mm. diameter; asci broadly cylindrical; spores biserial, oblong, acute, hyaline, smooth, 25 x 3  $\mu$ ; paraphyses with an enlarged brown nodulose tip.

On dead leaves of *Notofagus gunnii*.

*P. prasinum*, Mass. Disc plane with an upturned margin, 0.5-1 mm. diameter; yellowish-green, usually reddish-brown with age; externally somewhat furfuraceous to glabrous, spores 6-7 x 2-2.5  $\mu$ , oblong; paraphyses with thickened yellow green tips.

On dead wood.

*P. subciboria*, n.s. Ascophore discoid, thin concave to plane; disc white, becoming livid with age, 1-2 mm. diameter, stem short, slender, black; external surface black, verrucose or wrinkled; spores oblong, smooth, hyaline, 10 x 2.5  $\mu$ .

*Cyathicula.*

Ascophore firm to waxy, sessile or shortly stalked, glabrous with the exception of a single row of teeth round the margin; asci cylindrical, 8-spored; spores hyaline, mostly continuous oblong.

*C. multicuspidata*, Rod. Cup-shaped, sessile, white, delicate, about 1 mm. diameter, smooth, but the margin armed with compound lobes; spores narrow oblong, granular, 15-20 x 4  $\mu$ .

On dead rhachis of *Dicksonia antarctica*.

*C. granulosa*, n.s. Sessile, peltate, orange, 2-4 mm. diameter, fleshy; disc slightly granular; margin acute with a line of minute pale teeth composed of agglutinated hyphae, externally granular; asci broadly clavate, 8-spored; spores irregularly biserial, smooth, hyaline, continuous, narrow elliptic, 28 x 9  $\mu$ .

On dead wood.

*Ciboria.*

Ascophore concavo-convex thin, fleshy; normally long-stalked and emerging from cracks in dead wood; externally smooth or mealy or in some cases bearing few dark bristles; asci cylindrical, 8-spored; spores hyaline, smooth, oblong to fusiform.

*C. firma*, Pers. Cups concavo-convex, black or nearly so throughout, rather tough, glabrous, 4-10 mm. diameter; stem very long and slender; spores oblong, 17 x 3.5  $\mu$ , when old 1—many septate.

*C. olivacea*, n.s. Disc convex, repand, dark olive green on a rather short stalk, soft fleshy almost waxy, 3-5 mm. diameter; externally black, ribbed but not hairy; spores uniserial, fusiform, but with obtuse ends, hyaline, continuous, 8 x 2.

*C. strigosa*, n.n. *Dasyscypha eucalypti*, Berk. Disc concave to convex, fleshy yellow when fresh, dark when old and dry, 2-6 mm. diameter; externally pale livid then dark; armed externally especially on the margin with few dark stiff bristles; stem thin, long, black, to very short; spores 16 x 4-5. When the ascophore arises in a crevice and is erumpent the stem is very long; when growing in shade on dead leaves or twigs it is medium, and when on smooth bark it is almost obsolete; this also applies to *C. firma*.

*C. ochracea*, Mass. Ascophore glabrous; plane to convex with a drooping margin; fleshy; everywhere from ochre to ochre-brown, 3 mm. diameter; stem about 1 cm., spores oblong, 10-15 x 2-5  $\mu$ .



*Pseudohelotium.*

Ascophore concave to peltate, sessile or nearly so, waxy, externally pilose to pruinose; spores continuous hyaline, oblong.

Very close to *Helotium*.

*P. hyalinum*, Pers. Discoid, sessile, white to cream coloured, brown when dry, soft fleshy pellucid when fresh; externally minutely pruinose; spores 16-24 x 2-5  $\mu$ .

*P. undulatum*, n.s. Ascophore discoid distorted, undulate when dry, tough, fleshy, white, becoming ochre when dry, subsessile; externally slightly downy; asci very slender, 8-spored; spores uniseriate, ellipsoid, hyaline, smooth, acutely pointed at both ends, 12-14 x 6  $\mu$ .

*Belonidium.*

Ascophore superficial, sessile, minute; exciple parenchymatous, glabrous; asci narrow cylindric, 8-spored; spores biseriate, fusiform, smooth, hyaline, 3—many septate.

On living and dead plants.

Differing from *Mollisia* in the many septate spores.

*B. araneosum*, Berk. Ascophore convex, seated upon creeping threads, peltate or convex, orange-yellow; spores narrow, fusiform at maturity, many septate, 50-60  $\mu$ .

*B. furfuraceum*, n.s. Ascophore plane pale-straw coloured, 0.2-0.4 mm. diameter, waxy, externally furfuraceous; spores narrow fusiform, multi-septate, 48-60 x 3  $\mu$ .

*B. viscosum*, n.s. Cæspitose often confluent, sessile, convex, orange-crimson, waxy, 1-2 mm. diameter, viscid; spores narrow fusiform, hyaline, smooth, mostly 7 septate, 40-50 x 2  $\mu$ .

*Sclerotinia.*

Ascophores springing from a sclerotium disc plane or nearly so, fleshy, glabrous; stem long and slender; asci cylindric, 8-spored; spores uniseriate, hyaline, smooth, continuous.

"Close to *Ciboria*, differing in growing from a sclerotium." Masee.

*S. dubium*, McAlpine and Rod. Ascophore chestnut-brown, plane to concave, thin, mostly 4 mm. diameter, stem 1-2 cm. long, slender, wavy; spores oblong, obtuse, 12 x 4-5  $\mu$ . Sclerotium subglobose, 1 cm. diameter.

*S. sclerotiorum*, Mass. Solitary or few together growing from a black sclerotium, concave to convex, margin entire, glabrous, thin, rather firm, pale brown, 3-7 mm. broad; stem slender, 1-3 cm. long; spores elliptic, 9-13 x 4-6  $\mu$ .

Sclerotium in living carrot and other cultivated vegetables.

*Chlorosplenium.*

Ascophore on a short slender stalk, tough and pliant, concave, membranous, glabrous, dark blue-green; asci narrow clavate, 8-spored; spores hyaline, continuous or septate, elongated.

*C. æruginosum*, De Not. The entire plant dark blue green; disc plane undulate, 2-5 mm. diameter; stem usually short, sometimes 1 cm. long, spores fusiform, 10-14 x 3  $\mu$ .

On dead wood, which it stains.

## Section II.—VESTITÆ.

*Tapesia*. Ascophores gregarious, growing on a white layer of mycelium on the under surface of rotting wood.

*Erinella*. Ascophores minute, 3—many septate.

*Trichopeziza*. Ascophore minute, globose, densely clothed with stiff yellow hairs.

*Lachnea*. Usually crimson, clothed externally with rigid brown hairs.

*Dasyscypha*. Ascophore small, shortly stalked, externally woolly hairy.

*Geopyxis*. Ascophore large, cup-shaped on a fairly long stalk.

*Sepultaria*. Ascophore large, subterranean and globose; emerging from the ground at maturity and splitting irregularly at the apex.

*Tapesia.*

Ascophore minute, thin, sessile, pilose or downy, seated on a spreading subiculum formed of branched interwoven hyphæ; asci narrow clavate, 8-spored; spores irregularly biseriate, smooth, hyaline, continuous or septate.

*T. epitephra*, Berk. White to pale ochre, gregarious, about 0.3 mm.; spores continuous.

*Erinella.*

Ascophore minute sessile or shortly stalked, plane; externally pilose; asci cylindric, 8-spored; spores hyaline, narrow, 3—many septate.

*E. apala*, Mass. Gregarious, seldom exceeding 0.5 mm. diameter, sessile or shortly stalked; disc yellow-umber; externally very tomentose, white; spores filiform arranged in a fascicle, 3-7 septate when mature.

On dead *Juncus*.

*Trichopeziza*.

Ascophore at first globose, then peltate, sessile, minute; externally hairy or with a ciliate margin; asci broadly cylindrical, 8-spored; spores fusiform, continuous, hyaline.

*T. sphærula*, Sacc. Cups sessile, seldom exceeding 0.5 mm., often not expanding but discharging spores through an apical pore, bright yellow, sprinkled externally with divergent simple stiff hairs, spores narrow oblong, obtuse, 15 x 3  $\mu$ .

On bark of *Casuarina*.

*Lachnea*.

Ascophore sessile, plane when mature, fleshy, disc usually dark red, rarely pale or grey; externally brown and armed, principally towards the margin, by long brown stiff septate bristles; asci cylindrical, 8-spored; spores obliquely uniseriate, hyaline, continuous, elliptic, obtuse, smooth or the surface marked with nodules or reticulations.

Colour is not always dependable. Many lose their red colour when dry and do not recover it when restored.

*Key to Lachnea.*

Spores smooth.

Habitat fimicole.

*coprinaria*, bristles simple.

*stercoria*, some bristles stellate.

Habitat on wood or ground.

*setosa*, bristles long overarching when dry.

*carneo-sanguinea*, spores 10  $\mu$ . broad.

*hybridea*, bristles clustered, spores 15  $\mu$ ., broad.

Spores eventually verruculose.

*scutellata*, long bristles, 500-600  $\mu$ . long.

*umbrorum*, long bristles, 250-360  $\mu$ . long.

Spores verrucose.

*margaritacea*, bristles short, 150  $\mu$ . long.

*hirta*, on ground, bristles 300  $\mu$ . long.

*badioberbis*, on wood, bristles 600-1,000  $\mu$ . long.

*L. coprinaria*, Phil. Disc plane orange-red to scarlet, 5-10 mm. diameter, margin more or less erect, fringed with

thick walled, tapering, straight septate pale or brown hairs, 300-500 x 9-12  $\mu$ ., cortex parenchymatous; spores smooth, elliptic, ends obtuse, 17-19 x 9  $\mu$ .

On cow dung.

*L. stercorea*, Gill. Disc plane, dingy red to orange, externally paler and pilose, 2-4 mm. diameter; marginal bristles thick walled, base often bulbous and branched, bristles below the margin stellate; spores smooth, elliptical, obtuse, 17-20 x 8-9  $\mu$ .

*L. setosa*, Phil. Disc concave, orange-red, 3-6 mm., externally pilose, the brown bristles numerous and very long, when dry closing over the disc; spores elliptic, obtuse, smooth, 16-20 x 8-10  $\mu$ .

On dead wood.

*L. carneo-sanguinea*, Phil. Disc plane with an erect margin, 3-5 mm. diameter, deep red; externally pale brown, densely clothed with erect, rigid, brown bristles which form an erect fringe round the margin; bristles 50-120 x 9-12  $\mu$ .; spores elliptical, obtuse, continuous, hyaline, smooth, 17-20 x 9-10  $\mu$ .

On the ground.

*L. hybrida*, Phil. Disc plane, 6-12 mm. diameter, yellowish to red-yellow, externally dingy ochraceous and clad with small clusters of short thick-walled septate bristles; spores broadly elliptic, obtuse, smooth, 25 x 15  $\mu$ .

On dead wood.

*L. scutellata*, Gill. Plane, deep red, 3-8 mm. diameter, externally paler; bristles 300-600  $\mu$ .; spores hyaline, elliptic, obtuse, smooth till mature then verruculose, 18-25 x 11-14  $\mu$ .

On dead wood.

*L. umbrorum*, Gill. Plane, nearly the whole of the external surface bound down to the earth by dense hyphal growth, leaving only a narrow margin free; yellow-crimson, becoming yellow when dry; bristles short mostly under 250  $\mu$ .; spores broadly elliptic, very obtuse, smooth till rather old, then becoming minutely verruculose; 22 x 12  $\mu$ .

*L. margaritacea*, Berk. Disc plane vermilion, with a recurved margin, 5-7 mm. diameter; externally armed with relatively short bristles, longest about 150  $\mu$ . long; spores elliptical, coarsely verrucose, 24-27 x 12-14  $\mu$ . Very like *L. hirta*, but growing on wood and with a rougher epispore.

*L. hirta*, Gill. Disc plane but the margin remaining incurved, deep red, externally paler and armed with long

rigid brown hairs, 250-350  $\mu$ . long; spores at first smooth, becoming rather coarsely warted at maturity, 18-22 x 8-11  $\mu$ .

Growing on the ground, rarely on wood.

*L. badioberbis*, Berk. Disc plane, smoky orange to pale amber, 3 mm. diameter, externally paler, copiously armed with long brown bristles 600-1,000 long; spores broadly elliptic, 22 x 12  $\mu$ ., coarsely verrucose.

On dead wood.

#### *Dasyscypha.*

Ascophore minute, shortly stipitate or sessile, concave to plane, thin and delicate in texture, externally pilose, hairs cottony; asci clavate 8-spored; spores irregularly bi-seriate, hyaline, smooth, narrow, continuous; paraphyses lanceolate and acute or cylindrical, often longer than the asci, growing on wood.

*D. virginea*, Fckl. Disc concave to nearly plane on a short thick stem, margin upturned, white throughout usually under 1 mm. diameter, externally densely pubescent below and towards the margin armed with rigid white spreading septate hairs; spores oblong continuous, 6 x 2  $\mu$ .

Common on dead wood.

*D. lachnoderma*, Berk. Disc concave, warm-orange, mostly 1-2 mm. diameter, externally densely covered with short hairs, the marginal ones not long and spreading; margin involute; stem short slender usually dark; spores slender fusiform, curved, smooth, continuous, 18-25 x 2  $\mu$ .

*D. candida*, n.s. Ascophore white about 0.3 mm. diameter on a slender stalk of the same length, externally closely beset with short cylindrical, obtuse, hairs; spores hyaline, smooth, 8-12 x 3  $\mu$ .

On dead wood. Larger spores and a different vestiture as in *D. virginea*.

*D. pterydophylla*, Rod. Disc cupulate on a short slender hairy stem, lemon yellow throughout, about 0.3 mm. diameter; externally armed with short rigid yellow hairs; margin incurved; spores narrow fusiform, hyaline, smooth, continuous, 16 x 1.5  $\mu$ .

On dead stipe of *Dicksonia antarctica*.

*D. ovina*, Rod. Superficial or partially erumpent, dull brown throughout, sessile, concave, margin inflexed and paler, 1-2 mm.; externally with a dense vestiture of short brown woolly hairs; spores broadly elliptic, smooth, hyaline, but turning brown, 14 x 8; paraphyses slender, with clavate olive tips.

#### *Geopyxis.*

Ascophore cup-shaped to nearly plane on a relatively long stem; disc broad fleshy; externally pilose, downy, scurfy or glabrous; stem slender smooth; asci cylindrical, 8-spored; spores obliquely uniseriate, hyaline, continuous, elongated.

On ground, rarely on wood. Equally referable to the *Carnosæ*.

*G. coccinea*, Mass. Ascophore chalice-shaped on a long fleshy stem; disc white to pale crimson 2-4 cm. diameter; externally pale, slightly tomentose; spores 22-25 x 8-12  $\mu$ .

*G. pallidus*, Rod. Cup-shaped 5-8 mm. diameter on a slender stem of 10 mm., all parts white becoming brown when dry, thin fleshy externally smooth or slightly mealy; margin brownish with short irregular fimbriations; disc smooth, asci linear; spores oblong, hyaline, minutely verrucose; 22-24 x 10  $\mu$ .

On ground.

#### *Sepultaria.*

Ascophore large subterranean, globose and completely closed when young; emerging from the ground the apex is ruptured in a more or less stellate manner exposing the disc, fleshy, externally with numerous hyphæ extending from the surface through the soil; asci cylindrical, 8-spored; spores obliquely uniseriate, hyaline, continuous, smooth, elliptic.

The genus appears more of the character of *Carnosæ*.

*S. austrogeaster*, Rod. Oblong, about 1 cm. diameter on emerging splitting into few bold lobes and resembling in appearance the outer peridium of *Geaster*; fleshy, dull-brown, clothed with copious earth-binding hyphæ; spores broadly elliptic, very obtuse, hyaline, smooth, 24 x 10  $\mu$ ., paraphyses clavate with a thickened end septate the sections often swollen and moniliform.

In the mature state very like *Peziza cochleata*.

*S. aurantia*, Rod. Habit of the genus but only about 6 mm. diameter; disc bright orange to yellow or ochre; spores elliptic, rather acute at both ends, hyaline, smooth, 22 x 8  $\mu$ .; paraphyses filiform, septate, hyaline.

#### Section III.—CARNOSÆ.

Spores globose.

*Barlæa*. Spores hyaline.

*Curreyella*. Spores coloured.

Spores elliptic or fusiform.

Spores hyaline.

*Humaria*. Small, on ground.

- Peziza*. Large cup-shaped.  
*Otidea*. Split on one side or contorted.  
*Rhizina*. Flat and bound to the substratum.  
*Aleurina*. Spores dark.

Aberrant members of the section.

- Urnula*. Cup-shaped, black.  
*Hydnocystis*. Convoluted, white.

#### *Barlæa*.

Ascophore small, fleshy, sessile, concave to plane glabrous, cortex parenchymatous; asci cylindrical, 8-spored; spores globose, hyaline.

Growing on the ground.

Saccardo places *Barlæa* and *Curreyella* in *Detonia*.

*B. militina*, Berk. Peltate, soft-fleshy deep crimson-red to orange-red, 4-10 mm. diameter, disc smooth shining; externally paler, obscurely furfuraceous; asci cylindrical; spores smooth, 12-16  $\mu$ .; paraphyses filiform.

*B. verrucosa*, Rod. Sessile, peltate, fleshy, 1 mm. diameter, crimson, externally paler; spores 20  $\mu$ .; covered with large hemispheric warts; paraphyses slender, apex clavate crimson.

Probably not distinct from *Lamprospora tuberculata*, Seaver.

*B. miniata*, Sacc. Sessile, cup-shaped waxy, 1-2 mm. diameter, disc crimson, exciple extending beyond the disc, often forming a dentate ochraceous collar; external surface glabrous; spores 13-18  $\mu$ ., smooth when young alveolate when mature; paraphyses filiform curved at the end.

*B. archeri*, Berk. Sessile, concavo-convex, fleshy crimson, 2-3 mm. diameter, exciple not extending beyond the disc; spores hyaline, smooth, 6-12  $\mu$ .; paraphyses filiform. Very close to *B. miniata*.

*B. echinulata*, n.s. Sessile, discoid with an obtuse margin, disc crimson, 2-4 mm. diameter, external surface and margin ochraceous, exciple ochre and extending in teeth beyond the disc; spores hyaline, echinulate, 20-22  $\mu$ .

#### *Curreyella*.

Ascophore sessile or very shortly stalked, fleshy rather large, widely expanding; exciple parenchymatous; asci cylindrical, 8-spored, spores globose, uniseriate, coloured at maturity; paraphyses septate, clavate.

*C. trachycarpa*, Mass. Ascophore shortly stalked, plane but undulate when mature often contorted, 1-6 cm. diameter; disc chestnut brown or variously darkened, externally granular; spores globose and for a long time hyaline and smooth, finally pale brown and closely covered with blunt warts, 10-14  $\mu$ .

*C. alveolata*, n.s. Sessile, plane to convex, rather tough, 1-2 cm. diameter, externally verrucose; spores globose, light brown, alveolate, 24  $\mu$ ., paraphyses slender filiform, not enlarged at the apex.

#### *Humaria*.

Ascophore sessile, fleshy, at first closed then plane; glabrous, cortical cells polygonal; asci cylindrical, 8-spored, spores uniseriate, continuous, hyaline, elliptic.

On the ground; not on wood.

Disc brown.

*macrospora*, spores verrucose.

*tenacella*, spores smooth.

*bovina*, fimicole.

Disc red or yellow.

*muelleri*, disc plane.

*carbonigena*, disc umbilicate.

*fusispora*, spores fusiform.

*rutilans*, spores reticulate.

*omphalodes*, on a subicle.

*candida*, white.

*granulata*, fimicole.

*mollispora*, spores allantoid.

*stipitata*, stalked.

*H. macrospora*, Fckl. *Peziza brunnea atra*, Desm. Blackish-brown, 1-1.5 cm. diameter; spores hyaline, continuous, elliptic, acute, verrucose when mature, 20-22 x 10  $\mu$ .; paraphyses septate, apex enlarged brown.

*H. tenacella*, Phil. Disc brown umber, 3-6 mm. diameter, margin entire often repand; spores elliptic, hyaline, smooth, 10 x 6  $\mu$ .; paraphyses slender with thickened brown curved apex.

*H. bovina*, Sacc. Brown umber, glabrous; disc umbilicate, undulate, about 1 cm. diameter; cortical cells very large; spores oblong-elliptic, hyaline, smooth, 19 x 9, paraphyses few or none.

On cow dung.

*H. muelleri*, Berk. Sessile, plane, fleshy, 1 mm. diameter, crimson, externally paler, slightly pilose, margin prominent, obtuse, spores hyaline, smooth, elliptic,  $18 \times 9 \mu$ ; paraphyses clavate at the apex.

*H. carbonigena*, Berk. Sessile, flexuose and umbilicate, dark red, margin brown acute, 2-3 mm. diameter, disc granular, spores elliptic, smooth,  $22 \times 12 \mu$ , paraphyses clavate at apex.

*H. fusispora*, Berk. Sessile concave to plane, yellow, 2-5 mm.; spores fusiform acute,  $30-32 \mu$ ; paraphyses clavate and crimson at the apex.

*H. rutilans*, Sacc. Ascophore attached by a minute central point, disc concave plane, margin entire obtuse, parenchymatous orange to crimson, 3-10 mm. diameter, paler externally and minutely downy; spores obtuse, smooth, then minutely reticulate,  $13-15 \times 8-9 \mu$ ; paraphyses slender septate with an orange clavate apex.

*H. omphalodes*, Mass. *Pyronema omphalodes*, Sacc. Sessile and crowded into crust-like expansions seated on a white tomentose subiculum, plane to convex, orange to red, 1 mm. diameter, spores hyaline, smooth, elliptic, obtuse,  $11-13 \times 6 \mu$ .

*H. candida*, n.s. On the ground, hemispheric, waxy, dull white; 2-6 mm., disc concave, externally minutely tomentose, asci cylindric, apex flat; spores smooth, hyaline, elliptic,  $12 \times 6 \mu$ .

*H. granulata*, Sacc. Sessile plane soft; disc deep orange to red, 1-3 mm. diameter, externally paler and granulose; spores elliptic, hyaline,  $15-20 \times 8-9 \mu$ ; paraphyses very short, broadly clavate, septate, red.

On horse and cow dung.

*H. mollispora*, Rod. Hemispheric, fleshy, pinkish, hyaline, exciple smooth, disc plane; spores elliptic fusiform, smooth, allantoid, the wall very thin,  $18-5 \mu$ .

On the ground amongst small moss.

*H. stipitata*, n.s. Plane often undulate, dark orange, fleshy, 4-6 mm. diameter on a short stem, externally little paler, subpruinose; asci cylindric; spores elliptic, hyaline, smooth,  $10 \times 5 \mu$ , paraphyses filiform.

Differing from *Ombrophila aurantiaca* in being fleshy not cartilaginous, and from *Helotium citrinum* by growing on the ground.

### Peziza.

Ascophore sessile, or with a short stem-like base; fleshy and brittle, cup-shaped, rarely plane, externally mealy to somewhat verrucose, cortical cells polygonal; asci cylindric, 8-spored; spores uniseriate, continuous, hyaline, elliptic, smooth or rough; paraphyses present.

Growing on the ground, differing from *Humaria* by the larger size and mealy or rough exterior.

Spores smooth.

*cochleata*, umber, spores  $17 \times 7 \mu$ .

*vesciculosa*, dark umber, spores  $22 \times 11 \mu$ .

*repanda*, dark chestnut, spores  $20 \times 10$ .

*plicata*, cinnamon, margin crenate.

*drummondi*, dark brown, margin plain.

*convoluta*, dark brown, convoluted.

Spores rough.

*badia*, spores obtuse, brownish-ochre.

*aurantia*, bright crimson.

*P. cochleata*, Bull. Cup-shaped, but usually much split and contorted; disc pale smoky umber throughout, fleshy, 5-8 cm. diameter; externally paler, slightly pruinose; exciple spongy and cavernous, spores hyaline, continuous, smooth,  $16-18 \times 7-8 \mu$ .

On ground.

*P. vesciculosa*, Bull. Clustered and distorted, cup-shaped, disc rather dark brown, externally granular paler, spores smooth, hyaline, continuous, elliptic, obtuse,  $21-24 \times 11-12 \mu$ .

Common on rotting manure.

*P. repanda*, Wahl. *Discina repanda*, Fries. Sub-sessile, very flat, plane when mature, disc generally dark brown, sometimes paler, margin readily splitting, undulate often crenate, 4-10 cm. diameter; externally usually whitish and minutely granular; spores smooth, hyaline, continuous, elliptic, obtuse to acute;  $18-22 \times 11-12 \mu$ .

*P. convoluta*, n.s. Disc umber brown, plane or reflexed, thrown into numerous bold veins or convolutions, margin lobed 3-4 cm., the young state concave and simpler; spores smooth, hyaline, elliptic, obtuse,  $14-15 \times 7 \mu$ , externally not paler, smooth but thrown into numerous radiating obtuse and branched veins.

*P. plicata*, Mass et Rod. Sessile, plano-convex, softly fleshy, cinnamon-brown, about 1 cm. diameter, margin crenated and lobed, externally nearly white granular, spores elliptic, hyaline, smooth,  $11 \times 5 \mu$ .

*P. drummondi*, Berk. Sessile, plane to recurved and contorted, margin usually entire, 1-2 cm. diameter, brown, externally paler and furfuraceous; spores elliptic, hyaline, smooth, obtuse,  $14 \times 6 \mu$ .

*P. badia*, Pers. Large, cup-shaped, often 5 cm. broad, sessile or nearly so, fleshy and brittle, disc dark brown amber; externally paler and minutely granular, spores hyaline, continuous, elliptic, asperate when mature,  $15-19 \times 9-10 \mu$ .

Distinguished from *P. cochleata* by the darker disc and rough spores.

*P. aurantia*, Pers. Large, often exceeding 5 cm., cup-shaped, fleshy brittle, usually much split, crimson-orange; externally pale; delicately pruinose, spores broadly elliptic, hyaline, continuous when mature with a deeply reticulate surface,  $15-16 \times 7-8 \mu$ .

Massee places amongst others this and *P. cochleata* in the genus *Otidea*.

*Forma stipitata*, smaller than the type, more scarlet than crimson, on a well-developed stem.

#### *Otidea*.

Ascophore shortly stipitate or sessile, medium to large size, fleshy or somewhat leathery, externally scurfy, villose or almost glabrous, elongated and cut down on one side, nearly or quite to the base making the ascophore oblique, often irregularly contorted; asci cylindrical, apex rounded or somewhat truncate, 8-spored, spores obliquely uniseriate, hyaline, continuous, smooth or rough, elliptic.

*O. tasmanica*, n.s. Sessile, concave, then plane but when mature strongly recurved, about 1 cm. diameter, attachment marginal or nearly so, delicately fleshy, dull lilac colour, externally glabrous, spores oblong, obtuse, smooth,  $12-16 \times 5 \mu$ .

*O. lobata*, n.s. Ascophore lobed and much contorted lemon-yellow, often many arising from a common stroma, attachment eccentric, 3-15 mm. diameter, externally glabrous; spores elliptic, smooth, hyaline,  $16 \times 5 \mu$ .

Much like *Ombrophila aurantiaca*, but not cartilaginous, also *Phaeopezia ochracea*, but the spores not coloured.

#### *Aleurina*.

Cupulate fleshy, sessile or shortly stalked medium size; externally lightly furfuraceous or glabrous; asci cylindrical

8-spored; spores uniseriate, continuous, smooth or verrucose, coloured, pale sooty-brown.

Differing from smaller forms of *Peziza* only in the spores being coloured.

*A. apiculata*, Sacc. Ascophore sessile or shortly stalked concave to convex, rather tough, disc very dark brown, margin entire, externally nearly white; spores elliptic smooth, acute at both ends brown to black,  $20-25 \times 7-11 \mu$ .

*A. ochracea*, Mass et Rod. Sessile or shortly stalked solitary or densely crowded often many cups arising from a common stroma, concavo-convex, dull orange, 6-12 mm. diameter; margin undulate, externally white, spores elliptic, acute at both ends smooth, light brown  $15-18 \times 6-7 \mu$ .

Very like *Ombrophila aurantiaca* and *Otidea lobata* but differing by the coloured spores.

*A. stipitata*, n.s. Ascophore cup-shaped on a stem longer than the diameter of the disc, the whole plant chestnut brown, 4-8 mm. diameter usually caespitose; externally smooth and shining stem relatively stout 8-10 mm.; spores smooth oblong at first hyaline, becoming dark grey to nearly black  $12-16 \times 4 \mu$ .

May be referred to *Podaleuris*.

*A. tasmanica*, Mass. Sessile, cup-shaped, almost leathery, 1-2 cm. diameter, disc when young dark greenish brown, externally chestnut brown, verrucose, coarsely so on the margin, exciple parenchymatous, cell-walls brown; spores elliptic, dark brown, covered with coarse protuberances,  $28 \times 16 \mu$ , paraphyses filiform, stiff, dark, with clavate or globose apex.

#### *Rhizina*.

Ascophore sessile, fleshy, expanded from the first, bound down by strands of copious mycelium leaving the margin alone free; asci cylindrical, 8-spored, spores continuous or uniseriate, hyaline or brown smooth, elliptic or fusiform uniseriate.

*R. lignicola*, n.s. Ascophore black, expanded, plane but twisted and revolute, smooth, bound down by coarse strands, 2-4 cm. diameter; spores smooth, hyaline, or very faintly tinted, uniseriate,  $9 \times 3 \mu$ .

*Urnulla campylospora* = *U. rhytidea*, Berk. Ascophore large cup-shaped, black, stipitate, often several arising from a common stroma; fleshy, neither corky nor cartilaginous; asci very long, cylindrical, 8-spored; spores smooth, dark, oblong, curved,  $22-30 \times 8-10 \mu$ .

*f. tenella*. Smaller and the ascophore very thin and fragile.

Generally referred to *Dermatzæ*, but though the common stroma and erumpent habit agree, yet the large size and fleshy substance do not.

*Hydnocystis cyclospora*, Mass. et Rod. 2-3 mm. diameter, white, fragile or fleshy, convoluted, hollow, the hymenium lining the inner surface, half-subterranean and emerging on maturity; asci cylindrical; spores nearly spherical, 10 x 8, smooth, hyaline.

*Hydnocystis echinospora*, n.s. White, fragile, fleshy, 1 cm., convoluted, hollow, the hymenium lining the inner surface orifice near the base, emerging from the soil at maturity; asci cylindrical, 8-spored; spores uniseptate, spores oblong, obtuse, 18 x 12  $\mu$ ., echinulate, hyaline.

Originally described in error as *Sphærosoma tasmanica*. *Hydnocystis* connects the *Pezizas* with the *Tuberaceæ*.

#### Family HELVELLEÆ.

Ascophore clavate, capitate, pulvinate or otherwise disposed, but the ascigerous layer on the upper or external surface free from the first and not formed in a cup as in other members of the Order.

*Helvella*. Stem thick, ascophore folded.

*Morchella*. Stem thick, ascophore in pits and ridges.

*Cyttaria*. No stem, ascigerous layer in pits.

*Leotia*. Stem and ascophore mucilaginous.

*Vibrissia*. Ascophore a small simple head on a stem.

*Geoglossum*. Erect club. Spores filiform.

*Mitrella*. Erect club. Spores elliptic.

*Spragueola*. A minute sessile cushion.

#### *Helvella*.

Ascophore a thick fleshy convoluted body, generally 3-6 cm. diameter, on a thick fleshy stem 4-8 cm. long; hymenium spread over the upper surface; asci cylindrical, 8-spored; spores hyaline, smooth, elliptic.

*H. monachella*, Fries. Ascophore purple black, stem hollow pale; spores 16-17 x 10  $\mu$ .

Edible.

#### *Morchella*.

Ascophore thick fleshy, the surface formed by ridges and pits over which the ascigerous layer is distributed.

Edible.

*M. tasmanica*, J. Ramsbottom. Ascophore pyramidal with a constricted base, surface raised into longitudinal ridges with small connecting lines between, blackish brown, 5-10 cm. tall, stem pale hollow, shorter than the head, spores 20 x 10  $\mu$ .

*M. conica*, Pers. Ascophore conical, acute, from a broad base, stem sometimes much exceeding the head.

#### *Cyttaria*.

Globose from a slender attaching point, about 2-3 cm., almost cartilaginous, apricot yellow, the upper half bearing numerous depressions in which the ascigerous layer forms, at first the pits are covered by a membrane, the lower portion of the body is sterile, spores ellipsoid, continuous.

Parasitic on *Notofagus cunninghami*.

*C. gunnii*, Hook. The character of the genus.

#### *Leotia*.

Ascophore stipitate, substance fleshy-gelatinous, convoluted into a round head, ascigerous layer covering the upper surface, stem relatively long; asci clavate, 8-spored; spores hyaline, continuous, or uniseptate, narrow, elliptical.

*L. lubrica*, Pers. Usually gregarious, mucilaginous, all over greenish yellow; head 1-2 cm. diameter, stem 2-8 cm. long; spores 22-25 x 5-6  $\mu$ .

#### *Vibrissia*.

Ascophore sessile or stipitate, head hemispheric, smooth, the ascigerous layer reflected over the outer surface, substance soft; asci clavate, narrowed below into a slender pedicel, 8-spored; spores filiform, hyaline, as long as the asci, in a fascicle, remaining fixed to the head and vibrating for some time after maturity.

*V. tasmanica*, n.s. Solitary or two or more arising from a common base, on dead twigs in the water or on wet ground; stem slender, glabrous, pale dull green, up to 1 cm. long; head hemispheric, 3-4 mm. diameter, umbilicate beneath for the insertion of the stem, pale dull green glabrous, asci narrow, cylindrical, 180 x 3  $\mu$ ., spores filiform 80-120 x 1  $\mu$ ., about 10 septate.

*Geoglossum.*

Ascophore clavate, fleshy, the ascigerous layer reflected over the upper thickened portion of the club, erect, entire; asci clavate, 8-spored; spores linear arranged in a fascicle, brown, septate, stem short or elongated, surface black, internally white.

*G. glabrum*, Pers. *G. nigratum*, Fries. Black sometimes tinged with olive or purple, dry; fertile portion not sharply distinct, glabrous, cylindrical or slightly flattened, 3-7 cm. long; stem glabrous; spores linear, 75-85 x 8-9  $\mu$ ., brown, 7 septate, slightly constricted; paraphyses clavate above, many septate, the upper segments often moniliform.

*G. australe*, Berk. Black, 6-10 cm., fertile portion usually flat, short, glabrous; sometimes longer, stem long slender and with a squamulose surface; spores 80-120  $\mu$ . x 4-6  $\mu$ ., 7 septate.

*G. hirsutum*, Pers. Black, dry, everywhere densely velvety, the bristles much exceeding the asci; fertile portion generally about 1 cm. from lanceolate, flattened to globose or otherwise irregular; stem usually long and slender; spores 120-160, light brown, 7-15 septate, paraphyses slender, septate with slightly thickened curved ends.

*G. walteri*, Berk. Differing from *G. hirsutum* by the shorter spores, 80-110, with 7 septa, and few bristles, which hardly exceed the asci.

*G. farlowi*, Cooke. Also similar to *G. hirsutum*, but the bristles still more reduced and the spores 60-75  $\mu$ . long and constantly 3 septate.

*Mitrlula.*

Ascophore erect, clavate to globose on a long stalk, fleshy, variously coloured, often black, asci narrow, 8-spored; spores narrowly elliptic, uni-biserial, hyaline, septate rarely continuous. Differing from *Geoglossum* only in the spores.

*M. serpentina*, Mass. *Geoglossum viride*, Pers. Usually caespitose, yellowish-green to olive-green, turning black when dry, mostly 4 cm. long; ascigerous portion expanded, clavate rather flat, glabrous often slimy, hollow stem slender, granulose; spores hyaline, smooth, narrow, elliptic, ends rather acute, when old 3 septate, 13-18 x 5  $\mu$ .; paraphyses slender, septate, straight, apex clavate and tinged with green.

*Forma carnea* = *M. carnea*, Sch. Differs only in the colour, which is pale fleshy.

*M. rufa*, Sacc. Caespitose, free or many from a common base, clavate, 4-5 cm., the whole plant glabrous or the stem slightly squamulose; dark smoky ochre, fertile portion distinct, flattened with obtuse edges; asci clavate, 8-spored, spores irregularly biserial; spores fusiform, smooth, hyaline, curved, continuous when young becoming 2-5 septate; 28-32 x 5  $\mu$ .; paraphyses filiform branched, ends curved often in a complete circle.

*M. berterii*, Mont. *M. vinosa*, Berk. Blackish-brown with a tinge of purple, glabrous, fertile portion thin cylindrical, about 1 cm.; stem similar or rather longer, only about 2 mm. thick; spores hyaline, continuous, smooth, 7-10 x 1.5-2  $\mu$ .; paraphyses slender, tips slightly clavate, tinged with red or brown.

*M. cucullata*, Fries. Gregarious, slender, seldom exceeding 1 cm., orange yellow to brown, sporiferous portion hollow, glabrous, ovate to nearly globose, generally compressed, 2-4 x 2 mm., stem slender, often crooked; spores hyaline, smooth, continuous, nearly fusiform, 12-18 x 3  $\mu$ .; paraphyses slender, tips clavate.

*Spragueola.*

Ascophore sessile, hemispheric, irregularly undulate surface, solid, hymenium covering the entirely exposed surface, attached to the substratum by radiating mycelium, substance almost mucilaginous; asci cylindrical, 8-spored; spores uniseriate, continuous; in the type hyaline, smooth, elliptic, but in the Tasmanian species they are globose, echinulate; paraphyses slender, septate.

This definition is adapted from that of the genus by Geo. Masee in the *Annals of Botany*, vol. II., page 295. This course was preferred to that of establishing a new genus for its inclusion. It appears that Masee first used the name for a distorted *Mitrlula*, *M. americana*, and subsequently transferred it. This may not have been strictly in accordance with rules, but has proved convenient.

*S. mucida*, Rod. Ascophore sessile, sub-globose, vaguely undulate, about 5 mm. diameter, on half-buried wood in damp places, white; spores globose, coarsely echinulate, 18  $\mu$ . diameter; paraphyses exceeding the asci filiform, attenuate at the apex immersed in dense jelly; at maturity the jelly increases and spreads to 1-2 cm. carrying paraphyses, asci, and spores with it.



## Family GYMNOASCACEÆ.

No defined ascophore, the asci erect and packed in a single layer on the surface of the host or non-living material.

*Ascomyces*. Parasitic.

*Ascomyces trochocarpæ*, n.s. Enlarging and distorting the pistil of *Trochocarpa disticha*.

*Ascomyces deformans*. Covering the under surface of the leaf forming a light brown layer and causing much distortion (Peach curl).

*Ascomyces aureus*. Causing golden yellow blisters on leaves of Black Poplar.

*Ascocorticium*. No ascophore. Asci closely packed on a plane or irregular erect growth. Saprophytic.

*Ascocorticium effusum*, Rod. Bright scarlet, waxy, creeping over earth or wood, plane or with a nodular or irregular papillose surface; asci cylindric, 8 uniseriate spores; spores ellipsoid, smooth, hyaline, obtuse, 12-16 x 5-8  $\mu$ .; paraphyses filiform.

On ground; burnt wood; also on a plastered wall.